

Towards A Disruptive Learning Model in Information Systems Education:

A Reflective Student-Dominant Logic Perspective

by
Malcolm Garbutt

Supervisors:

Professor Lisa F. Seymour

Professor Johannes C. Cronjé

Thesis Presented for the Degree of

DOCTOR OF PHILOSOPHY

In the Department of Information Systems

Faculty of Commerce

UNIVERSITY OF CAPE TOWN



AUGUST 2021

The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

Dedications

UNDERTAKING TASKS

To my wife – Lindy Garbutt

Mrs. “Dr.”, it is never too late to take up golf.

You always knew that one day a PhD would be a reality.

APPLYING EFFORT

Douglas Adams

42 years later.

INCREASING UNDERSTANDING

Robert M. Pirsig

Chautauqua introduced me to philosophy,

Phaedrus introduced me to quality,

and the narrative relationships introduced me to the potential for resolving dualities.

PURSUING QUALITY

Stephen King

On the shelves of every student, every novice author,

and every aspiring writer

should be a well-thumbed copy of your book on writing.

Foreword - Thanks

To my wife, Lindy, you suffered through the tough times. I hope you have appreciated the good times.

Thanks to the unsung heroes, the people I have been privileged to help and who in turn have helped me – often inadvertently – and to the special people. To x, y, z not a, b, c. You are not ranked, each helped in different ways.

To my supervisors, Professors Lisa Seymour and Johannes Cronjé, I know it was a frustrating journey.

To Professor Johannes Cronje's TERPS "puppy class" – thank-you, all. Thank you Dr Franci Cronjé for opening your home to us for all those many evenings. Covid-19 cut that short too soon. The group was pivotal to my progress. It may have resulted in me taking longer to finish but that was balanced by being engaged with learning. We need a lot more engagement in doctoral studies.

To Professor Hari Harisandrath, help works both ways. Thank you for the many opportunities to review papers and articles for you. ICIS was a privilege as was EJISDC. Thanks for providing the privilege to step into your editorship shoes.

To Adrie Stander, I miss the weekly coffee-therapy sessions. Eat more cheese and avoid those coffee-shops.

To Dr Pat Harpur, what a difference a year (now two) makes. You have grown in leaps and bounds since your doctorate.

To (soon to be Dr) Pitso Tsibolane, the chats and the pivotal coffee shop chat in Somerset West. "What did that woman say at SACLA?"

To Professor Mike Kyobe, you were always there.

To Professor JP van Belle, the pressure helped, but my procrastination was stronger.

To Professor Ulrike Rivett, thanks for offering a supporting shoulder. It was good to know that you were there. 15 minutes at a time, every day.

To Professor Judy van Biljon, I wish our paths crossed more often.

To Professor Andy Bytheway, I regularly think of that cramped meeting room in Santiago where you explained research in terms of entity-relationship diagrams.

To Professor Wallace Chigona, I can never read Bourdieu without thinking of you.

To Professor KJ Johnstone, you provided me with growth opportunities. The Finnish model holds potential. I wish I had paid attention to your advice before I started the ride.

To Professor Annette Mills, I learnt more about PLS-SEM in two hours with you than I did in two years on my own.

To Professor Robert Davison, the many chats have been insightful.

To Professor Geoff Walsham, a private one-to-one with you around an open fire under an African sky was a memory that I shall long cherish.

To Professor Ojelanki Ngwenyama, you opened my eyes to a new world.

Finally, to everyone who has helped but I have forgotten to mention, forgive me and thank you.

Declaration

This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except where specifically indicated. It has not been previously submitted, in part or whole, to any university or institution for any degree, diploma, or other qualification.

Signature:

Signed by candidate

Date: 25 August 2021

Student Name: Malcolm Garbutt

Student Number: GRMAL002

Abstract

This thesis describes the research carried out to identify mechanisms as potential causes of action that can lead to improved learning outcomes. Identifying mechanisms requires an exploratory approach because mechanisms are not always directly perceivable. The potential mechanisms in this study were identified by analysing the reflections of students who participated in experiential learning projects during business process management education. The research was necessary due to a persistent need to minimise the gap between learning and practice. The research is unique because it takes a student-dominant approach to review students' reflective practices using a novel pragmatic-critical realist paradigm.

Although reflection is central to experiential learning, there is limited understanding of how students reflect and what they consider to influence their learning outcomes. This limitation was explored using action research with mixed methods analysis which combined thematic analysis and partial least squares based structural equation modelling.

During four action research cycles, student reflections on business process projects as part of higher education enterprise systems and business process management courses in a South African higher education institution were observed and analysed. Each action research cycle changed one aspect of the students' projects. The first intervention required students to reflect on action, the second required students to reflect in action, and the third required reflection for action. In the fourth cycle, the teaching staff changed.

The findings showed that reflection is complex and must be linked to action to improve learning. Reflections were observed to positively influence learning outcomes when students apply effort to assigned tasks. On the basis of the observations, two models were proposed. The first model is a learning influence model embedded in the second disruptive learning model. The models show that reflective practices can improve learning outcomes by recognising that students learn at different levels but are predominantly absolutist. Students need to be inspired to apply effort in completing tasks and overcoming satisficing.

Keywords

Reflection, Learning Influencers, Experiential Learning, Applied Effort, Business Process Management, Education

Publications

1. Garbutt, M., & Seymour, L. F. (2015). Enterprise Systems Competencies-Supplying the Skills–The Novice Practitioner Perspective. In *9th IDIA Conference, Zanzibar*.
2. Garbutt, M., & Schuler, J. (2016). Towards an understanding of the integrative relationship between Business Process Management and Enterprise Resource Planning Systems. In *International Conference on Information Resources Management (CONF-IRM)*. Association for Information Systems AIS Electronic Library (AISeL).
3. Garbutt, M. (2016). Disciplinary kingdoms and the pursuit of pragmatism in research: a student perspective. *The Electronic Journal of Information Systems in Developing Countries*, 77(1), pp. 1-10.
4. Garbutt, M., & Seymour, L. F. (2017). Goal-Setting: Learnings from a Business Process Management Class Assignment. In *CONF-IRM 2017*.
5. Garbutt, M., & Seymour, L. F. (2017). Business Process Management for Development (BPM4D): Developing Capabilities Through Self-Assessment. In *ACIST 2017*.
6. Garbutt, M., & Seymour, L. F. (2018). An Exploration of Levels of Learning and Levels of Reflection in a South African Higher Education Experiential Learning Assignment. *Southern African Computer Lecturers' Association*. In *SACLA 2018*.
7. Garbutt, M., & Seymour, L. F. (2019). The BPM Skills Learning Gap-a Comparison of Industry Requirements and Skills Acquisition. In *CONF-IRM 2019*.

Table of Contents

Dedications.....	2
Foreword - Thanks.....	3
Declaration.....	5
Abstract.....	6
Keywords.....	6
Publications.....	7
Table of Contents.....	8
List of Figures.....	12
List of Tables.....	13
1 Introduction.....	15
1.1 Research Problem.....	16
1.2 Research Paradigm.....	16
1.3 Aim of the Study.....	16
1.4 Research Questions and Research Objectives.....	16
1.5 Rationale.....	17
1.6 Previous Research.....	17
1.7 Research Design and Methodology.....	21
1.7.1 Research Instruments.....	21
1.7.2 Research Process.....	22
1.7.3 Analysis and Interpretation of Data.....	22
1.8 Researcher's Involvement.....	23
1.9 Limitations of the Study.....	25
1.10 Value of the Study - Contribution.....	26
1.11 Outline of the Study.....	26
2 Previous Research.....	30
2.1 Literature Review Method.....	30
2.2 Knowledge and Learning Spaces.....	34
2.3 Experiential Learning in Business Process Management Courses.....	38
2.3.1 Business Process Management.....	38
2.3.2 Business Process Management Skills Development.....	40
2.3.3 Business Process Management Training.....	41
2.3.4 Business Process Management Education.....	41
2.3.5 Experiential Learning for Business Process Management Education.....	43

2.3.6	Experiential Learning: Theoretical Underpinnings.....	45
2.3.7	Learning Theories - Situating Experiential Learning.....	48
2.3.8	Kolb’s Experiential Learning Theory.....	51
2.3.9	Summary of Experiential Learning in Business Process Management Courses	58
2.4	Student Reflections for Improved Learning Outcomes.....	59
2.5	Learning Influence Generative Mechanisms.....	61
2.5.1	Levels of Skill Development	61
2.5.2	Four Stages of Competence.....	63
2.5.3	Four Levels of Learning.....	64
2.5.4	Informative and Transformative Learning	65
2.5.5	Depth of Knowledge Assessment Mechanism for Experiential Learning.....	66
2.5.6	Summary of Potential Generative Learning Mechanisms.....	68
2.6	Reflective Practices	68
2.6.1	Reflexivity	69
2.6.2	Reflective Practice	74
2.6.3	Four Levels of Reflection	74
2.6.4	Four stages of Learning from Experience Through Reflection	75
2.6.5	Action as Theoretical Underpinning of Experiential Learning and Reflexive Practice	79
2.6.6	Reflective Practice Summary	80
2.7	Reflection on the Knowledge Gap.....	81
2.8	Theoretical Lens Model.....	83
2.9	Research Problem, Aim and Questions.....	85
2.10	Summary	86
3	Philosophy and Research Context	88
3.1	Pragmatist-Critical Realism	88
3.2	Foundation of Pragmatism.....	89
3.2.1	Pragmatist Categories.....	91
3.2.2	Pragmatism and Education.....	95
3.2.3	Application of Pragmatism in Research	96
3.2.4	The Problem of Pragmatism	96
3.2.5	Critical Realism	97
3.2.6	Pragmatist-Critical Realism	100
3.3	Research Setting	101
3.3.1	Information Systems Courses Setting	102

3.3.2	Business Process Management Experiential Learning Project.....	103
3.4	Ethics.....	104
3.5	Summary.....	104
4	Research Design and Methodology.....	105
4.1	Action Research.....	105
4.2	The Role of Theory.....	108
4.2.1	Action Research Cycles.....	110
4.3	Reflexive Thematic Analysis.....	114
4.4	Partial Least Squares Based Structural Equation Modelling.....	117
4.4.1	Formative Measurement Model Assessment.....	118
4.4.2	Structural Model Assessment.....	121
4.4.3	Mediator and Moderator Analysis.....	123
4.4.4	Application of Partial Least Squares Structural Equation Modeling.....	124
4.5	Summary.....	124
5	Findings: Identifying the Generative Mechanisms (Learning Influencers).....	125
5.1	ARC1 - Reflection-On-Action.....	126
5.2	ARC2 - Reflection-in-Action.....	147
5.3	ARC3 – Reflection-for-Action.....	157
5.4	ARC4 – All Reflection forms – How Students Reflect with Different Staff.....	165
5.5	Action Cycle Exit.....	172
5.6	Consolidation of the Action Research Cycles.....	172
5.7	Qualitative Findings Summary.....	174
5.8	Quantitative Findings.....	177
5.8.1	Partial Least Squares Based Structural Equation Model Definition.....	178
5.8.2	Model Assessment.....	179
5.8.3	Formative Measurement Model Assessment (Outer Model).....	180
5.8.4	Structural Model Assessment.....	181
5.8.5	Mediator Analysis.....	185
5.9	Summary of Quantitative Findings.....	186
5.10	Summary.....	187
6	Findings: Application and Assessment of Generative Mechanisms (Drivers of Effort).....	189
6.1	Depth of Knowledge and Learning Mechanisms.....	190
6.2	Analysis Method.....	190
6.3	Drivers of Effort.....	191

6.4	Retrospective-Prosppective	200
6.5	Learning Influence Disruptors	201
6.6	Summary	207
7	Discussion.....	209
7.1	Influencers of Learning Generative Mechanisms.....	210
7.2	Using Learning Influencer Mechanisms for Improved Learning.....	216
7.3	Reflection and the Implications of Reflection	221
7.4	Implications for education	224
7.5	Implications of the Learning Influencers.....	226
7.5.1	Applying Effort as a Learning Influencer	227
7.5.2	Disrupted Learning	233
7.5.3	Disrupted Learning Process	236
7.6	Recommendations for Practice.....	238
7.7	Summary.....	241
8	Conclusion.....	243
8.1	Overview of the Study.....	244
8.2	Reflections on the Study	247
8.3	Contribution of the Study	249
8.4	Recommendations for Practice.....	250
8.5	Limitations of the Research	252
8.6	Further Research.....	254
8.7	Final Thoughts.....	254
	References.....	256
	Appendix A - Ethics approval	288
	Appendix B – Data Collected In the Four Action Research Cycles	289
	Appendix C - Guidelines and Rubrics	290
	Appendix D - Examples of Reflective Journals	295
	Appendix E - Partial Least Squares Structural Equation Modelling Data	302
	Appendix F - Drivers of Effort Data Samples.....	304
	Appendix G – Work Assignment (Project) Guidelines.....	312

List of Figures

Figure 2.1. A hermeneutic framework for the literature review (Boell & Cecez-Kecmanovic, 2014). ...	32
Figure 2.2. Spiral evolution of knowledge conversion and self-transcending process (Nonaka & Konno, 1998).	37
Figure 2.3. Three categories of learning (Holmgren, 2014).....	42
Figure 2.4. Experiential learning and learning styles (Kolb, 2015).	53
Figure 2.5. Customer dominant logic model (Heinonen, Strandvik, Mickelsson, Edvardsson, Sundström & Andersson, 2010).....	60
Figure 2.6. Four stages of competency.	63
Figure 2.7. Four dimensions of reflexivity (Hibbert et al., 2010).	72
Figure 2.8. Reflex interaction, reflective analysis and critically reflexive questioning (Cunliffe, 2004). 73	
Figure 2.9. Learning model based on Cronjé (2011).....	77
Figure 4.1. Enhanced cyclical pragmatist-critical realism action research model. (Adapted from Davison et al. (2012)).	108
Figure 5.1. Mapping the Gartner skillset to examined grades.....	128
Figure 5.2. ARC1 thematic map showing themes, categories, and codes.	133
Figure 5.3. ARC2 thematic map showing themes, categories, and codes. The double asterisks (**) indicate new codes.....	153
Figure 5.4. ARC3 thematic map showing themes, categories and codes. The double asterisks (**) indicate new codes.....	162
Figure 5.5. ARC4 thematic map showing themes, categories and codes.	170
Figure 5.6. Full thematic map with themes, categories, and codes network diagram for all cycles....	176
Figure 5.7. Exploratory conceptual model for the influence of reflective learning influencers on learning outcomes.....	179
Figure 5.8. Experiential learning structural equation model showing outer weights and inner paths (p- values in brackets).....	180
Figure 6.1. Themes and categories for the drivers of effort.....	192
Figure 7.1. Learning influencer onion.....	210
Figure 7.2. Links between the proposed learning influencer generative mechanisms, drivers of effort, project disruptors, and assessment methods for improved learning outcomes.....	221
Figure 7.3. Learning influencer model.....	228

List of Tables

Table 1.1. Research questions and objectives.	17
Table 2.2. Structure of the literature review.	34
Table 2.3. The 4MAT model derived from Scott (1994).	55
Table 2.4. Comparison of 4MAT and Gagne-Briggs models of instruction (Nicoll-Senft & Seider, 2009).	55
Table 2.5. Comparison of Webb's (1997, 2002) depth of knowledge model to the dimensions of knowledge of Anderson and Krathwohl (2001).	68
Table 2.6. Learning model superimposed on levels of reflection and stages of reflection models.	78
Table 2.7. Theoretical lens model.	83
Table 4.1. The research process.	110
Table 5.1. Initial codes for ARC1.	131
Table 5.2. Themes, categories, and codes for cycle ARC1 (presented in the sequence of the final code count total over the cycles).	132
Table 5.3. Learning influencers linked to levels of learning identified by Helsing et al. (2004).	134
Table 5.4. Initial codes for ARC2.	151
Table 5.5. Themes, categories, and codes for cycle ARC2 indicating the changes between ARC1 and ARC2 with the new codes (*).	151
Table 5.6. Initial codes from the thematic analysis of ARC3.	160
Table 5.7. Themes, categories, and codes for cycle ARC3 Indicating the changes between cycles with new codes (*).	161
Table 5.8. Initial codes identified for student reflections in ARC4.	168
Table 5.9. Themes, categories, and codes for cycle ARC4, indicating the changes between cycles with the new codes (*).	168
Table 5.10. Overview of the four action research cycles.	173
Table 5.11. Overview of learning influencer observations for all action research cycles.	174
Table 5.12. Themes, categories, and codes for all cycles indicating the changes between cycles.	174
Table 5.13. Reflective learning influencer model hypotheses.	179
Table 5.14. Outer model measurements.	180
Table 5.15. Structural model total effects assessment.	182
Table 5.16. R ² Assessment with and without the reflection construct.	183
Table 5.17. Q ² Assessment with and without the reflection construct.	184
Table 5.18. Reflective learning influencer hypotheses findings.	187
Table 5.19. Learning influencers comparison across cycles.	188

Table 6.1. Drivers of effort relative to the learning influencers.	191
Table 7.1. Mapping the learning influencers model to the 4MAT model.	232
Table 7.2. Disrupted learning model construct recognition and ramifications.	237

1 Introduction

This thesis describes research undertaken to identify potential generative mechanisms that may lead to improved learning outcomes. Mechanisms are theorised to generate causal actions that produce observable effects (Heeks et al., 2019). As human knowledge is limited to what our senses can perceive, there is a potential for generative mechanisms to exist that are not directly perceivable (Bhaskar, 2008). Generative mechanisms, thus, hold the potential to explain observable events but require an exploratory approach to be identified (Blom & Morén, 2011). The potential mechanisms in this study were identified by analysing the reflections of students who participated in experiential learning projects as part of business process management education.

The research is necessary due to the persistent inadequacy of business process management education (Seymour & Sonteya, 2012; Thennakoon et al., 2018) and the concern about minimising the gap between learning and practice (Thennakoon et al., 2018). The study is unique because it adds the student perspective dimension to the work mentioned above. Furthermore, it evaluates experiential learning from the perspectives of Kolb (2015) and Dewey (1938) with links to the practice view of Schatzki (2016). The study used a student-dominant approach (Bélanger & Van Slyke, 2012) to review students' reflective practices using a novel pragmatic-critical realist paradigm (Heeks et al., 2019). This allowed for a less educator-biased approach to explore generative mechanisms that may lead to improved learning outcomes. The research findings resonate with Gibbs (Potter, 2015), Helsing et al. (2004) and Anderson and Krathwohl (2001) to view business process management education from a broad education perspective. At the same time, links are made to studies of reflective practitioners (Daudelin, 1996; Mezirow, 1990; Moon, 2000; Schön, 1983; Walsh, 2009). The stages of reflection recommended by Kember et al. (2008) are linked to stages of education with assessment at each stage Webb (1997).

The remainder of this chapter provides an overview of the research, beginning with the research problem in the next section, followed by sections on the research paradigm, the aim of the study, and the research questions linked to the research objectives. This is followed by the rationale for the research and an overview of previous research before providing the research design and methodology. The final sections include a review of the researcher's

involvement in the study, the limitations, and the contribution of the study before providing a brief description of each chapter.

1.1 Research Problem

Reflection is a central tenet of experiential learning (Kolb, 2015; Miettinen, 2000, Perusso et al., 2020). Nevertheless, there is limited understanding of what students reflect on that may influence their learning outcomes. Experiential learning applied to business process management courses is no exception. Consequently, there is a limited understanding of what mechanisms improve learning outcomes and how they can be applied in business process management courses.

1.2 Research Paradigm

The philosophy underpinning this study was pragmatist-critical realism (Heeks et al., 2019), which combines the practice of pragmatism with the ontology and epistemology of critical realism. The combination of the two philosophies allowed for multiple perspectives while integrating the researcher's view into the work. The pragmatist-critical realism stance supports a holistic philosophical stance for information systems education as required by the first tenet of education frameworks suggested by Foley (2000), namely formal education. The primary research method was an action research approach compatible with pragmatism and critical realism, as both are concerned with practice-oriented change (Heeks & Wall 2018, Heeks, Ospina & Wall, 2019).

1.3 Aim of the Study

The study aimed to explore student reflections to identify mechanisms that could improve learning outcomes in information systems courses. The identified potential generative mechanisms may help educators formulate, teach, and assess learning outcomes that transcend primary retention and improve learning transfer in new situations (Anderson & Krathwohl, 2001).

1.4 Research Questions and Research Objectives

The overarching research question that guided the research process was:

- What do students undertaking a business process management experiential project reflect on that may improve learning outcomes?

Five research sub-questions were posed to investigate the main research question. The sub-questions are listed in Table 1.1, together with the objective relevant to each question.

Table 1.1. Research questions and objectives.

	Question	Objectives
RQ1	What generative mechanisms influence learning outcomes in business process management experiential learning projects?	Identify a set of learning influencer generative mechanisms. (Learning Influencers)
RQ2	How can the identified learning influencers improve learning outcomes?	Identify how learning influencer mechanisms can improve learning outcomes.
RQ3	What effect do the learning influencers have on learning outcomes?	Explore the potential of learning influencers to improve learning outcomes.
RQ4	How are the learning influencer generative mechanisms activated?	Identify how the learning influencer generative mechanisms provoke improved learning outcomes.
RQ5	How can the identified learning influencers be assessed?	Identify how the learning influencer generative mechanisms can be assessed.

1.5 Rationale

This study was initiated by students who did “not got it” after an experiential learning project. The principles of a student-dominant logic approach were followed to obtain student-driven insight into learning patterns. Students' reflections on business process management experiential learning projects were analysed to identify generative mechanisms to improve learning outcomes in information systems courses. The generative mechanisms may help educators formulate, teach, and assess teaching practices and lead to improved learning outcomes that transcend rudimentary retention and transfer experiences to new situations.

1.6 Previous Research

Trkman (2010) describes business process management as a complex field with operational challenges originating in organisational, managerial, technological, and social domains. More recently, Klun and Trkman (2018) questioned the future of business process management, claiming that it is at a reductionist crossroads. Reductionist combinations of processes and technology produce technical barriers, with assimilation and integration limitations. Such

obstacles, according to Robey et al. (2002), can be resolved through education. However, a review by Thennakoon, Bandara, French and Mathiesen (2018) found that only 25% of publications on business process management had a meaningful focus on training. Thennakoon et al. (2018) concluded that high levels of training might not translate to improved process efficiency nor a high return on investment.

In a South African study of critical success factors for enterprise systems, business process understanding and education substantially impacted enterprise systems operations (Kalema et al., 2014). In addition to being a critical success factor for enterprise systems (Kalema et al., 2014), business process education provides economic benefits for developing countries (Avgerou, 2008). However, there has been a persistent concern for the lack of understanding of the competency outcomes of enterprise systems educational programs at the university level (Ravesteyn et al., 2008). This results in a long-term skill gap between graduates' competencies and the competencies required by industry (Armarego, 2008). Although enterprise systems and business process management education are increasingly integrated into information systems courses (Klun & Trkman, 2018), this is not always true for other business disciplines (Grandzol & Ochs, 2010).

Experience is closely associated with education as all human activity has a learning dimension (Foley, 2000). Foley (2000) distinguished four forms of learning: formal education, non-formal education; informal learning; and incidental learning. Formal education is the traditional education system through formalised teaching and training, such as higher education institutions. Non-formal education is sporadic systematic instruction, such as on-the-job training. Informal learning occurs when individuals or groups reflect on experiences not related to formal instruction, such as an in situ business process review. Incidental learning is incidental to activities that a person undertakes in daily life and is often tacit. However, such definitions remain unclear, and the boundaries are blurred. For example, reflection and incidental learning can occur during any of the four forms of learning. Furthermore, the formal theory of rules may be of lesser importance than how to act in a situation. Undeniably, formal education disseminates information and skills from past experiences to the next generation (English, 2013). Consequently, reflection on actions may lead to the generation of informal hypotheses, which should be tested against formal theories. In this way, formal theory can be challenged and simultaneously improve everyday experiences (Foley, 1999).

Carr (2003) argues that education is multidimensional, alternating between a liberal view of the pursuit of meaningful knowledge and truth and a postmodern or non-realist epistemology incorporating personal and non-instrumentally valuable knowledge. However, the latter may not be of specific or vocational use to the learner (Carr, 2003). Thus, formal instructional education is differentiated from vocational education gained through experiential activities. However, learning occurs both in formal and informal education. Experiential learning is preferable for students who encounter difficulties in formalised instructional learning (Carr, 2003). For similar reasons, Foley (2000) argues for the need for educational frameworks that are holistic, coherent, and strategic. Frameworks must be developed from the analysis of practice and formal theory. Consequently, educational frameworks should be practical or pragmatic and based on potential theoretical mechanisms. While pragmatism has established links to education (Dewey, 1938), possible generative mechanisms are a foundational aspect of critical realism (Bhaskar, 2008), which has been associated with education (Corson, 1991) and educational practice (Mirzaei Rafe et al., 2021).

Combining education and experience in experiential learning projects is commonplace in business education (Chavan, 2011), including information systems courses (Ruhi, 2016). For experiential learning, authors such as Bélanger and Van Slyke (2012) recommend a student-centred approach using a *“learn-do-reflect”* learning approach (p. xvii).

Dewey (1938) describes experiential learning as a process by which a learner creates meaning. Experiential learning fosters improved learning outcomes through reflecting on in-situ experiences to combine theory and practice cognitively. Thus, reflection is a core tenet of experiential learning and fundamental to education (Dewey, 1938). Almost a century later, there remains a lack of understanding of how improved learning outcomes are brought about by reflection (Perusso et al., 2020). Reminiscent of the content, process and premise forms of reflection promoted by Mezirow (1990), Perusso et al. (2020) support a guided dialogical reflection approach for building competencies through three levels - reflection-on-action, reflection-in-action, and critical reflection.

Since experiential learning espouses learner-created meaning from experience, clear guidelines are essential to limit unintended learning outcomes (Finney & Finney, 2010; Perusso et al., 2020). One proposal to accomplish this and make universities more attractive

to students and businesses promotes corporate-style customer-oriented higher education (Finney & Finney, 2010). The student-as-customer approach to qualifications as a product of university operations (Finney & Finney, 2010) has led to a debate about its efficacy (Guilbault, 2018). Viewing students as customers can result in students conceiving the value derived from their education as an exchange where they can obtain a qualification in exchange for money rather than the derived from their learning (Dziewanowska, 2017; Guilbault, 2018). Dziewanowska (2017), Guilbault (2018), and Lusch and Wu (2012) all promote a service science approach in higher education using service-dominant logic (Vargo & Akaka, 2009; Vargo & Lusch, 2016). The service-dominant logic approach considers value to be derived from customer satisfaction. This is important as research has shown that improving student satisfaction may increase university engagement (Finney & Finney, 2010). The service-dominant logic approach has been expanded to the formulation of student-dominant logic, which focuses on participants, processes, and resources. It leads to the co-creation of value between the educational institution and the student (Vargo et al., 2008).

Experiential learning that combines education and reflection of experience has been proposed to increase business process capabilities (Rosemann & vom Brocke, 2010). Experience and reflection can be repeated until learning changes habit (Daudelin, 1996). Therefore, experiential learning crosses the boundaries of learning theories. Learning occurs constructively through cognitive reflection on experiences that typically result in behavioural changes in social settings. Experience is based on activities performed with or without explicit cognitive action (Miettinen, 2000). Experience with direct cognitive action, or reflective experience, requires disruption to interrupt non-reflective experiences without cognitive effort. The required disruption ranges from simple attention through thinking (Schatzki, 2016) to transformational learning (Mezirow, 2003). Transformational learning is seen to embody levels of development. Helsing et al. (2004) advocated four levels of learning: absolutist, transitionist, relativist, and contextist. Absolutist and transitionist are primarily positivistic and post-positivistic, respectively. The relativist and contextist levels are interpretivistic (Saunders et al., 2009) and subjectivistic (Dugger, 1983). At each level, forms of reflection can be observed. While reflection on experience may improve learning outcomes, Vygotsky (1978) recommends that, for the best outcome, learning must be relevant to students' lives, meaningful, and taught naturally.

This led to the question of what students reflect on that may lead to improved learning outcomes.

1.7 Research Design and Methodology

As action research is the preferred research method for a pragmatist-critical-realism study (Heeks et al., 2019), a series of action research cycles were undertaken to explore the research problem and answer the research questions. Care had to be taken to avoid the inherent shortcomings of action research where practice takes precedence over theory. Several authors such as Baskerville and Pries-Heje (1999), Dick (2003), and Manuell and Graham (2017) promote alternative methodologies to support theory development in action research studies. However, the methods must align with the study's philosophy (Braun & Clarke, 2006). Unlike theory building under a pragmatist paradigm with its agnostic ontology, action research theory in the paradigm of pragmatist-critical realism must acknowledge the critical realist perspective.

Data collection and analysis methods are characteristically mixed in research in pragmatism and critical realism philosophies (Zachariadis et al., 2013). This study used reflexive thematic analysis (Braun and Clarke 2006, 2019) for qualitative analysis and partial least squares based structural equation modelling (Hair et al., 2017) for the quantitative analysis method. During the four action research cycles, the research method observed, adjusted, and analysed student reflections from business process projects as part of enterprise systems and business process management higher education courses.

1.7.1 Research Instruments

The qualitative research instruments were the reflective learning sections from projects submitted as part of the assessments for the business process management and enterprise systems courses that comprised the settings for the four action research cycles. The reflection sections were predominantly free-form, but guidelines were presented for each course, as shown in Appendix C.

For the quantitative analysis, an exploratory partial least squares structural equation model was theorized based in part on the qualitative findings. Quantified findings from the analysis of the reflections obtained by counting the occurrence of each theme reference in the

reflection documents, together with aggregated student marks derived from the mid-term tests, the experiential learning project, the reflections and the final examination for each course supplied the data for the quantitative analysis.

1.7.2 Research Process

Two units of observation were employed for the study; student reflections and aggregated student marks. The principal data were qualitative and originated from student reflections included in the team project submissions. The reflection sections were extracted from the project submissions and stored in separate documents. The documents were imported into Atlas.ti version 7. As the student reflections were part of the project submissions, the data for each action research cycle were obtained and analysed simultaneously; the revision occurred iteratively throughout the cycles. Thus, findings in later cycles were compared to the earlier cycles and were revised together.

The learning influencers and marks conceptual model was created in SmartPLS version 3.3.3 for the partial least squares structural equation model analysis. Summarised marks per student for the reflection section of the projects, the project marks (excluding the reflection mark), the mid-term test marks, and the final examination marks were provided by the course conveners in Excel spreadsheets. Because the projects were carried out in groups, the project and reflection marks were per group. However, the test and examination marks were for individual team members, aggregated per team for the quantitative analysis. The alternative was to differentiate team marks per individual student as the project marks were apportioned to each team member. This was not done because the unit of analysis for the primary qualitative study was per group.

1.7.3 Analysis and Interpretation of Data

The qualitative data analysis was guided by the reflexive thematic analysis method recommended by Braun and Clark (2019). Each document was read multiple times, starting with the first reading for marking. This provided a high-level view of the reflections from a group perspective and supported the initial familiarisation with the data phase (Braun & Clarke, 2006). Following data familiarisation, initial codes were identified for each case in Atlas.ti. Then, the codes were summarised into categories and potential themes through a continuous iteration between each hermeneutic unit per cycle and between cycles. The final

phase involved refining the themes and confirming the identified data features applied to each theme.

The thematic analysis process identified four generative mechanisms of learning influence, which were termed learning influencers. The learning influencers resonated with the literature on learning, reflection, and assessment. During the generation of the learning influencers, the applying effort influencer was observed to dominate the reflections. A conceptual model was formulated and tested through partial least squares structural equation modelling in SmartPLS to test the validity of this observation and the hypothesis that learning influencers and reflection had a significant effect on learning outcomes.

Two questions were answered through the literature regarding the qualitative data from the qualitative analysis outcome. How are the learning influencer generative mechanisms activated, and secondly, how can the learning influencer outcomes be assessed?

1.8 Researcher's Involvement

This section reflecting on my involvement in the research addresses the requirement of Braun and Clarke (2019) to situate the study and provide insight into contextual factors. My involvement with this topic is multifaceted. I had undertaken the full-year postgraduate business process management and enterprise resource systems course several years before the study. The postgraduate course exposed the students to business process management principles, enterprise systems, and business process integration. The course was the first part of a two-year honours programme, which included a mini-thesis or technical report in the second year. Students were exposed to enterprise systems software and software tools used for business process modelling and business process integration. The course included coaching in business and academic writing, making presentations, doing group work, and reviewing the literature. Real business cases were used for applying skills and knowledge. The principal assignment of the business process course was a work assignment, referred to from now on as the project. The project required students to select and analyse an existing business process in an organisation. The project deliverable was a document following the BPTrends business process methodology (Harmon, 2019), consisting of a scoping diagram, stakeholder analysis, and a business case.

The analysis phase took the form of an As-Is diagram, and for the design phase, a To-Be diagram. After that, an enterprise software system had to be selected, and activity sheets detailing the process steps, organisational data, master data, and reports were produced (Seymour et al., 2012). Process improvements had to be provided and metrics determined to ensure that improvements were achieved after implementation. Finally, reflection on the project and their learning were expected from the students. The guidelines for the project are provided in Appendix G.

When I took the post-graduate course, I observed similarities in the reflections of the students on their projects. After the project, I was interested in what the other students considered essential and required extra attention. An analysis of the project reflections was later published (Garbutt & Seymour, 2015). Referring to my earlier work has raised the question of validity due to self-referencing and the potential for “*belly-gazing*” (audience comments at Conf-IRM 2019). While this was well-meant, it is also a sign of our reliance on a presumption of objectivity. To be genuinely objective, we must remove ourselves from the scene and not hide our involvement. Pirsig (2014, p. 73) explains the separation of our experiences to explain our world in terms of sorting sand from the “*endless landscape of awareness*” around us.

“To understand what he was trying to do, it’s necessary to see that part of the landscape, inseparable from it, which must be understood, is a figure in the middle of it, sorting sand into piles. To see the landscape without seeing this figure is not to see the landscape at all” (Pirsig, 2014, p. 73).

The danger in the sorting process is that the world changes – at least for the participants. Pirsig (2014) used the analogy of a knife used to separate experiences that causes something to be killed in the process. Thus, while objectivity is paramount in research, it is a fallacy not to acknowledge how close the researcher came to the subject matter. Breaking the 'silence' (Charmaz, 2016, p. 133) and recognising the researcher's involvement allows the reader and other researchers to determine the potential subjective influence. Charmaz (2016) promotes the subjective influence of constructivism for “*situated knowledge*”, which must be “*relative to the social circumstances impinging on [the research]*” (p.132).

Throughout the action research cycles of this study, I addressed students and tutors on reflection. In addition, I marked the reflection section of student projects. In 2018, during the final cycle of the study, I lectured students and assessed business process management topics for the course. This provided the opportunity to combine my first-hand experience with the lecturers' expertise in prior cycles. It allowed for a high validity of the findings and an experiential learning experience in situ for me.

Regarding my interest in the overarching educational aspects, I am interested in alternative teaching methods. This was inspired by a high school teacher who wished to take a more hands-on approach to teaching but was restricted by the prevailing education system. This raised two questions about (i) what influences students to learn and (ii) how these influencing factors can be activated. To answer these questions, the potential of students to learn in diverse ways at multiple levels of understanding and interest must be acknowledged. Although considerable literature is available for each of these questions, a definitive solution is lacking. Meanwhile, there is evidence of no significant difference in learning outcomes irrespective of learning style or approach (Russell, 1999). The best answer appears to be "*it depends*". This study is moderated by my belief that situations are contextual and solutions are always tempered by "*it depends*".

1.9 Limitations of the Study

As with all research, several limitations were encountered. First, the setting was a single university in South Africa with the course content fundamentally the same across the four action research cycles. As a result, the findings may differ with different course content. Although the action research cycle reflections were reviewed and analysed multiple times, the reflections were not followed up by interviews to clarify nuances. This was in part due to the analysis being completed after the students had left the university. Richer data may have been garnered through follow-up sessions, although this would require additional time allocation.

The disruptive learning model was derived from this study and the literature to explore mechanisms that could improve learning outcomes for business process management courses and was not empirically tested. However, the disruptive learning model is a situating model to apply effort as an influencer of learning that stemmed from the study.

1.10 Value of the Study - Contribution

The study contributes to the existing knowledge base and presents two learning models together with guidelines for practice. The first model is the learning influencer model, which identifies four learning influencers that can improve learning outcomes. The model incorporates guidelines on how to assess each learning influencer. Guidelines are presented on how to recognise the learning influencer stage and assess each stage. The second, disruptive learning model, describes the disruptive influences that may activate the learning influencer mechanisms.

A methodological contribution was provided through the application of the pragmatist-critical realism approach (Proctor, 1998), following the guidelines of Heeks and Wall (2018) and Heeks et al. (2019). While pragmatism provided a practical positioning and supported the action research method, critical realism provided the ontological and epistemological support for the proposed mechanisms observed in the student reflections.

1.11 Outline of the Study

This study explored the paucity of understanding the impact of reflective practice for improved learning. The thesis comprises eight chapters in which a series of action research interventions and analyses are described that provide insight into the value-creating processes of students experienced in multiple contexts (Grönroos, 2011), which can lead to better learning outcomes.

Chapter 1 Introduction

Chapter 1 provides an overview of the study, which originated from students who “did not get it” even after an experiential learning project. The chapter introduces the study, the research problem, the research paradigm, the research objectives, the research questions and objectives, the research rationale and a synopsis of previous research. Finally, the chapter outlines the research design, the researchers' involvement, and the study's value.

Chapter 2 Previous Research

In Chapter 2, the literature which provided the background for the study is presented, starting with a description of the literature review process, followed by a review of the types of knowledge and learning spaces, experiential learning in the context of business process management education, student reflections for improved learning, and the potential

mechanisms that may improve learning outcomes. Reflective practice in the context of experiential learning projects is reviewed, followed by a reflective review of the knowledge gap. Potential learning mechanisms are posited to improve learning outcomes, from which a theoretical lens model guiding the study was derived. The final section revisits the research problem, aims, and research questions.

Chapter 3 Research Paradigm

In Chapter 3, the philosophy and setting of the action research study are discussed. The underpinning philosophy of pragmatist-critical realism is described, and its relevance for information systems research is defended. In the second part of the chapter, the research setting of the experiential learning projects in four enterprise systems and business process management courses in the Department of Information Systems at the University of Cape Town is described.

Chapter 4 Research Design

In Chapter 4, the action research process, the analysis method, and research methods are described. Action research is the preferred research method for pragmatist-critical realist studies (Heeks et al., 2019). According to pragmatism and critical realism philosophies, mixed data collection and analysis methods are needed for both pragmatism and critical realism philosophies (Zachariadis et al., 2013). This study used thematic analysis (Braun and Clarke 2006, 2019) for qualitative analysis and partial least squares based structural equation modelling (Hair et al., 2017) for the quantitative analysis method. During four action research cycles, the researcher observed and analysed student reflections on business process projects as part of higher education enterprise systems and business process management courses.

Chapter 5 Findings – Learning Influencers

In Chapter 5, the findings from the four action research cycles are described. The student reflections showed similar outcomes for each intervention across the four action research cycles. The qualitative analysis of the student reflection findings showed that applied effort was the most common influencer of learning of the four potential influencers of learning. This finding was confirmed in the quantitative analysis. The other influencers of learning are shown to support applying effort. Applying effort transcends an absolute answer provided by traditional education methods while epistemologically supporting an absolute answer or

outcome unknown to the student learners at the time of learning. The question arose as to what actions provide scenarios where business process learners are encouraged to apply effort and how these can be assessed.

Chapter 6 Findings – Drivers of Effort

In Chapter 6, what inspires or drives students to apply effort in an experiential business process project is explored. Exploring the drivers of effort entailed reanalysing the findings from the reflections in Chapter 5 to identify where students indicated that they had applied exceptional effort, leading to improved learning. According to the reflective literature (Miettinen, 2000; Schatzki, 2016; Turnbull, 2008), this requires a disruptive influence that forces students to move beyond an absolutist frame of mind. Several drivers of effort are observed, which, by disrupting habitual action, can lead to improved learning outcomes. Central to these disruptions are the student presentations of their project findings, from preparing the presentations to post-presentation feedback. Applying effort is shown to be the most significant generative learning mechanism with the potential to improve learning in experiential learning courses in business process management experiential learning courses. In the context of business process management experiential learning projects, applying effort incorporates the four levels of learning as espoused by Helsing et al. (2004) – absolutist, transitionist, relativist, and contextist - and may be assessed through the depth of knowledge model provided by Webb (2002).

Chapter 7 Discussion

In Chapter 7, the findings of the four action research cycles with support from the literature are discussed. The findings show that reflection is a complex topic and needs to be performed in conjunction with action to improve learning effectiveness. Reflections from students are observed to positively influence learning outcomes when students expend effort on assigned tasks. Based on these observations, two models are proposed. The first model is a learning influence model embedded in the second disruptive learning model. The models attempt to answer the research questions posed in the study. Reflective practice can improve learning outcomes by recognising that students learn at different levels but are predominantly absolutist. Students need to be inspired to apply effort in completing tasks and overcoming satisficing.

Chapter 8 Conclusion

In Chapter 8, the study is summarised with acknowledgement of limitations and suggestions for further research. The sine qua non presented by the study was that students should be aware that applying effort leads to higher learning outcomes through disruptive learning methods. The leading disruptor observed in the business process management project is shown to be the presentation of concrete experiences of the students. Students are shown to learn by imitating others and performing tasks (absolutist) in preset situations. Experiential learning is confirmed to be effective when reflection is combined with action. Improved learning correlates more strongly with the application of effort to the tasks (transitionist). However, mastery and wisdom require higher learning levels when combining novice imitation with experience and reflection (relativist). Applying understanding in multiple contexts equates with aesthetics at the highest level (contextist), which can be viewed as practical wisdom or wisdom-in-action.

2 Previous Research

This study explored the reflections of students undertaking business process management experiential learning projects to identify potential generative mechanisms that may lead to improved learning outcomes. In this chapter, a review of related literature provides the theoretical underpinnings of the study. From the literature, a synthesis was made of what is considered essential to improve learning in information systems and revealed gaps in knowledge that supported the research's objective. During the same time, the literature provided reasons why addressing these gaps were important.

2.1 Literature Review Method

This review of the literature followed an iterative approach through the research cycles and reflected the general cyclical research method. Consequently, it is neither a systematic nor a structured literature review, as the strict guidelines for systematic and structured literature reviews were not pragmatic for this study. There are two primary reasons for this. First, the time required for the study and the lack of multiple reviewers. The length of time elapsed in a doctoral study and other multicycle studies requires multiple iterations, which are unlikely to consistently follow the precise requirements of a systematic literature review unless the literature review is done in its entirety at the beginning of the research. A literature review at the beginning of a study runs the risk of being outdated in multi-year research. This is made worse in action research studies, which may change focus as the research questions are revised (Dick, 2003). Although the potential for objectivity is more likely for positivist studies and during the proposal stage, it is questionable whether this still holds during the finalising of the thesis. Furthermore, multiple reviewers are a fundamental requirement for systematic literature reviews (Rowe, 2012). Rowe (2012) suggests that doctoral theses typically do not meet the requirements to make 'significant *contributions to knowledge based on rigorous and deep literature reviews*' (p.470). These concerns are shared by Okoli and Schabram (2010), who regard graduate thesis literature reviews as distinct from conventional literature reviews, let alone systematic literature reviews. They emphasise the student perspective in using literature reviews in doctoral theses as a basis for academic discussion built on summarising, analysing, and criticising key literature. A literature review reveals the synthesis of the student's understanding of the subject matter, the rigour of the student's approach, the justification for future research and introduces the student to academic practice and

protocols with the expectation of the student presenting themselves as experts in the field. For the literature review to be reproducible, Kitchenham et al. (2009) require the application of structured principles; however, Boell and Cecez-Kecmanovic (2015) regard a systematic literature review as a step too far.

Defining literature reviews as a synthesis of existing knowledge to reveal current biases and knowledge gaps and propose future research, Rowe (2014) identifies three types of literature reviews: describing, understanding, and explaining. The three types are categorised according to a four-dimensional typology linked to time, as shown in Table 2.1.

Table 2.1 A four-dimensional typology for literature reviews (Rowe, 2014).

Dimension	Type	Description
1	Goal with respect to theory	Describing (a-theoretically), understanding, or explaining
2	Breadth	Problem, stream or theme, discipline
3	Systematicity	Inclusion criteria (search process, type of source, period, discipline), coverage, quality assessment, sources description
4	Argumentative strategy	'Logical structures in the argumentation enacted in the paper'... 'the <i>order of the components of the author's argument</i> ' (de Vaujany et al., 2011, p. 401)

The goal of literature reviews concerning theory is to describe or explain a problem, a theme, or a discipline. Rowe (2014) warns that literature reviews do not typically strive to contribute to theory building, ultimately one of a doctoral thesis's goals. The most relevant aspect of a doctoral literature review is systematicity that comprises 'Inclusion *criteria (search process, type of source, period, discipline), coverage, quality assessment, source description*' (p.243). Argumentative strategy is less important in a doctoral study and is regulated by its research design and philosophical underpinning. To synthesise knowledge, knowledge must be defined.

This review of the literature was informed by the four-dimensional typology proposed by Rowe (2014) in terms of theory, breadth, systematicity, and argumentative strategy – and an iterative hermeneutic approach proposed by Boell and Cecez-Kecmanovic (2014) and

presented in Figure 2.1. The hermeneutic cycle was appropriate for multiple iterations over the extended period of a doctoral study.

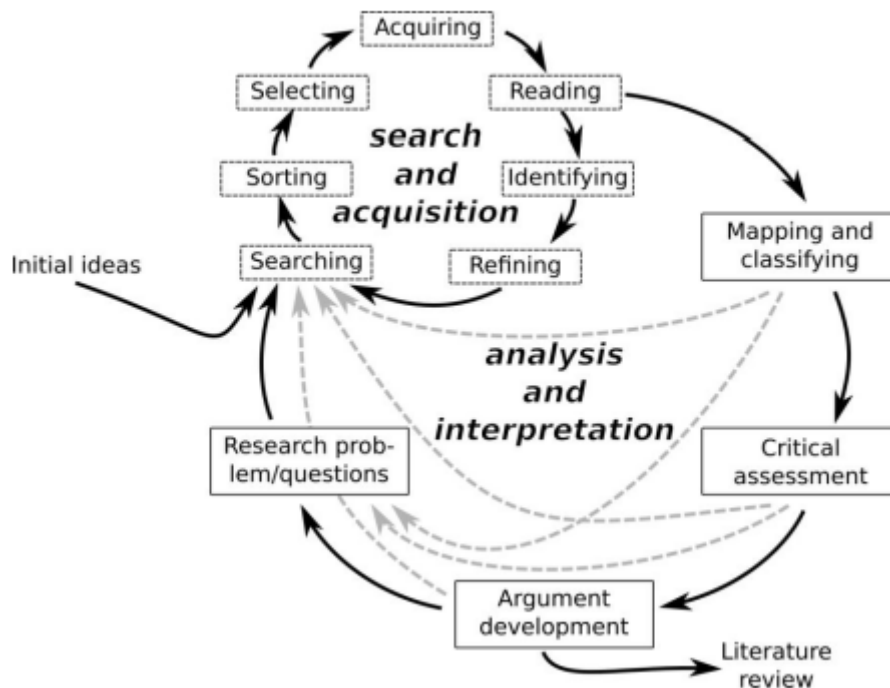


Figure 2.1. A hermeneutic framework for the literature review (Boell & Cecez-Kecmanovic, 2014).

In hermeneutic literature reviews, a cyclical process is followed through two interconnected loops. In the first loop, the relevance of the potential literature is sought and assessed in the second loop. Common to all literature reviews is the trade-off between rigour and relevance. Schön (1995) used the analogy of a cliff over a swamp to explain the difference between rigour and relevance. Rigour is less critical than relevance in the swamp, where there are messy problems. In contrast, the clarity of the high-ground cliff affords the ability to endure rigour at the cost of grassroots relevance. The practitioner or researcher must optimise where the best solution is found. The twin hermeneutic cycles allow for alternating between the high-ground rigour for searching and the low-ground relevance for assessment. An absolutist structure is evident in the rigorous first cycle, with literature either holding potential or not. However, messy problems on the ground are contextual, and the literature requires a critical assessment as to their relevance to the problem.

- **Goal with respect to theory**

This literature review aimed to understand the prevailing knowledge of learning, reflection, and potential generative mechanisms that may improve learning outcomes.

- **Breadth**

The problem is the potential for improving learning through reflective practices in experiential learning projects to educate future business process practitioners in the information systems discipline.

- **Systematicity**

Systematicity is derived from the thesis's pragmatist aspect through a long-term intermittent hermeneutic cycle supported by an abductive approach. Pragmatism values consequences above processes as processes are regarded as part of an unfinished universe (Garrison, 1995, 2005). The significance of meaning, truth and value is thus entwined in outcomes. However, without a critical assessment of inputs and processes, the effectiveness of outcomes and consequences can be limited or even detrimental. As much as there is a possibility of benevolent beauty, there is an equal chance of vicious ugliness through dangerous dialogues (Garrison, 2005, p. 114). Consequently, reflection on the method of the literature review is essential and must be part of systematicity.

The iterative nature of the research cycles did not restrict the selection of the literature to specific processes, sources, periods, or quality assessment. However, general guidelines were followed. Most of the included literature originated with searches using scholar.google.com and the number of citations noted. Preference was given to journal articles and books before conference publications. Lower quality articles and web pages were consulted for references which were then confirmed or used as a base for further searches. Websites such as Wikipedia were useful for summarising new concepts and providing a starting point on various topics but never directly referenced. Such sites typically provide sufficient background and details on the foundations of concepts as a starting point for more in-depth searches.

Concerning the timing, preference was given to more recent work and the original works. For example, to understand Peirce's concepts of pragmatism, Plowright (2016) was consulted in conjunction with Peirce (1905).

- **Argumentative strategy**

In keeping with the cyclical approach to this study, the literature review followed a cyclical learning strategy promoted in the 16th century by Ignatius of Loyola (Nowacek & Mountin, 2012). Ignatius of Loyola observed a learning spiral within a context that cycled through experience, reflection and action before ending with evaluation. Part of literature reviews is synthesising the literature for which Besson and Rowe (2012) recommend a conceptual framework presented at the beginning of the literature review (Rowe, 2014). Applying the Ignatian pedagogy as a framework provides a structure for the literature review, as shown in Table 2.2.

Table 2.1. Structure of the literature review.

Step	Section	Ignatian Pedagogy	Literature Review Conceptual Framework
1	3	Introduction	
2	3.1	Context	Literature Review Method
3	3.2	Experience	Knowledge and Learning Spaces
	3.3		Experiential Learning in Business Process Management Courses
	3.4		Student Reflections for Improved Learning Outcomes
	3.5		Generative Learning Mechanisms in Experiential Learning Projects
	3.6		Reflective Practice
4	3.7	Reflection	Reflection on the Knowledge Gap
5	3.8	Action	Theoretical Lens Model
6	3.9	Evaluation	Research Problem, Aim and Questions
7	3.10	Summary	Chapter Summary

2.2 Knowledge and Learning Spaces

Understanding knowledge has been a philosophical dilemma for centuries. Realist philosophies consider knowledge as objective with independent existence that needs to be identified (Devitt, 1991). Objectivity does not mean that the world is unknowable, but that the world is not cognitively constructed based on human knowledge (Devitt, 1991). Constructivist philosophies perceive knowledge as created collaboratively in context by

human actors. It may also be existentialist, whereby no one person can acquire knowledge on behalf of another (Crotty, 1998). Social constructivism is a variation of constructivism that seeks to perceive reality socially (Galbin, 2014). The focus shifts from mirrors of reality in peoples' minds to the relations that sustain individuals in their world (also referred to as a social structure or field (Bourdieu & Wacquant, 1992)). Knowledge is of lesser importance than the meaning that the observer places on it, particularly in the pragmatist tradition. Pragmatism understands meaning as socially constructed but continuously changing as the self grows (Garrison, 1995; Jackson, 2014).

The growth in knowledge through which meaning is formed and reformed is personal and often referred to as tacit knowledge. Tacit knowledge cannot be expressed nor readily communicated (Polanyi, 1969). Although tacit knowledge has an explicit element, it carries experiential connotations for tacit knowledge in contexts other people may not know (Straw, 2000). This reveals the secondness and the underexplored thirdness of Peirce (1905). Thirdness is noticed in the relations important for social constructivism and embedded in sociology and communication (Galbin, 2014). Dewey suggests that communication occurs through art which is understood as cultural artefacts (Garrison, 1995) and resonates with Peirce's signs (Samuels, 2000). Art is a subtype of aesthetics that includes quality and is linked to education through Dewey's concept of experience. Tacit knowledge integrates a functional relationship (or gestalt) between knowledge that is in bodies and minds, such as a technical skill, which a person cannot fully explain to another person (marginal elements) and the thing or things on which the person knowingly focuses (focal awareness) (Polanyi, 1969). Thus, learning and experience are closely linked. A popular learning theory that recognises these links is experiential learning theory (Kolb, 2015). According to Kolb (2015), experiential learning theory is a holistic framework based on gestalt for diversity education. Gestalt is unorthodox, radical and nonconformist (Rainey 2019) and originated in psychology a century ago. One of the most influential social psychology founders using gestalt methods was Kurt Lewin, whose work forms parts of Kolb's experiential learning theory (Rainey, 2019). Rainey (2019) provides a list of gestalt related implications, many of which were found to resonate with the current study.

“Gestalt...

- *defied isolationist theory and asserted holism;*
- *dared to challenge Freudian psychology and assumptions of Newtonian physics;*
- *applied mindfulness in the concept of “awareness” to the therapeutic process;*
- *created a relational and dialogic practice built on use-of-self, presence, and high contact;*
- *focused on now when the world wanted to hold tight to then and next;*
- *prioritized how and what over why;*
- *considered the body a valid source of information in therapeutic practice;*
- *encouraged client responsibility and accountability;*
- *proclaimed that 'resistance is good' and 'change is paradoxical';*
- *formulated a systems theory of human behaviour;*
- *positioned the group as a foundational and potent structure for social change;*
- *recognized the validity of learning from subjective experience. “ (Rainey, 2019, p. 61).*

Köhler (1959), a gestalt founder, acknowledged that gestalt might have adversely affected orthodox American psychology due to its limited regard for method and subjectivity, leading to incorrect assumptions. The preoccupation with the method limited the range of research (Köhler, 1959).

Although tacit knowledge is difficult to articulate, explicit knowledge carries awareness and is explainable (Polanyi, 1969). Explicit knowledge begins with experience and is enabled by a holistic internal understanding of a subject from the observed parts referred to as indwelling (Polanyi, 1969) and can be likened to Peirce's thirdness. Nonaka (1994) describes the relationship between tacit and explicit knowledge in the socialisation, externalisation, combination, and internalisation framework referred to as SECI. The framework is presented as a cyclical spiral model. Socialisation, externalisation, combination and internalisation are based on the premise that tacit and explicit knowledge can be placed on perpendicular axes to provide four quadrants, as shown by Nonaka and Konno (1998), depicted in Figure 2.2.

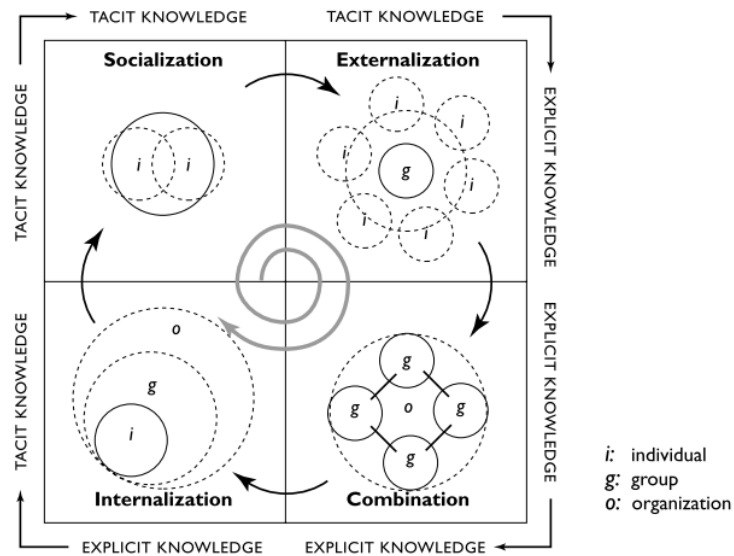


Figure 2.2. Spiral evolution of knowledge conversion and self-transcending process (Nonaka & Konno, 1998).

Socialisation is the conversion of tacit knowledge of one person to tacit knowledge of another through personal interactions. Externalisation is derived from tacit knowledge converted to explicit knowledge. Combination is when explicit knowledge is converted to another form of explicit knowledge. Internalisation describes the conversion of explicit knowledge to tacit knowledge. Although the model has been accused of being reductionist, which moderates the indwelling conception's power (Straw, 2000), it provides insight into the transference of knowledge. Separating the entanglements of tacit and explicit knowledge shows where the transfers occur, referred to as *ba* (Nonaka & Konno, 1998).

Central to *ba* is the concept of knowledge creation which is existential in recognising the self in all. Knowledge acquired by the individual through reflection on experience is embedded in the shared spaces of *ba*. Outside of *ba*, knowledge is explicit and can be communicated externally to *ba*. Inside *ba*, knowledge exists at multiple levels (Nonaka & Konno, 1998). *Ba* differs according to the social situation. In organisations, the individuals' *ba* is the team, the team's *ba* is the organisation, and the organisation's *ba* is the external environment. The most potent form of knowledge creation is when the multiple levels of *ba* are combined for a single purpose. For individuals (teams, organisations and even markets), *ba* is transcendental through social interactions, expanding individuals' knowledge through experience and reflection (Nonaka & Konno, 1998). This resembles Vygotsky's zone of proximal development

and the associated benefits of scaffolding (Vygotsky, 1978). Ultimately, *ba* is the shared space where the individual acquires knowledge through reflection on experiences in social settings and resonates with experiential learning theories.

In the next section, experiential learning is examined with a specific focus on business process management education.

2.3 Experiential Learning in Business Process Management Courses

Processes are a fundamental part of systems theory which defines systems as comprising a minimum of bounded input, process and output with feedback which collectively tries to bring equilibrium to the system (Von Bertalanffy, 1972). A process is a series of activities that produce outputs from inputs (Neck & Greene, 2011), thereby reducing all active organisational systems to sets of process activities (Taxén, 2009). In organisations, processes are commonly known as business processes (Harmon, 2019). Although business process concepts have existed for more than a century, they have gained significance in the past quarter-century with the introduction of enterprise systems (Harmon, 2019). Enterprise systems, including enterprise requirements planning systems and customer relationship management systems, are referred to as process-aware information systems (van der Aalst, 2013). Process-aware information systems combine process orientation and information technology to overcome a persistent gap between business and information technology (Bandara, Indulska, et al., 2007). The lack of a clear understanding of the integration between business processes and enterprise systems poses “*immense challenges*” in organisations (Taxén, 2009, p. 2) and must be managed.

2.3.1 Business Process Management

Business process management is the process of managing, coordinating, prioritising, and monitoring business processes (Bandara et al., 2011; Harmon, 2019). Business process management is a mechanism for gaining benefits from enterprise systems by integrating and aligning processes to improve business processes (Hammer, 2015). Consequently, business processes and process management are essential for enterprise systems (Alter, 2013; Davenport, 1998; Harmon, 2019; van der Aalst, 2013). The need for process management is highlighted in the process management principles defined by Hammer (2015, pp. 11–12): (i) All work is process work; (ii) any process is better than no process; (iii) a good process is better

than a bad process; (iv) one version of the process is better than many; (v) even a good process must be performed effectively; (vi) even a good process can be improved, and (vii) every good process eventually becomes a bad process. However, processes are activities and not objects which means that managers must produce and coordinate patterns of action and not only create artefacts (Pentland & Feldman, 2008). This resonates with the holistic gestalt view, which can be translated as “*form*” and “*organized structure*” (Moore & Fitz, 1993, p. 138).

Managing business processes extends beyond the execution of tasks to organisational capability (Rosemann & vom Brocke, 2015). Ko (2009) explains business process management as a cross-discipline theory-in-action founded on statistical process control and quality principles that eliminate variations (Hammer, 2015). Nonetheless, confusion has persisted in comprehending the differences between terminologies (Berente et al., 2009). Business process management is more than business process reengineering, workflow, and process modelling alone (Ko, 2009). Trkman (2010) describes business process management as a complex field with operational challenges originating in organisational, managerial, technological and social domains. Recently, Klun and Trkman (2018) questioned the future of business process management, claiming that it is at a reductionist crossroads. Reductionist combinations of processes and technology that produce technical barriers, assimilation, and integration limitations can be resolved through education, according to Robey et al. (2002).

Education is a critical success factor for implementing enterprise systems (Al-Mashari et al., 2003). In Africa, information technology and enterprise systems are vital for economic development, requiring skilled business process practitioners with technical and operational competencies (Bandara, Rosemann, et al., 2007; O’Sullivan et al., 2014; L. Seymour et al., 2006). However, there has been a worldwide paucity in understanding the appropriate competencies that business process management students need to learn (Ravesteyn et al., 2008). This hampers educators in designing courses that provide students with adequate competencies (Bandara, Rosemann, et al., 2007; E. Scott et al., 2002). Simultaneously, a balance between theory and practice must be maintained (Scholtz et al., 2012). Complicating the situation are vertical learning structures lacking cross-business discipline development, which establishes teaching of technological knowledge in silos even though business operates across functional layers (Grandzol & Ochs, 2010; Mohamed & McLaren, 2009; Nickerson,

2006). Meanwhile, poor knowledge transfer in education with low retention of transferred knowledge persists (Boyatzis & Saatcioglu, 2008). Boyatzis and Saatcioglu (2008) observed a half-life of six weeks for a business course which is equally relevant for business process management given its link to business education (Seethamraju, 2012).

2.3.2 Business Process Management Skills Development

Demand for suitably qualified and competent enterprise systems staff, including business process practitioners, intensifies as organisations invest in large cross-functional enterprise-wide systems with the aim of reducing costs and improving performance (Hustad & Olsen, 2011; Mohamed & McLaren, 2009; Scholtz et al., 2012). A South African study grouped enterprise systems' critical success factors into four types: critical, active, reactive, and inert (Kalema et al., 2014). Critical factors strongly impact other factors and, in turn, are strongly impacted by them. Understanding and education of business processes were found to impact enterprise systems while strongly impacting other factors. The centrality of processes to the internal dimensions of organisations is well established. At the inception of enterprise systems, Scott Morton (1995) articulated tensions between internal culture, technology, organization strategy, and external environment forces. Central to Scott Morton's argument are roles and processes for bringing about change and stability in organisations.

In addition to being a critical success factor for enterprise systems (Kalema et al., 2014), education provides economic benefits for developing countries (Avgerou, 2008). However, there has been an abiding concern for the lack of understanding of enterprise systems educational programs' competency outcomes at the university level (Ravesteyn et al., 2008). This results in a long-term skills gap between graduates' competencies and the competencies required by industry (Armarego, 2008). Although enterprise systems education is increasingly integrated into information systems courses, this is not always true for other business disciplines (Grandzol & Ochs, 2010), including business process management (Klun & Trkman, 2018).

Learning failures in enterprise systems education have been termed 'not learning' and are related to three areas: procedures, processes, and integration. Procedures are technical activities, and processes are the consequences of procedural actions. Integrative non-learning combines procedures and business processes (Stein & Galliers, 2013).

2.3.3 Business Process Management Training

A structured literature survey of business process management training by Thennakoon, Bandara, French, and Mathiesen (2018) found that only 4 out of 64 publications had a primary focus on training, with a further 11 frequently mentioning training. The remaining 49 papers were found to have a limited discussion of training. In their findings, Thennakoon et al. (2018) reveal the importance of training but found that high levels of training may not translate to improved process efficiency or a high return on investment.

2.3.4 Business Process Management Education

Like other information systems education, business process management requires a holistic approach, including skills gained from experience and organisational commitment, all of which may be problematic in developing nations (Bandara et al., 2012). Bandara et al. (2012) recommend three training levels: leadership, operational staff, and specialised process experts. They recommend two forms of training: short term training; and collaborative master and doctoral program education. However, education alone is insufficient, and Bandara et al. (2012) combine capabilities and skills through expertise and experience for learning. Baird, Davidson and Mathiassen (2017) stress that assimilation of information and communications technology into organisations often stops with single-loop learning, which provides an immediate result based on satisficing but requires double-loop learning to change underlying structures. Extending double-loop learning is the concept of triple-loop learning. Triple-loop learning is likened to deep reflection based on Argyris and Schön, although it did not arise in their work (Tosey, 2006; Tosey et al., 2012). Triple-loop learning is a complex and unclear extension to double-loop learning, best understood as learning to learn (Tosey et al., 2012). Holmgren (2014) provides a helpful diagram, shown in Figure 2.3, that provides insight into triple-loop learning.

Experience-based skills development is a recurring theme in business process management education (Bergener et al., 2012; Boyle & Strong, 2006; Rosemann & vom Brocke, 2010; Searle & Cantara, 2016). Thennakoon et al. (2018) indicate a change in focus from methods, techniques, and tools to capabilities. This view is supported in the definition of business process management by van der Aalst (2013), relating to human participation in improving business processes even without new technologies. Searle and Cantara (2016) group critical

business process management skills into operational, technical, and transformational categories.

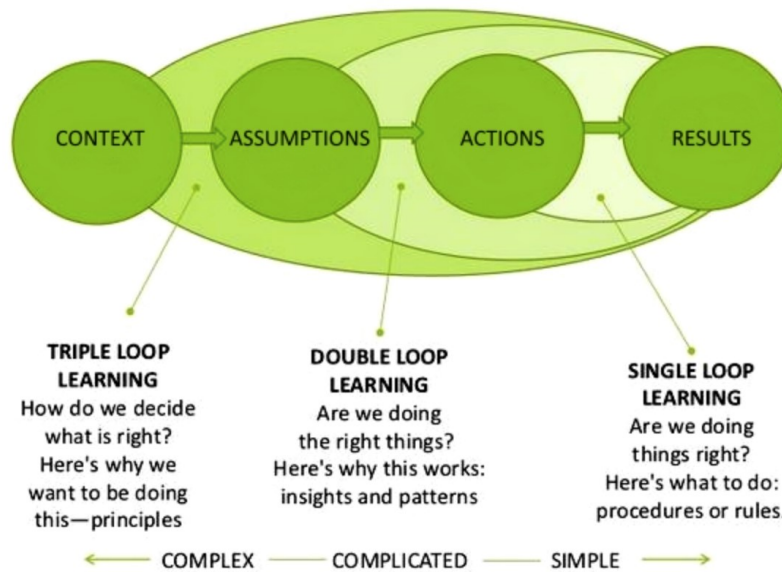


Figure 2.3. Three categories of learning (Holmgren, 2014).

The concepts of competency and capability are interwoven and not always clear. Lanzi (2007) explains capabilities as an accumulation of competencies, skills, and complex abilities. Boyatzis (2008), on the other hand, defines competency as a capability of ability. According to Boyatzis (2008), a competency is multiple capabilities that manifest as behaviour around an intention. In this study, capabilities are the skills and abilities of human actors that have the potential for action. Competency is the application of capabilities that are related to action and performance. Searle and Cantara (2016) observed that many organisations concentrate on process modelling and project management at the expense of process measurement and organisational change. Even when process modelling is considered necessary, minimal training has been provided to staff. Worsening the problem is the lack of a holistic business process view (Malinova & Mendling, 2018; Rosemann & vom Brocke, 2010) with a persistent lack of clarity about the links between skills and competencies (Dörge, 2010).

Rosemann and vom Brocke (2010) observe that business process practitioners with technical and operational skills are critical for business process management. They suggest that organisations facilitate process collaboration and education for their staff. Dörge (2010)

refers to the key competencies of the Organization for Economic Cooperation and Development (OECD) adopted in this study. *“Key competencies involve a mobilisation of cognitive and practical skills, creative abilities and other psychosocial resources such as attitudes, motivation and values”* (OECD, 2005, p. 8). A vital aspect of this definition is reflective thought and action, which requires *“complex mental processes and requires the subject of a thought process to become its object”* (OECD, 2005, p. 8). However, competencies may be tacit, lack technical focus and be internalised by the student (Lozano et al., 2012). Developing competencies requires transforming existing skills using training, education, and experience with reflection (Rosemann & vom Brocke, 2010).

2.3.5 Experiential Learning for Business Process Management Education

Reflecting on experience is central to experiential learning by creating knowledge from experience (O’Sullivan et al., 2014) by combining theory and practice (Raelin, 2007b). Combining theory and practice overcomes the separation of formal education from the world of work (Roth et al., 2014). Accordingly, the experiential process links the high ground with the messy swamp espoused by Schön (1995). Various authors have posited explanations of the theory-practice gap, such as Van de Ven and Johnson (2006), who describe three ways of framing the theory-practice gap. The first view is a knowledge transfer problem that views theory and practice as essentially the same concept and requires a better knowledge transfer mechanism. The second view regards theory and practice as complementary concepts. The third view builds on the second to suggest using economic-style arbitrage to mediate between theory and practice.

Experiential learning is increasingly being used to transfer knowledge to students (O’Sullivan et al., 2014) and is observed to be particularly useful in African societies (Gyimah-Brempong & Ondiege, 2011). While much has been learned from research dedicated to knowledge transfer between educational institutions and industry, the economic benefits have not always been realised (Agrawal, 2001). Agrawal (2001) separated knowledge transfer literature into four categories. The first category is the firm's absorptive capacity as a pull mechanism, with the second category as a push mechanism from universities. The third category views tacit knowledge from the universities spilling over into surrounding geographic regions. Lastly, knowledge is channelled through patents, publications, faculty consulting, and graduate placements.

Raelin (2007a) takes a pragmatic position and incorporates practice into knowledge building within a practice-based learning model. The model advocates dialogical interaction between theoretical, conceptual models and the norms and conventions from practice. The primary purpose of theory is to inform practice, which is weakened by a lack of reflection. Practice-based learning is expected to produce four learning benefits for the student: academic development, personal development; career development; and work skills development. The results are produced through experience that engages, extends, and creates knowledge. The goal of the practice-based learning model is to facilitate dynamic learning rather than impart knowledge. Raelin (2007a) calls for partnerships between theorists and practitioners for knowledge production and dissemination through three building blocks: tacit knowledge, mastery, and critical reflection. Tacit knowledge represents know-how and is embedded in practice but is challenging to articulate. Mastery develops tacit knowledge in multiple contexts to enable experts to adapt to changing conditions by drawing on previous experience and proven theories. Critical reflection integrates practice and thinking about the practice of others. However, assessing the model's outcome is problematic, particularly when Raelin (2007a) criticizes the Western tendency to assess knowledge through external measurement. The tacit nature of practice and the formulation of contextual theory demands assessments in a typically temporally and spatially limited context. Assessments must be aligned with the task and evaluated by the practitioner through self-reflection and self-assessment. From a practice theory, perspective assessments are sociomaterial acts linked to particular settings and involve multiple agents (Boud et al., 2016). Sociomaterial acts can influence experiential learning courses through design, facilitation, and assessment (Andresen et al., 2000; Boud, 2010). Restrictive design, degree of facilitation and misaligned assessment will reduce the impact of experience-based learning.

Recognising the critical nature of reflection and grounding in practice, Raelin (2007a) advocates a reflective practice of documenting practice outcomes for problem interventions to capture what was learned, how it was learned, how much was learned, and why it was learned. Thus, critical reflection is the 'middle ground' between tacit knowledge and mastery (Raelin, 2007b, p. 504).

2.3.6 Experiential Learning: Theoretical Underpinnings

Experiential learning, which combines reflective practice with experience, came to the fore in the 1980s. According to Moon (2000), Kolb significantly boosted experiential learning, although Boud may have been more influential in increasing awareness of reflection (Boud et al., 1985). Reflection as a business tool was fostered by the publication of the definitive work on the reflective practitioner by Schön (1983). Nevertheless, Moon (2000) warned that experiential learning remained a broad topic with unclear definitions. A lack of clarity in understanding the levels of experience required for learning obscures the relationships between experience, learning, and reflection. This has exacerbated the lack of understanding of the intentions and attitude of the learner towards learning.

Experiential learning continues to be controversial for learning outcomes (Miller & Maellaro, 2016; Perusso et al., 2020). Whereas Kolb is most associated with experiential learning, Dewey (1925) is recognised as the originator of learning through reflection. Moon (2000) ascribes reflective practice to four founders: Dewey, Habermas, Kolb, and Schön. According to Moon (2000), Dewey and Habermas form the backbone of reflective study. The interest of this study centres on Dewey, who describes reflection as a cognitive method of alleviating doubt (Daudelin, 1996). However, the outcome of experiential learning is a cause of dissension. Miettinen (2000) argues that Kolb is more interested in the experiential stages and learning styles and less concerned with either outcomes or reflection. For Habermas and Schön, the outcome of reflection is crucial, whereas it is of lesser importance for Dewey (Moon, 2000). The limited importance of outcomes for pragmatic Dewey is problematic, as outcomes dominate pragmatism. Dewey is more concerned with the potential for action and talks of “*living forward*” (d’Agnese, 2017, p. 100).

Moon (2000, p. 100) provides a list of potential outcomes for reflection: learning or material for further reflection; action or other representation of learning; critical review; reflection on the process of learning; the building of theory; self-development; decisions or resolutions of uncertainty; empowerment and emancipation; unexpected outcomes such as ideas that might become solutions; and emotion. Nevertheless, Moon (2000) misses at least one alternative outcome denoted by the Japanese *mu* or Chinese *wu*. *Mu* is also known as the void and is neither yes nor no, thus avoiding separation (Heine, 2014). Reflection may lead to nothing, thereby extending the range of reflection to include non-reflection. Daudelin (1996,

p. 41) indirectly addresses the issue by referring to the reflective outcome as “*action or (deciding whether to act)*”, which resonates with the view of Dewey.

The vagaries of definitions of reflection extend to the definitions of experience (Moon, 2000). Lack of definitions adds complexity to understanding experiential learning theories, where reflection is indispensable to learning from experience. Although experience is frequently derived outside the classroom, it ranges from physical action to codified action presented in writing or verbal forms (Moon, 2000). Experience may be derived in several ways, from performing an activity through reading a report on action to listening to a lesson. Boud et al. (1985) describe multiple forms of experiences, including emotion which is internal and not restricted to the classroom.

Reflection is often autonomous and outside the individual’s awareness, especially during monotonous tasks and relaxation behaviour (Daudelin, 1996). However, a repeatable reflective practice needs to consider the implications of the activity, especially in terms of relevancy. The act of considering is a form of reflection which, in essence, results from doubt (Dewey, 1925). Moon (2000) considers the relevance of the learner's learning intention as a moderator to their learning. The potential for learning viewed through the learner's eyes may help educators tailor experiences to facilitate learning. However, the potential for action is part of the tacit dimension (Polanyi, 1969). Likewise, learners may have difficulties explaining how they interpret their experiences. Perusso et al. (2020) observed that a guided dialogical process is critical to improving experiential learning outcomes.

Outcomes of experiential learning can take several forms, including emotion, self-learning, and higher-order learning (Daudelin, 1996; Moon, 2000). As Miettinen (2000) showed in Dewey’s distinction between everyday material activities, not all experiences increase knowledge. Knowledge increase involves non-reflective habits becoming reflective experiences through disruption of habitual experiences. Disruption leading to reflection implies an awareness of the disruption, which occurs when habitual practices are disrupted (Schatzki, 2016). While Daudelin (1996) considered the potential for reflection to be beyond an individual’s awareness, Schatzki (2016) described reflection as an element of awareness.

Awareness comprises two modes, attention and thinking. Attention relates to the five human senses and thinking to cognition, including emotions and reflection. Both Daudelin (1996) and Schatzki (2016) explain how seemingly random thoughts or sensory activities can occur while undertaking a practice. This contrasts with the smooth flow promoted by authors such as Kolb and Dewey, who show reflection as a single stage in a continuous cycle of experience – reflection – (re)action – experimentation. According to Schatzki (2016), awareness disrupts the habitual practice flow resulting in a suspension, hold-up or a hiatus of the activity. In experiential learning, this hiatus represents a time of reflection. However, not every experience results in reflection, nor does every person pause to reflect. One reason for this may be due to the nature of the practice. Schatzki (2016) uses the example of moving at a speed that does not allow enough time to reflect, forcing reliance on instinct or physical reaction times. On the surface, Schatzki's practice theory appears relatively straightforward; however, it is appreciably complicated. Practice theory primarily involves social practices, not individualism, even though individual senses and reflection are key elements. Social practice is a set of structured activities that are undertaken in a particular field. Reminiscent of Bourdieu, the field encourages individuals with habitus to operate according to the doxa of the field until a crisis occurs (Koch, 2020; Wacquant, 1989). Practices refer to social practice, which encompasses a set of activities performed by a social group. These social practices are combinations of doings and sayings of multiple individuals organised and regulated by a set of rules and teleoaffective behaviours (Schatzki, 2016). Social practices can be implemented as bundles; thus, cooking could be done simultaneously with the practice of listening to a radio service or a conversation with a group of friends. Disruptions to any of the practices could disrupt each of the concurrent practices. Practice activities are inseparable from the material arrangements of bodies and material artefacts that are interconnected like sinews represented by "*contiguity, causality, and physical structures*" (Schatzki, 2016, p. 26), much like rhizomes (Deleuze & Guattari, 1987).

In the current study, business process management can be considered a bundle of social practices of individuals through material arrangements, processes, and information technologies of organisations (Alter, 2013). Likewise, learning may be regarded as a practice undertaken by learners through the material arrangement of educational instruction, education structures, and related equipment.

2.3.7 Learning Theories - Situating Experiential Learning

Learning is a complex process that has led to the positing of numerous theories (Bélanger, 2011). Stevens-Fulbrook (2019) lists 15 learning theories and suggests that making sense of learning theories is like “*swimming through treacle*”. Hean et al. (2009) proposed two broad learning theory families, behaviourism and constructivism, while others considered three categories, behaviourism, cognitivism, and constructivism (Bélanger, 2011; Ertmer & Newby, 2013). However, broad definitions risk overlapping and providing opposing views (Bélanger, 2011).

Behaviourism

Behaviourism is a stimulus-response between environment and learner that sees learning as behavioural change. Learning is a black box reinforced by repetitive and habitual actions. Behaviourism derives from Pavlov and is typically associated with Skinner (Chomsky, 2006; Hean et al., 2009). Behaviour takes a positivist approach in only considering learning that can be measured (Hean et al., 2009) and causes measurable behavioural changes (Bélanger, 2011). Learning results in behaviour changes based on trial and error (Hean et al., 2009) and is evaluated through the behaviour changes (Bélanger, 2011). Repetitive impacts of social and material factors through learner conditioning reinforce learning. Mistakes are not a source of learning but a stimulus to improve poor behaviour. Effective behaviourism requires structured situations that progress from simple to complex behaviour changes (Bélanger, 2011).

A significant criticism of the behavioural approach is the focus on assessing change in behaviour to the exclusion of reflective thinking (Hean et al., 2009).

Cognitivism

Like behaviourism, cognitivism is a reaction to external factors. Cognitivism explains learning from the perspective of the brain, which uses internal processes to deal with external changes. Evaluation is similar to behaviourism in assessing outcomes as processes, including representations, strategies, and procedures used by learners in response to cognitive conflict and problem situations (Bélanger, 2011). Cognitivism theorises how the behaviourist black box uses cognitive functions to learn. Learning derives from thinking about an action to be performed or has been performed by the learner. It is a form of reflection that is neither

critical nor reflexive (Bélanger, 2011). Cognitivism focuses on the learning outcome from a behavioural-change perspective which is brought about cognitively. The learner is central to cognitivism, which focuses on internal cognitive processes compared to behaviourism's external behaviour. Non-observable cognitive processes produce learning from repetitive solving of everyday problems (Bélanger, 2011). Much of cognitivist theory is based on Gestalt theory, which produces action from sudden insights (Eureka moments). Cognitivism does not require the level of structure of behaviourism, as learners require more open situations for cognitive learning.

Mistakes are sources of learning, as they produce cognitive dissonance (Bélanger, 2011). According to Bélanger (2011), cognitive dissonance can explain learning triggered by inconsistencies and disruptions. Consistency motivates cognitive processes to create or return to a state of consistency and may be enhanced by recognising behaviour patterns. Progression beyond behaviourism is noted in the spiral of learning from complex to simple to complex (Bélanger, 2011). From Bandura, Bélanger (2011) notes the cognitivist need for instrumental tools and cultural contexts to recognise reciprocal social interactions.

Constructivism

Constructivism goes deeper than behaviourism's changes in reaction to stimulus-response situations and cognitivism's thinking process in response to changes in the environment (Bélanger, 2011). A fundamental principle of constructivism is the learner's active construction of knowledge (Bélanger, 2011).

Piaget and Vygotsky provide two forms of constructivism, cognitive constructionism and socio-constructivism (Hean et al., 2009). Constructivism is based on Piaget and believes that knowledge of the surrounding world is a combination of physical experiences and cognitively reconstructed experiences (Bélanger, 2011; Hean et al., 2009). An alternative view based on Vygotsky believes that constructivism occurs through social interaction, whereby learning is cognitively constructed from the combined experience of the learner and other people (Bélanger, 2011; Hean et al., 2009). A significant part of the latter form of constructivism is learning from a knowledgeable other through support mechanisms such as scaffolding and pushing the learner beyond their current limitations or threshold but not beyond their limits.

Cognitive constructivism

Cognitive constructivism is triggered by a cognitive conflict that leads to knowledge constructed in a context (Bélanger, 2011). The implication is that the learning context must make sense of the learner's situation to construct knowledge (Bélanger, 2011). Based on Piaget and Dewey, cognitive constructivism considers time in terms of students' age, whereby mature students learn differently from younger students (Bélanger, 2011; Hean et al., 2009). Constructive processes include assimilation and accommodation in interaction with the learning environment. The processes allow learners to deconstruct and reconstruct their beliefs and actions (Hean et al., 2009) and includes the transformative learning of Mezirow (Kitchenham, 2008; Mezirow, 2003), the reflective practice of Schön (1983) and the experiential learning of Kolb (2015) and Moon (2000).

Cognitive constructivism is essentially internal and criticised for focussing on the individual while failing to recognise the capacity for learning from peers and teacher-mentors (Hean et al., 2009).

Social constructivism

Social constructivism (or socio-constructivism) extends learning beyond the individual to recognise the environment's mediating effect (Hean et al., 2009). In the social constructivist view, social relationships mediate the learners' activities and influence learning. The origins of the socio-constructivist view are based on Vygotsky (1978), whose activity theory and zone of proximal development extend the learners' current level of knowledge through capable peers and facilitators. The proximal zone of development is a balance of learning situations beyond the level of the current development of the learner, but not so advanced as to cause failure to learn (Bélanger, 2011). The zone of proximal development is transcended through the mechanism of scaffolding. Scaffolding provides temporary facilitated support for learners to go beyond their current abilities with a gradual reduction of support as they become proficient in their knowledge. The activity theory view is extended to incorporate (Hean et al., 2009) and the communities of practice of Lave and Wenger (Bélanger, 2011; Hean et al., 2009).

Social constructivism is cognitively internal but contextualised and relies on external social mediation (Bélanger, 2011). Learning is driven by contextual problems and social cognitive

conflict, which can be reduced by scaffolding. Scaffolding decreases as learning improves, keeping the learning environment open to internal and social cognitive disruptions (Bélanger, 2011). Like cognitivism and cognitive constructivism, learning is a cycle from complex to simple to complex (Bélanger, 2011).

A critique of the social constructivist view is the lack of transfer of knowledge mechanisms due to the learner constructing personal context-bound mental structures. Demand for autonomy reduces the degree of learning support compared to cognitivism and behaviourism (Bélanger, 2011).

2.3.8 Kolb's Experiential Learning Theory

Kolb proposed experiential learning theory as a "*holistic model of the experiential learning process and a multilinear model of adult development*" (Kolb & Kolb, 2005, p. 194), purportedly based on the works of John Dewey, Kurt Lewin, Jean Piaget, Lev Vygotsky, William James, Carl Jung, Paulo Freire, Carl Rogers and Mary Parker Follett (Kolb, 2015, p. xvii). Although Miettinen (2000) acknowledges the influence of Piaget, Dewey, and Lewin, Kolb & Kolb (2005) include William James, Carl Jung, Paulo Freire, Carl Rogers, and "*others*". From the writings of these authors, Kolb synthesises six experiential propositions (Kolb & Kolb, 2005, p. 194):

- Proposition 1. Learning is a process in which learners construct knowledge through continued engagement with experience.
- Proposition 2. Learning is relearning, which requires reflective integration of new concepts with existing knowledge.
- Proposition 3. Learning occurs by resolving conflicts between new concepts and existing knowledge, implying the alternation between action and reflection and thinking and feeling.
- Proposition 4. Learning is internally holistic, requiring the whole person to integrate perceiving, acting, thinking, and feeling.
- Proposition 5. Learning is externally holistic, between the person and their environment as a synergistic relationship whereby the person influences their environment and is influenced by it.

- Proposition 6. Learning creates knowledge in a constructivist manner by creating and recreating social knowledge from personal experience, in contrast to the typical educational view of transmitting knowledge.

A crucial aspect of Kolb's experiential learning theory for transformation is reflection extended by authors such as Gibbs, whose reflective cycle places theory and practice in the iterative cycle (Potter, 2015).

Learning Styles

Kolb (2015) follows Piaget when referring to learning as a process in which ideas are shaped and reshaped through experience. Neck and Greene (2011) point out that learning should be considered a method rather than a process. Processes have known inputs and outputs, fixed steps, are linear and predictive, and are precision tested. In comparison, methods are a body of skills or techniques that provide an iterative, practised toolkit and creatively uses experimentation (Neck & Greene, 2011).

For Kolb (2015), experiential learning theory is built around four learning styles that are moderately stable over a person's life, recognising that people become introverted and more reflective as they age. The four learning styles, shown in Figure 2.4, are termed divergent, assimilative, convergent, and accommodative. While not mutually exclusive, individuals tend to prefer a single style influenced by the social environment, educational experiences, and the individual's underlying cognitive structure. Knowing the individual's learning style is considered an enabler to tailor learning to the person.

- **The Converger (Think and Do)**

The convergent learning style relies on abstract conceptualisation and active experimentation. Convergents prefer a single clear answer to a problem situation that can be deduced through a hypothetical-deductive process (i.e. behaviourist). Convergents are practical in using theory and experiment but prefer technical tasks and problems to social issues.

- **The Accommodator (Feel and Do)**

The accommodative learning style emphasises concrete experience with active experimentation. Accommodators are comfortable with people but may exhibit impatience.

They seek opportunities and take risks adapting to changing circumstances using an intuitive approach. They will abandon theory or plans when they do not fit the experience. Accommodators are hands-on people who prefer practical approaches to new challenges. However, they rely on others for information and are reluctant to do their own analysis.

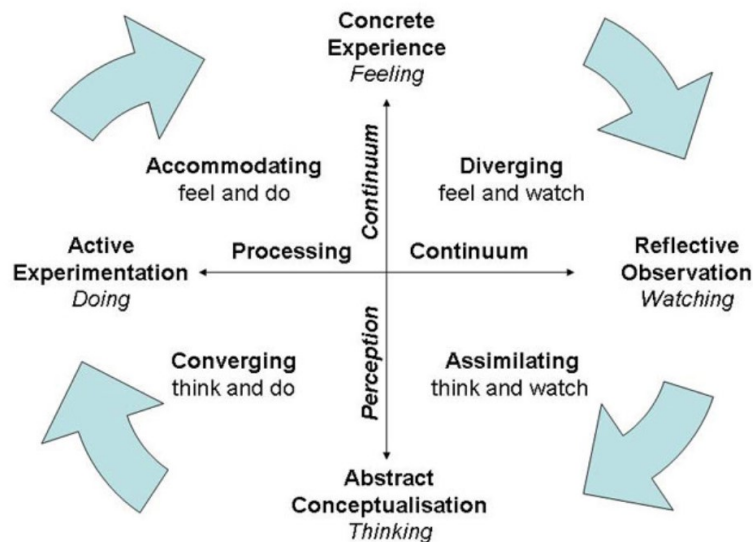


Figure 2.4. Experiential learning and learning styles (Kolb, 2015).

- **The Diverger (Feel and Watch)**

The divergent learning style emphasises reflective observation of concrete experiences viewed from multiple perspectives or contexts. The diverger style relies on imagination and awareness of meanings and values. It is particularly suited to brainstorming with divergers tending to be imaginative and sensitive. The diverger learning style incorporates gathering information into a broad interest base from which ideas are generated. This style can be summarised as watching and feeling.

- **The Assimilator (Think and Watch)**

The assimilation learning style prefers abstract conceptualisation with reflective observation. Here, inductive reasoning is evident from which theoretical models can be developed. The style focuses more on ideas and abstract concepts than people seeking to integrate logical explanations rather than practical value. Assimilators organise broad ranges of information into logical formats and prefer reading and lectures with time to cognise and assimilate information. They may need time to think things through [cf. Gestalt theory].

Kolb's experiential learning centres on two experiences; grasping and transforming (Kolb, 2015). Grasping experiences derive from concrete experience and abstract conceptualisation, which can be reframed as doing and thinking. Transforming experiences are reflective observation and active experimentation, which can be reframed as observations and to plan. Thus, Kolb's experiential learning sequence results in a do–observe–think–plan cycle.

Extension and Adaptation of Kolb's Experiential Learning Theory

The 4MAT model is based on Kolb's four learning styles and brain hemisphericity (Scott, 1994). Kolb's work has been extended and adapted by Bernice McCarthy, who formulated the 4MAT Model (Scott, 1994). This provides for four types of learners derived from Kolb and the left and right brain hemispheres, resulting in a set of eight steps in a sequential instructional model (Scott, 1994). A complete lesson will include all eight steps (Scott, 1994).

Scott (1994, p. 2) explains the four stages and eight steps as follows:

1. **Quadrant One** learners perceive information *concretely* and process it *reflectively*. Imaginative learners integrate experience with self, seek meaning, and learn best by listening and sharing.
2. **Quadrant Two** learners perceive information *abstractly* and process it *reflectively*. Analytic learners value sequential learning, seek continuity, know the accepted knowledge, and learn best in traditional ways.
3. **Quadrant Three** learners perceive *abstractly* and process *actively*. Common-Sense learners integrate theory and practice, test ideas with common sense and experimentation, and know what works and why.
4. **Quadrant Four** learners perceive *concretely* and process *actively*. Dynamic learners integrate experience and its application, enjoy self-discovery, and appreciate trial-and-error approaches [McCarthy, 1987]

The four quadrants are depicted in Table 2.3 with the teaching modes for each quadrant.

Table 2.2. The 4MAT model derived from Scott (1994).

4MAT Quadrant	Kolb	Perceive - Process	Teaching Mode (Ault, 1986 in Scott, 1994)
1 - Meaning (Why?)	Divergers	Concrete - Reflective	Group discussions, movies, short lectures with discussions, and audio and visual experiences
2 - Concepts (What?)	Assimilators	Abstract - Reflective	Extensive reading assignments, lectures, audiotapes, and "think" sessions
3 - Skills (How?)	Convergers	Abstract – Active	Workbooks, manuals, demonstrations, hands-on activities, and field trips
4 - Adaptation (If?)	Accommodators	Concrete - Active	Games, simulation, independent study, problem-solving, contract-activity assignments, and special readings

The 4MAT model illustrates how students perceive a concrete situation and process it reflectively (i.e. subjectively) (Quadrant 1). The students abstract the situation and process it subjectively (reflective) (Quadrant 2). In Quadrant 3, students actively (objective) process the abstracted concept and follow this with active (objective) processing of the concrete subject or artefact. Active processing is considered objective as the result of the action is concrete and can be analysed. The 4MAT model moves in a clockwise manner from concrete-reflective through abstract-reflective, abstract-active to concrete-active. This supports an observed situation with the desire to understand, abstract, and experiment. The 4MAT model has been successfully compared to other models, such as the comparison to the Gagne-Biggs model by Nicoll-Senft and Seider (2009), shown in Table 2.4.

Table 2.3. Comparison of 4MAT and Gagne-Briggs models of instruction (Nicoll-Senft & Seider, 2009).

4MAT Model of Teaching	Gagné -Briggs Instructional Design Model
Quadrant 1. Meaning. Why?	
Connect - Connect the knowledge of the content to a concept in a personal way.	Gain Attention. Present a problem or new situation.
Attend - Guide students to reflection and analysis of their experiences.	Stimulate the recall of prior learning. Activate previous knowledge or skills.

Quadrant 2. Concepts. What?	
Image - Employ a non-verbal medium to assess students' understanding of the concept.	Inform learner of objectives. Create a level of expectation for learning
Inform - Provide students with content knowledge about the subject.	Presenting new content. Present content.
Quadrant 3. Skills. How?	
Practice - Provide students with hands-on activities for practice and mastery.	Providing learning guidance. Provide information or activities to ensure that students understand and remember new content.
Extend - Require students to organize and synthesise their learning in a personal and meaningful way.	Eliciting performance. Provide students with an opportunity to practice what they have learned.
Quadrant 4. Adaptation. If?	
Refine - Analyze relevant applications of learning (ongoing throughout the model).	Providing feedback. Provide students with feedback on their practice. Assess performance. Assess student learning.
Perform - Provide opportunities for students to synthesise learning through sharing with others.	Enhancing retention and transfer. Assure generalization of learned skills to a new situation.

Criticism of Kolb's Experiential Learning Theory

Severe criticism of experiential learning theory resulted in Kolb and Kolb (2005) appealing to neuroscience and learning spaces to improve the theory. Kolb and Kolb (2005) link learning styles to the structure of the brain and simultaneously introduce learning spaces based on life space proposed by Lewin. The 4MAT model expands on the notion of brain structure (Scott, 1994), whereas learning spaces that connect person and environment resemble the *ba* of Nonaka and Konno (1998). The result is in an epistemic fallacy that conflates the learning cycle stages and the modes of learning. Consequently, Schenck and Cruickshank (2015) suggest using learning stages rather than learning modes (p.75). The primary issue is that Kolb's model conceptualises cerebral cortex activity as a single process that cycles through each stage of learning. This aggravates the process-method debate with Miettinen (2000) describing Kolb's experiential learning theory as an "*eclectic method of constructing [a] model of experiential*

learning" (p. 54) with the sole purpose of furthering Kolb's learning styles theory. Miettinen (2000) claims that Kolb combined "*the Lewinian tradition of action research and the work of John Dewey to substantiate his model*" (p. 4). Consequently, adapting Lewin's cycle is misleading, as each phase is distinct, as Kolb (Kolb, 2015).

Kolb's selective references to Dewey are also problematic for Miettinen (2000) when Dewey is used out of context to support Kolb's learning styles. Kirschner (2017) recommends eliminating them, as there is no evidence that learning styles lead to improved learning outcomes. A decade earlier, Kirschner had suggested that experiential learning was failing due to inherent minimal instruction (Kirschner et al., 2006). However, Biggs (1996) had addressed Kirschner's complaints by suggesting that educators must carefully plan the intended outcomes and learning methods. Consequently, the method (experiential learning cycle) and process (learning styles) are entangled. This raises the question of evaluating the outcomes and methods that must be considered during the setting and preparation of the lesson.

Kolb's experiential learning theory has been compared with the VARK learning styles of Fleming (1995). Fleming identified the four styles of learning that include visual (V), aural (A), read/write (R), and kinesthetic (K). Fleming and Mills (1992) added reading to the original visual, aural and kinesthetic approach with the stated objective to assist learners in modifying learning behaviour through reflection. Kurgun and Işildar (2016) suggest that students prefer trial-and-error and, consequently, a behaviouristic learning method. However, they concluded that students perform better as convergers (Fleming's kinesthetic) after reflection between abstract conceptualization and active experimentation.

Reflection is central to Dewey's reflective thought and action model, which is more interconnected than Kolb's experiential learning theory (Miettinen, 2000). As a pragmatist, Dewey distinguished between everyday material activities and experience. Experience for Dewey takes two forms, material and reflective. Everyday material activities involve nonreflective habits, while reflective experience occurs when the habitual experiences are disrupted. This philosophy is based on transactional realism, which considers the world in flux and constantly changing through social interaction (Hall, 2013). Constant changes to the world require ongoing adaptations by individuals that renders truth temporal and embedded

in action. For truth to be considered valid requires continual experiencing and substantiation (Hall, 2013).

Alternative Forms of Experiential Learning

Experiential learning is not restricted to Kolb and Dewey. Jesuit scholars have used the Ignatian pedagogy for at least four centuries, following the learning cycle of experience, reflection, and action (Nowacek & Mountin, 2012). Reflection is dominant as a learning process that allows the meaning of experiences to surface. Like the more recent experiential models, evaluation is a post-learning element, but Ignatian learning is always considered contextually, unlike Kolb. Context provides a holistic setting for learning by providing insights into the agential and structural contexts combined with prior learning, feelings, and attitudes. Context includes emancipation with freedom which is highly valued. Ignatian pedagogy reflects on experience encapsulated in context using memory, understanding, imagination, and emotion to produce action, evaluated through reflection on its effectiveness, to capture the meaning and value of experiences (Jesuit Institute, 2014).

2.3.9 Summary of Experiential Learning in Business Process Management Courses

This sub-section reviewed learning in business process management courses with particular attention to experiential learning projects. Experiential learning combining education and reflection of experience has been proposed to increase business process capabilities (Rosemann & vom Brocke, 2010). Central to experiential learning is reflection, which can be repeated until learning results in a change of habit (Daudelin, 1996). Therefore, experiential learning crosses the boundaries of learning theories. Learning occurs constructively through cognitive reflection on experiences that typically result in behavioural changes in social settings. Experience is based on activities performed with or without explicit cognitive action (Miettinen, 2000). Experience with explicit cognitive action, or reflective experience, requires a disruption to interrupt the non-reflective experiences without cognitive action. The disruption ranges from simple attention through thinking (Schatzki, 2016) to transformational learning (Mezirow, 2003). Transformational learning is seen to embody levels of development. Helsing et al. (2004) advocate four levels of learning – absolutist, transitionist, relativist, and contextist. Absolutist and transitionist are primarily positivistic and post-positivistic, respectively. The relativist and contextist levels are interpretivistic (Saunders et al., 2009) and subjectivistic (Dugger, 1983). Forms of reflection can be observed at each level.

The question then is, what do students reflect on that may lead to improved learning outcomes? Vygotsky (1978) recommended that learning be relevant to students' lives, meaningful, and taught naturally for the best outcomes.

2.4 Student Reflections for Improved Learning Outcomes

The centrality of reflection in experiential learning requires an understanding of reflection. Reflection is widely considered imperative to learning both in organisational settings (Baird et al., 2017; Schön, 1983) and in education (Dewey, 1938; Kolb et al., 2011), and yet there is a persistent lack of understanding of reflection for technology assimilation (Baird et al., 2017; Perusso et al., 2020). This is compounded by different reactions to reflection on experiences (Kolb et al., 2011). Daudelin (1996) suggests that three things are required to understand reflection (i) an understanding of the process of reflection; (ii) an understanding of which reflective processes best construct knowledge from experience; and (iii) tools that help to use reflection as a technique for learning. While the experiential learning of Dewey (1938) and (Kolb et al., 2011) is the process of learning, Daudelin (1996) focuses on the process of reflection.

From the origins of business process management, the customer has been central. Hammer and Champy (2002, p. 38) defined a process as *“a collection of activities that takes one or more kinds of input and creates an output that is of value to the customer”*. Davenport and Short (1990, p. 4) defined a business process as *“a set of logically-related tasks performed to achieve a defined business outcome [to] improve strategic and operational performance in product development, product delivery, and customer service and management”* (p.3). Customer centricity is found in customer-dominant logic (Heinonen & Strandvik, 2015; Heinonen, Strandvik, Mickelsson, Edvardsson, Sundström, & Andersson, 2010;), where services cross the boundary between the organisation and the customer (Heinonen et al., 2010). In contrast to customer-dominant logic, goods-dominant and service-dominant logic are both provider-dominant, seeking to expand the service-dominant logic approach (Heinonen et al., 2010). Heinonen et al. (2010) provide a holistic view of both the service provider and the customer, which provides breadth and depth of the provider-service-customer view, as shown in Figure 2.5. The service provider incorporates processes and actions that support and provide services both visible and invisible. Although the service-

dominant logic approach focuses on the customer, it has been accused of “idolizing customer-centricity” (Heinonen et al., 2010, p. 533). The customer experience is more far-reaching as it relates to past, present and future service experiences (Heinonen et al., 2010).

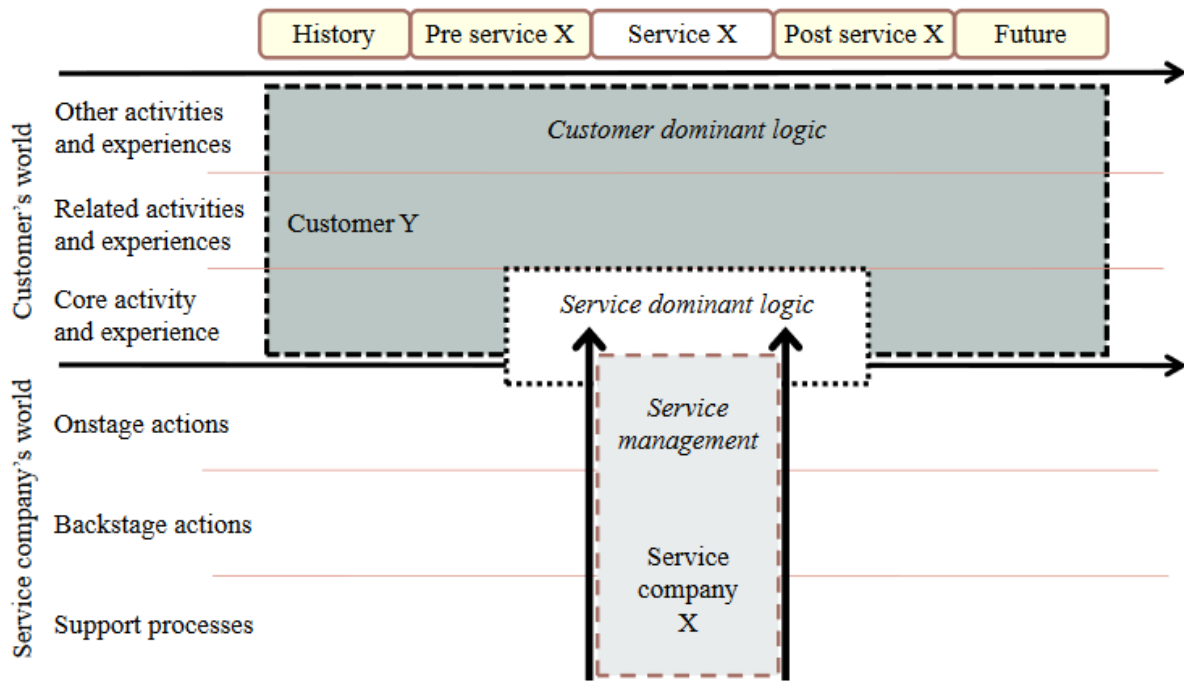


Figure 2.5. Customer dominant logic model (Heinonen, Strandvik, Mickelsson, Edvardsson, Sundström & Andersson, 2010)

While students can be considered customers of higher education institutions, the relationship is more complicated than a straightforward customer-supplier affiliation (Díaz-Méndez et al., 2019). Nevertheless, service is fundamentally the same in organisations and higher education institutions and the basis of the customer-dominant logic approach. Hence, the service-dominant logic approach (Vargo et al., 2008; Vargo & Lusch, 2016) has been preferred in higher education. The service-dominant logic approach is touted to increase student involvement, improve customer satisfaction (Finney & Finney, 2010), and co-create value (Dziewanowska, 2017; Guilbault, 2018; Lusch & Wu, 2012; Vargo et al., 2008). Central to the service-dominant logic approach is the value co-creation between the service provider and the customer (Vargo & Akaka, 2009; Vargo & Lusch, 2016). Service-dominant logic changes the focus from value-in-exchange to value-in-use (Díaz-Méndez et al., 2019). Qualifications, such as degrees and diplomas, are less valued in this approach than student competencies. However, without a thorough understanding of the interactions between student and

institution (i.e. customer and provider interactions), the co-creation of value cannot be identified (Grönroos, 2011). Grönroos (2011) concludes that co-creation is possible in limited situations where the service provider facilitates the value of the service derived by the customer. The proviso is that the provider engages with the customer's value-creation processes, determined contextually and experientially by the customer (Grönroos, 2011). Engaging with customers and students at such a level requires cognitive insights that can only be acquired directly from the student. Consequently, there is a need to acquire and decode the reflections of the student. However, there is a concern that some students react intuitively, and others pause to reflect (Kolb et al., 2011).

A student-dominant logic approach and the suggestions for understanding reflection of Daudelin (1996) were used in this study to identify potential generative mechanisms that could lead to improved learning outcomes through the analysis of the reflections of students undertaking experiential learning business process management projects. Overarching research questions and five sub-questions were generated to guide the research process. The research questions are developed in the following sections and presented in the penultimate section of the chapter.

2.5 Learning Influence Generative Mechanisms

This section reviews potential generative mechanisms that may influence student learning and how these generative mechanisms can be applied and assessed in educational courses. The pragmatist-critical realism approach follows a strong practice orientation to search for generative mechanisms that produce observable effects (Heeks et al., 2019). The link between practice and generative mechanisms is clear in Bhaskar's statement of mechanisms as '*nothing other than ways of acting on things*' (Bhaskar, 2008, p. 3). Generative mechanisms are explanatory and provide a "*rich source of explanatory devices*" (Easton, 2010, p. 122) of how and why observed events occur, but require an exploratory approach for identification (Blom & Morén, 2011).

2.5.1 Levels of Skill Development

Learning is closely related to skill development, especially concerning experience. Dreyfus and Dreyfus (1980) approach skill development from the basis that problem-solving is an essential feature of intelligent behaviour. They see concrete experience as essential to building skills

from abstract formal rules. Dreyfus and Dreyfus (1980) consider themselves contra-Piagetian and understand skill proficiency ranging from concrete experience to abstract concepts applied in multiple contexts. They consider behaviourism and cognitivism restrictive and take a Vygotskian constructivist stance to argue that scaffolded concrete experience builds higher-level skill proficiency (Dreyfus & Dreyfus, 1980). They propose a five-stage model of directed skill development from novice through competence, proficiency, and expertise to mastery.

- **Novice**

Novices learn from a reductive approach that decomposes situations into non-context abstract principles and formulas. Students require scaffolding and formative assessments to apply learned knowledge in similar situations.

- **Competence**

Recurrent exposure to real situations allows students to become competent through taught content. Instructors must pay attention to patterns that allow the student to appreciate multiple contexts in the environment. Dreyfus and Dreyfus (1980) call these 'aspects', which are relative to other situations and supported by guiding principles or guidelines.

- **Proficiency**

Practice provides proficiency through the application of the guidelines in multiple situations. The experienced aspects provide lenses for viewing new situations. However, students may view a unique situation from multiple points of view and determine different situations.

- **Expertise**

Expertise occurs after the student has experienced many varied situations and begins to take appropriate action with little or no cognitive effort.

- **Mastery**

Mastery extends beyond cognition. Dreyfus and Dreyfus (1980) consider a master to encounter "*moments of intense absorption in his work*" (p.15) with no awareness of guiding principles. However, these moments are fleeting.

At the levels of expertise and mastery, the person is regarded as an expert with embedded proficiency and competence. Consequently, in this study, the two skill levels are considered variations of the expert level.

2.5.2 Four Stages of Competence

The well-known conscious competence learning model, also known as the four stages of competence, provides insight into competency. While the provenance of the model is unclear, the earliest reference is by Broadwell (1969). The four-quadrant model describes the relationships between conscious action and competence. Superimposing consciousness as a continuum perpendicular to a competence continuum portrays the four dimensions depicted in Figure 2.6.

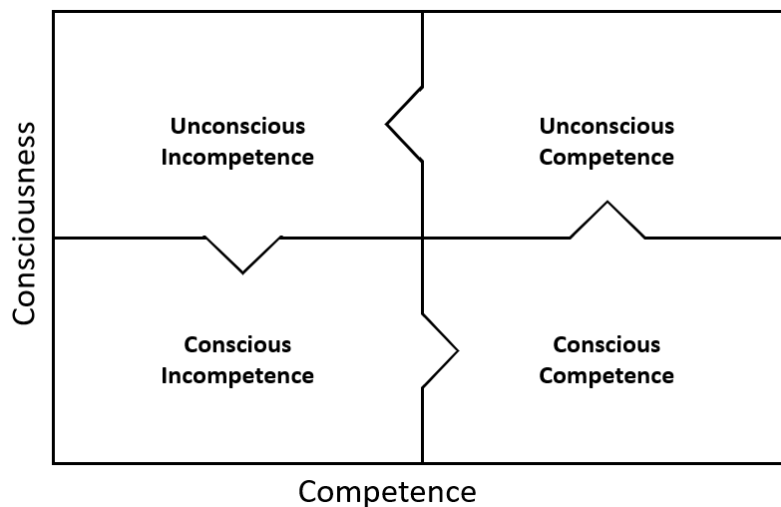


Figure 2.6. Four stages of competency.

Broadwell (1969) explains the four stages of competence in terms of levels with the unconscious incompetent at the bottom, the conscious incompetent at the next level, the conscious competent at the third level, and the unconscious competent at the final level. The unconscious incompetent acts consistently and can be likened to habit. This person focuses on the task, which Broadwell (1969) refers to as monotonous. At the second level, the conscious incompetent knows that something is missing, looks for help, and is willing to try new things to improve knowledge. This speaks to applying effort. The third level of conscious competent is confident in different settings, having experimented and adapted to multiple scenarios. The final level is the unconscious competent. This person has reached a level that is adaptable to different contexts. They are confident in knowing but do not always know why they know. They operate at an implicit level of knowledge and prefer to teach through experience as traditional masters who share their expertise through apprenticeships.

Broadwell (1969) considers masters as having inherent natural abilities in contrast to the espoused ability to progress through the levels.

2.5.3 Four Levels of Learning

From a Piagetian developmental perspective, Helsing et al. (2004) define four levels of development learning from the analysis of five adult learning models. In everyday life, learning is nuanced and has countless permutations determined by how people perceive the world around them (Helsing et al., 2004). Although learning levels may be identified, learning should be considered a *“process of interaction between individuals and their environment that influences many dimensions of an individual’s life”* (Helsing et al., 2004, p.159). Helsing et al. (2004) support their espoused levels with learners’ perceptions of the educators. They suggest that the evaluation of the educator by learners provides a rubric that could indicate their level. Knowledge of the learner’s developmental level assists the educator in providing methods suitable to the individual. Although the levels appear distinct, they are interconnected by transitional steps that may be observable as the learner moves between levels.

- **Level 1 – Absolutist**

Learners take an absolutist stance towards knowing based on a dualist philosophy. For level 1 learners, knowledge is certain and directly observable as either true or false and yes or no. Educators are sources of clearly communicated and accurate knowledge that deliver clear instructions and rules on obtaining absolute answers.

- **Level 2 – Transitionist**

Transitionist knowing disrupts the dualist view where learners have an awareness that their knowledge is incomplete. Learners progress beyond pure knowledge acquisition towards understanding and seek opportunities to apply their new knowledge. Learners tend to interact emotionally with educators, seeking acknowledgement and encouragement for their learning and rapport.

- **Level 3 – Relativist**

Learners start to recognise that truth is relative to multiple nonfinite versions in contrast to a simple lack of knowledge. This level is characterised by openness to new ideas and provides the basis for critical thinking. However, learners need to develop reflective practices and methods for evaluating versions of the truth. Learners begin to develop their own

perspectives and seek opportunities to share these with peers. In turn, they identify peers as knowledge sources, but they do not trust their interpretations for acquired knowledge. Relativist learners seek affirmation from educators who must support learners and encourage independent thinking.

- **Level 4 – Contextist**

The contextist stance expands the relativist view to take cognisance of the context of knowledge creation. Learners evaluate the background to information and the process by which it is acquired. They acknowledge authoritative sources but do not take them as determinants of absolute truth. The learners take responsibility for their learning and have developed methods for self-evaluation of their own complex ideas. Contextist learners require educators to facilitate learning by using multiple teaching strategies and encouraging corroborative argumentation.

2.5.4 Informative and Transformative Learning

Kitchenham (2008) reflects on personal experience when suggesting transformative learning as a theoretical framework for understanding learner experience with technology. Although transformative learning can bring about structural changes in knowledge, skills, attitude, and behaviour, it is *“complex and multifaceted”* (p.104). This resonates with the higher levels of learning - relativist and contextist - of Helsing et al. (2004). The lower levels, absolutist and transitionist, can be likened to informational learning, which, according to Kegan (2009), increases individuals' wealth of knowledge and skills and extends existing cognitive structures.

Kegan (2009) distinguishes between informative and transformative learning based on Piaget's assimilative and accommodative processes. Assimilative processes integrate experiences into existing learning and knowledge structures (i.e. non-learning), while accommodative process experiences modify the underlying knowledge structure. Newman (2012) suggests that the two learning forms are manifestations of the same reality and suggests that the term *“transformational”* should be replaced with *“good”*. However, Taylor and Cranton (2013) question if transformation is good as there are negative implications of structural changes brought about by transformative learning. Frenk et al. (2015) observed a middle ground that provides an informative-formative-transformative approach. Informative

learning increases knowledge and skills to form expertise, and transformative learning adds leadership traits required for change agents. Formative learning is the transitional state between knowledge building and structural change where experts become professionals.

Taylor (2008) argues that transformative learning is more than behavioural changes, while Kegan (2009) contends that transformative learning requires epistemological changes from concrete to abstract. Similarly, Mezirow (2003) describes transformational learning as an epistemological form of metacognitive reasoning that transforms 'frames of reference' (p. 58). A frame of reference is "a set of assumptions that structure the way we interpret our experiences" (Mezirow, 1990, p. 1). Frames of reference comprise two dimensions, habits of mind and points of view. Both dimensions affect learning levels by evolving the understanding of activity, leading to changes in subsequent actions (Mezirow, 1990). Habits of mind may be addressed through reflection, reflective action and reflexivity required by transformative learning (Bass et al., 2017; Mezirow, 1990, 2003). Mezirow (1990) describes three forms of reflection: content (what), process (how), and premise (why). Processes (how) are both objective (how the experience occurred and when) and subjective (how the experience was experienced). Nevertheless, reflection must be learnt and scaffolded to be effective (Perusso et al., 2020). Kegan (2009) argues that educators must understand the current epistemologies of their students, ranging from concrete to abstract, for transformative learning to be effective. According to Cranton (in Newman, 2012), verification by the learner is subjective and the appropriate research method. Objective research into transformative learning may be inappropriate, and the generalisation of findings questionable. Newman's (2012) reasoning resonates with the lack of empirical findings of learning improvements through transformational learning programs (Bass et al., 2017). Nevertheless, without assessment mechanisms improvements in learning outcomes cannot be observed.

2.5.5 Depth of Knowledge Assessment Mechanism for Experiential Learning

Research into the depth and breadth of experiential learning has shown that depth of knowledge produces higher-order thinking skills (synthesis and application) and overall educational experience (Coker et al., 2017). On the other hand, breadth improves working relationships. Coker et al. (2017, p. 19) conclude that 'in *experiential learning, depth should be taken more seriously*'. Several assessment models exist of which Bloom's taxonomy is most frequently used (Cannon et al., 2010; Cannon et al., 2009). Another assessment method

derives from the work of Webb (1997, 2002). Whereas Bloom's taxonomy relies on a sequential progression from lower to higher levels (Anderson & Krathwohl, 2001), Webb's depth-of-knowledge model is not as restrictive. Like Bloom's taxonomy, Webb's depth of knowledge helps educators assess learning outcomes at multiple levels to comprehensively evaluate course assessments. The four levels of Webb's (1997, 2002) depth of knowledge model resemble the dimensions of knowledge of Anderson and Krathwohl (2001), mainly at the lower levels. Anderson and Krathwohl (2001) list four knowledge dimensions: factual knowledge, which are the essential elements required in a discipline; conceptual knowledge, which links factual knowledge into functioning units; procedural knowledge, which are the methods and techniques to put the conceptual knowledge in practice; and metacognitive knowledge which is the combination of cognition and the awareness of personal cognition.

Webb's four levels (2002) are geared to assessment and do not include Anderson and Krathwohl's (2001) metacognitive level.

- **Level 1 – Recall**

Students can recall facts and definitions.

- **Level 2 – Skills and concepts**

Recalled concepts are combined to provide a solution to a problem. This level includes concepts as skills may be too narrowly defined in some cases.

- **Level 3 – Strategic thinking**

Higher thinking is used for reasoning and planning. This level frequently requires explaining and may be complex and abstract, with demands higher levels of reasoning.

- **Level 4 – Extended thinking**

Higher levels of thinking using complex reasoning and planning occur over time. Extended time is in respect of advanced activities and not repetitive tasks which fall under level 2.

A comparison between Webb's (1997, 2002) depth of knowledge model and the dimensions of knowledge of Anderson and Krathwohl (2001) is presented in Table 2.5.

Table 2.4. Comparison of Webb's (1997, 2002) depth of knowledge model to the dimensions of knowledge of Anderson and Krathwohl (2001).

Level	Depth of Knowledge (Webb, 1997, 2002)	Dimensions of Knowledge (Anderson & Krathwohl, 2001)
1	Recall - students can recall facts and definitions.	Factual knowledge - the essential elements required in a discipline
2	Skills and concepts - recalled concepts are combined to provide a solution to a problem	Conceptual knowledge - links factual knowledge into functioning units
3	Strategic thinking - higher thinking is used for reasoning and planning	Procedural knowledge - the methods and techniques to put the conceptual knowledge into practice
4	Extended thinking - higher levels of thinking using complex reasoning and planning occur over time	Metacognitive knowledge - the combination of cognition and the awareness of personal cognition

2.5.6 Summary of Potential Generative Learning Mechanisms

Effective transformative learning requires reflection, reflective action, and reflexivity (Bass et al., 2017; Mezirow, 1990, 2003), which must be verified by the learner (Boud et al., 2005; Newman, 2012). Dreyfus and Dreyfus (1980) take a constructivist approach suggesting that students move from novice to master levels through scaffolded experiences. Helsing et al. (2004) take a cognitive approach in proposing four levels that transcend an absolutist objective philosophy to a contextual subjective philosophy. This provides an integrative effect of informative – formative – transformative learning (Frenk et al., 2015; Kegan, 2009; Newman, 2012). Helsing et al. (2004) confirm their levels on the basis of the educator. Transformative learning requires reducing scaffolding and formative assessments as the levels move from absolutist novice to contextual master. Webb (1997, 2002) provides a four-level depth-of-knowledge assessment model that has a similar ontological basis to the levels of Helsing et al. (2004) and Anderson and Krathwohl (2001).

The next question concerns the relationship that may exist between reflection and the identified learning influence generative mechanisms.

2.6 Reflective Practices

Reflection is crucial to experiential learning models (Bass et al., 2017; Dewey, 1938; Kolb, 2015; Mezirow, 2003; Perusso et al., 2020) and practitioners trying to understand reflective

practice must appreciate that reflection is complex. Kolb et al. (2011) indicate that students react in diverse manners when faced with a disruption in their practice. While some students react intuitively, others may pause to reflect. Furthermore, it is crucial to consider that reflection on learning is personal and cannot be done on behalf of another person (Boud et al., 2005).

However, reflection alone is insufficient and requires support and training (Perusso et al., 2020). Simultaneously, there is a lack of clarity of what reflection means, epitomized by Bolton (1999), who combines reflection and reflexivity when suggesting that reflection is the act of looking through the mirror in contrast to looking into the mirror. McIntosh (2010) uses the analogy of a mirror when describing reflection as looking back at an experience that is passive, partial, personal, reductionist and subjective. Hibbert et al. (2010) extend the reflection metaphor from the potential change in practice to transformation through reflexive action as a transformative recursive process. This resonates with Finlay (2008), who considers reflection and reflexivity as a continuum from inaction to purposeful action.

2.6.1 Reflexivity

Cunliffe (2016) takes a pragmatic stance when defining reflexivity as questioning what is taken for granted and examining the effect it may cause. Reflexivity operates at multiple levels, from self-reflexive and constructive to a group level as critical reflexivity (Cunliffe, 2016). Allen et al. (2017) extend reflexivity to action research and call for recognising an ontology for reflexivity different from reflection. Johnson and Duberley (2003) define three types of reflexivity that embrace combinations of ontological and epistemological assumptions centred around change: methodological, deconstructive, and epistemic reflexivity. Methodological reflexivity sustains objectivity, while deconstructive reflexivity seeks to unpack and revise constructive processes, and epistemic reflexivity is critical and emancipatory.

Change is central to reflexivity and is approached through reflection (Hibbert, 2013). Recognition of change in reflexivity is fundamental in Archer's morphogenetic approach (Archer, 2010). For Archer, reflexivity is the internal conversation that mediates agents' internal and external worlds (Vogler, 2016). Reflexivity is a mediator between structure and agency, referred to as morphostasis and morphogenesis (Archer, 2010). Morphostasis is the process in complex systems that preserves the status quo, while morphogenesis is the process

that brings about a change of state, form, or structure (Archer, 2010). Fast-paced globalisation has resulted in 'unprecedented morphogenesis' (Archer, 2010, p. 284), which has produced instabilities in social structures and increased reliance on agents' powers, further destabilising structures. While this makes morphostatic decisions uncertain, it unlocks agents' opportunity to make morphogenetic changes of new connections between existing structures through reflexivity (Archer, 2010). Archer's morphogenetic explanatory framework outcomes can be reproductory or transformative based on intertwining the stratified ontology of structure, culture, and agency. However, the layers are not inseparable as in the agential theory of Barad (2003) but resemble the imbrication of Leonardi (2013). Archer (2010) relates the inseparability to emergence and double morphogenesis, whereby agents themselves change to pursue social change.

Archer situates the morphogenetic approach between pragmatism and critical realism and criticises extreme versions of each as either too internally focused on agents (pragmatism) or externally focused on structure (critical realism). Pragmatism exploits reflexivity to overcome habitual personal action blocked by problematic situations, while the layered ontology of critical realism uses reflexivity to understand and adjust action to conform to underlying structures (Archer, 2010). Although this view may hold appeal, it is confounded by social structures concealed in the real domain beyond the veiled actual domain and observable empirical domains (Bhaskar, 2008). Efforts to understand the hidden social dispositions have found Bourdieu meaningful (Archer, 2010; Elder-Vass, 2007; Vogler, 2016). According to Archer (2010, p. 272), "*many scholars accord routine action a central role in social theory and defend the continuing relevance of Bourdieu's habitus. Simultaneously many recognise the importance of reflexivity.*" Similarities of the morphogenetic approach of Archer are seen in Bourdieu's habitus. Like Archer, Bourdieu's habitus takes a middle ground between structure and agency (Koch, 2020). Habitus guides practice through *doxa*, unquestioned social practices until a state of crisis occurs (Koch, 2020). Crises result in either an authoritative power with a limited range of possibilities for action referred to by Bourdieu as orthodoxy (Koch, 2020). While orthodoxy brings about restoration and is the most common result of a crisis, heterodoxy opens the future to bring about change through conscious action (Koch, 2020). In the advent of disruption, morphogenesis may be compared to heterodoxy and morphostatic to orthodoxy.

Consequently, habit and habitus reinforce existing social structures. Habit reframes the structural, cultural, and agential domains to the extent of maintaining them. In Archer's terms, the ruling status quo is retained in a morphostatic position. However, this does not reduce everything to a static role, as habits must be formed and reformed to fit the culture and social structure, much like Bourdieu's habitus. On the other hand, morphogenesis is observed in the layer of agency constrained by higher layers of structure and culture. Thus, there is a continuum between morphostasis and morphogenesis with unlimited hybridisation between the state's extremes (Archer, 2010).

Archer (2010) prefers the term parity to hybridisation, representing variances across populations compared to hegemonic positioning between the two poles. Archer (2010) provides a broad differentiation for different reflexivity modes: communicative, autonomous; meta; and fractured reflexives.

- **Communicative reflexives**

Communicative reflexives are internal conversations that require completion and confirmation by others before resulting in courses of action.

- **Autonomous reflexives**

Autonomous reflexives are self-contained internal conversations that lead directly to action.

- **Meta-reflexives**

Metareflexives are critically reflexive internal conversations that are critical about effective action in society.

- **Fractured reflexives**

Fractured reflexives are internal conversations that intensify distress and disorientation rather than leading to purposeful courses of action.

The mirror metaphor for reflectively observing actions may lead to change in practice, but transformation occurs only through reflexive action (Hibbert et al., 2010; McIntosh, 2010). Reflective practice causes change through a recursive reflexivity process (Hibbert et al., 2010). Thus, reflexive habits lead to action derived from the relationship between reflection and recursion mediated by a process of change. Reflection and recursion are the main aspects of experiential learning theory (Dewey, 1938; Kolb, 2015). Hibbert et al. (2010) encourage examining reflection and recursion in relation to each other. From a Peircean perspective,

reflexivity can be viewed as a second formed from the firsts of reflection, recursion, and change to form a third (Plowright, 2016).

Hibbert et al. (2010) propose a four-quadrant reflexivity model to describe relationships between reflection and recursion. In the model, reflection is either closed to self or open to others, and recursion can be active or passive. Superimposing reflection as a continuum perpendicular to the recursion continuum portrays the four dimensions of the reflexivity model as depicted in Figure 2.7. Hibbert et al. (2010) emphasise that the model is a method of understanding the relationship between reflection and recursion relative to reflexivity and is not intended as a taxonomy.

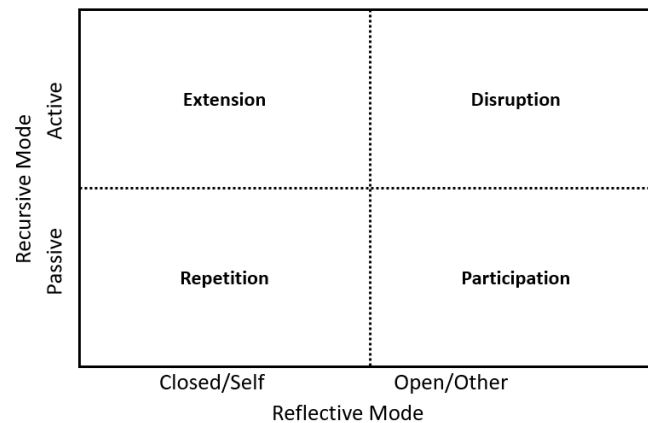


Figure 2.7. Four dimensions of reflexivity (Hibbert et al., 2010).

- **Extension – Reflective Self and Active Recursion**

Reflection is self-focused, but a level of shock or stuckness leads to active recursivity. Comparable to Archer’s autonomous reflexivity.

- **Disruption – Reflective Other and Active Recursion**

Disruptive reflexivity with active recursion and reflection focuses on others and may become disruptive to self. Comparable to Archer’s fractured reflexivity.

- **Repetition – Reflective Self and Passive Recursion**

Reflexivity is bounded by passive recursivity and self-focused reflection. Comparable to Archer’s communicative reflexivity and possibly Bourdieu’s reflexivity.

- **Participation – Reflective Other and Passive Recursion**

Participatory reflexivity is reflectively open to others and passively recursive, leading to trust and dialogue. Comparable to Archer’s meta-reflexive.

Reflexivity is central to ethical living for Cunliffe (2016), who defines reflexive practice as 'subjective understandings of reality as a basis for thinking more critically about the impact of our assumptions, values, and actions on others' (Cunliffe, 2004, p. 407). Thus, Cunliffe (2004) combines subjectivity and objectivity in reflexivity. Subjective dealings with others challenge the subjective understanding of reality and critically think about social interactions. Critical thinking is mediated by assumptions, values, and actions, thereby linking critical reflexivity to disconcerting or disturbing a person's equilibrium. Subsequently, Cunliffe (2016) defined reflexive practice as "[q]uestioning what we, and others, might be taking for granted—what is being said and not said—and examining the impact this has or might have" (Cunliffe, 2016, p. 741). The change towards a more robust ethical intersubjective stance reveals a more in-depth focus on relationships and a socially constructed understanding of the world. From a Peircean perspective, Cunliffe moves deeper into the territory of secondness. Cunliffe (2004) provided a sense-making map of reflex interaction, reflective analysis and critical reflexive questioning with reflexive class activities and the use of reflexive journals. Reflex journals 'are incredibly useful in terms of helping students understand the difference between reflection and reflexivity and how to be reflexive' (Cunliffe, 2016, p. 744). Thus, Cunliffe separates reflection from reflexivity and consequently from the practice of being reflexive. Together reflection, reflexivity, and reflexive action reflect pragmatist views from disrupted habit that leads to action through reflection. Figure 2.8 shows Cunliffe's concept of reflexivity concerning objectivity and subjectivity. The reflex action mediates objective reflective analysis and subjective critical reflexive examination.

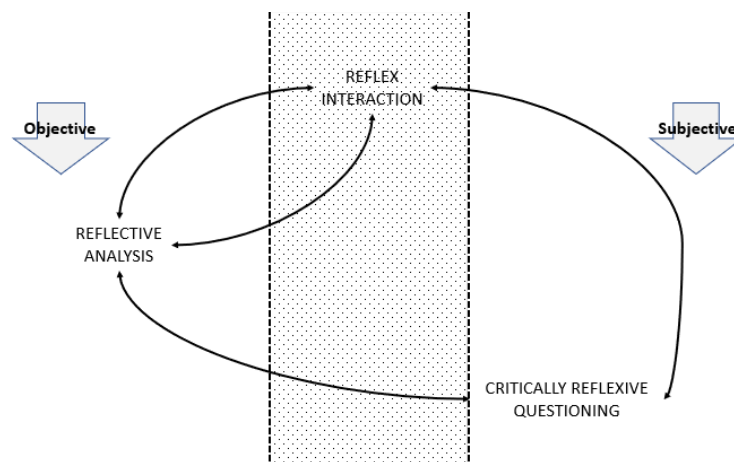


Figure 2.8. Reflex interaction, reflective analysis and critically reflexive questioning (Cunliffe, 2004).

2.6.2 Reflective Practice

Moon (2009) combines reflection and reflective learning when observing reflection as widely used but complex and challenging to teach. Two key issues arise when teaching reflective writing: how to get students to write reflectively; and obtaining reflections that are more than simple descriptions. As reflection and reflective learning are constructed terms, there are multiple interpretations and methods for practicing reflection, making reflection challenging to teach and assess (Moon, 2009; Perusso et al., 2020). According to Moon (2009), teaching the theoretical background to reflection is not beneficial and may even constrain reflection. The use of graduated examples of reflection from good reflection (or deep as the process and premise (Mezirow, 1990), i.e. depth) rather than from not good reflection (or descriptive content (Mezirow, 1990), i.e. breadth) is preferable for teaching students reflective practice.

Reflective practice is best known from the work of Schön (1983). Reflection and practice are inevitably connected in a variety of methods, both in material and conceptual terms. Moon (2009) uses multiple levels (depths or 'graduations', p.58) of reflection, which are similar to other authors with respect to a continuum of reflection from superficial to deep reflection. McIntosh (2010) links reflective practice with action research, while Raelin (2007b, p. 499) cites three building blocks to “*create mutuality*” between theory and practice, tacit knowledge, critical reflection, and mastery. This is similar to Kolb (2015) and Dewey (1925), whereby the practice of reflection on experience leads to learning. However, Kolb and Dewey differ markedly in their approaches. Kolb separates reflection and action, while Dewey is less vocal about reflection but still interweaves reflection and action (Miettinen, 2000). Mezirow (2003) advocated critical reflection as the most effective form of reflection that can lead to transformative learning. The potential for action is not the same as taking action, and consequently, people must be motivated to reflect to better understand their situation (Mezirow, 1990).

2.6.3 Four Levels of Reflection

The literature describes reflection as complex (Boud et al., 2005), having multiple forms (Kemmis, 2005) with the potential to go beyond the how- and how-to of action to contemplate the why (Mezirow, 1990). Kember et al. (2008) provide four levels of reflection: habitual action (or non-reflection); understanding (comprehending); reflection; and critical

reflection. In the current study, understanding is referred to as comprehending to avoid confusion with the theme of increasing understanding observed in the findings.

- **Level 1 - Habitual action**

Habitual action (or non-reflection) occurs when a process that was undertaken often is automatically followed without further consideration. It is associated with surface learning and called non-reflection as the learner may not understand the process, and consequently, no alternatives are considered. Learners at this level are absolutists, often paraphrasing and showing evidence of plagiarism.

- **Level 2 - Comprehension (*Understanding*)**

Comprehension occurs when learners seek to comprehend the subject matter and to look at what the author means. Comprehension requires limited reflection and consequently may not be put into practice. New knowledge is not assimilated into the learners understanding and has a short half-life. The students' work may accurately reflect the theory, but there will be no application in practice.

- **Level 3 - Reflection**

Reflection allows the learner to experientially understand the information by relating it to personal experience and applying it in practice. Knowledge and experience form personal meanings of the subject matter, and learners incorporate personal insights into their knowledge.

- **Level 4 - Critical Reflection**

Critical reflection has transformative properties that can change learner beliefs and presumptions and are most noticeable in learners in the early stages of understanding a concept before assumptions become established.

2.6.4 Four stages of Learning from Experience Through Reflection

Daudelin (1996) provided a simplified reflective practice process that allows people to take responsibility for their learning through four stages of reflection to answer three questions regarding the need to understand (i) the core processes of reflection, (ii) the most likely process that promotes learning, and (iii) the tools that can be used to use reflection for learning. The reflective process starts with articulating the problem, analysing the situation, proposing theoretical assumptions, and supporting the solution. The taking of action includes deciding not to take action or repeatedly apply the reflective process (Daudelin, 1996).

Daudelin (1996) recommends posing questions as a technique to increase the learning power of reflection at each stage.

- **Articulation**

Articulation is the problem statement requiring reflection. Daudelin (1996) refers to Dewey's state of doubt as a driving force for reflection. The relevant question for the articulation stage is what occurred?

- **Analysis**

Analysis is the act of looking for solutions that may resolve the doubt. The relevant question for the analysis stage is, why did it happen?

- **Assumption**

Assumption is the process of generating a hypothesis for overcoming doubt, which entails formulating a tentative theory and testing it. The relevant question for the assumption stage is how can things be done differently in the future?

- **Action**

Action ends the hypothesis and articulates a modified behaviour pattern that indicates that learning had taken place. Daudelin (1996) includes the decision to act as part of action if it leads to a change of behaviour. The relevant action stage question is what should be done now?

The process of reflection by Daudelin (1996) resembles the reflection of Mezirow (1990). Following the definition of process by Neck and Greene (2011), processes have fixed steps, are linear and predictive compared to methods which are iterative bodies of skills and techniques that creatively use experimentation. Consequently, reflexive practice fits more with the definition of a method than a process.

The four questions of Daudelin (1996) resonate with a learning model proposed by Cronjé (2006), which has been extended over the past decade and a half (Cronjé, 2006, 2013, 2020). The learning model depicted in Figure 2.9 is based on the model of Burrell and Morgan (1979), adapted by Cronjé (2006). On the horizontal axis, social science research ranges from objective to subjective, and along the vertical, the nature of society ranges from regulation (concrete) to radical change (abstract) (Cronjé (2011)). Each quadrant indicates a paradigm

that varies according to the ontological understanding of society's nature and the nature of research.

Cronjé (2011, p. 3) describes each of the paradigms as follows:

- **Radical humanist**

Radical humanists are interested in the subjective world but feel the need to transcend or overthrow current societal arrangements. They aim to explore alternatives.

- **Interpretive**

Interpretivists believe that the world's human experience is subjective, and they are concerned about understanding it as it is. They aim to explain situations.

- **Functionalist paradigm**

Functionalists believe that the world is objectively discoverable and can be improved by “tightening up” the rules. They aim to develop solutions.

- **Radical structuralist**

The radical structuralist view is based on an objective world view. They concentrate on structural relationships, believing that radical change is built into the very nature of society. They aim to describe the position as it is.

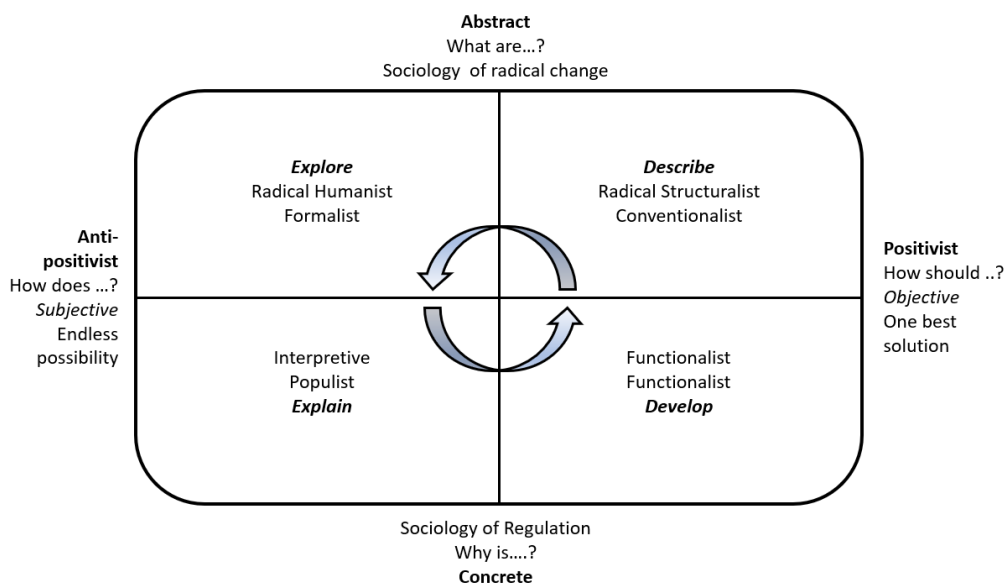


Figure 2.9. Learning model based on Cronjé (2011).

Based on Roode (1993), Cronjé's (2020) learning model poses four questions on the perpendicular axis, which resonate with Daudelin (1996). On the abstract-concrete axis, the questions are what and why. On the subjective-objective axis, the questions of how and when

(or under what circumstances) are posed. The questions and stages from Daudelin (1996) show similarities to the questions and quadrants of Cronjé (2020), as shown in Table 2.6, which combines the four levels of reflection (Kember et al., 2008) with the four stages of reflection and four associated questions (Daudelin, 1996), four quadrants of learning, and the four associated questions (Cronjé, 2020).

Table 2.5. Learning model superimposed on levels of reflection and stages of reflection models.

Four Levels of Reflection	Four Stages of Reflection	Four Questions	Four Quadrants	Four Questions
(Kember et al., 2008)	(Daudelin, 1996)	(Cronjé, 2020)		
Level 1. Non-Reflection as Habitual Action	Articulation	What occurred?	Describe	What & When
Level 2. Comprehension (Understanding)	Analysis	Why did it happen?	Explore	What & How
Level 3. Reflection	Assumption Hypothesis Generation / Tentative Theory to Explain	How do we do things differently?	Explain	How & Why
Level 4. Critical Reflection	Action	What should we do now?	Develop	Why & When

Cronjé (2016) recommends using the learning model for design science research, which has similarities to action research (Iivari & Venable, 2009). The approach provides two outputs – design output and research output. The design output flows from the develop quadrant and the research output from the explore quadrant. This resembles the 'profound yet powerful' simple questions of Daudelin (1996, p. 42), which ask 'what else' and 'why' much like the 'five why' (Serrat, 2017). When asking “*what else*” (i.e. Cronjé’s what and how) calls for reflective practice.

The primary source of criticism of the Burrell and Morgan (1979) model is the inherent limitation of incommensurability (Cronjé, 2011; van Zyl, 2015). To overcome this, Roode (1993) suggested the use of a sequential reflection of each quadrant. Reflecting on each paradigm allows researchers to identify a specific aim and guide students to formulate focused research questions (Cronjé, 2011). The combination of the prescriptive nature of Burrell and Morgan’s model, “*the simplistic one-dimensional approach*” of Roode (van Zyl, 2015, p. 11) and lack of self-reflexivity in students has brought further criticism to the model (van Zyl, 2015). Van Zyl (2015) suggests that these issues have led to the over-simplification

of research approaches. The result is that students unthinkingly accept the status quo, thus remaining 'inexperienced, ill resourced, and underprepared' (van Zyl, 2015, p. 9). This leads to the potential that staff, who were poorly prepared as students, will be ill-prepared to effectively educate students (van Zyl, 2015). To better prepare students, van Zyl (2015) recommends self-reflexivity, introspection, and autonomy. The intention is for students to pragmatically investigate all alternatives in their research and not rely solely on a single paradigm (van Zyl, 2015).

Hence, this raises the question of what form of reflection or self-reflexivity is suitable in each quadrant.

2.6.5 Action as Theoretical Underpinning of Experiential Learning and Reflexive Practice

The current study began with the need to understand how to improve learning outcomes in experiential learning courses based on the theoretical positions that reflection leads to improved practice. Considering that people need in-depth training for effective reflection (Moon, 2009; Perusso et al., 2020), a reflective practice may yield minimal results in novices, such as students undertaking a semester course. From a pragmatist perspective, action is more effective than reflection. Although reflection may lead to action it is the practice of action that affords learning in experiential learning (Dewey, 1938).

Raelin (2007b) discusses the need for a synthesis between knowledge and action and encourages viewing knowledge from a knowing-in-action perspective rather than reflection-on-practice, limiting the ability for theory to inform the practice. Raelin (2007b, p. 496) encourages the development of an epistemology of practice to “*explore how the concept of knowledge can be broadened to incorporate practice, paying special attention not so much to the content of our knowledge but to the processes that encourage more knowing-in-action and their outcomes*”. The focus shifts from rote learning to combining practice and theory in processes that encourage action-in-learning and adapting outcomes. The shift from theory to practice is observed in the learning outcomes associated with Bloom’s revised taxonomy (Anderson & Krathwohl, 2001). Anderson and Krathwohl (2001, p. 64) provide three broad learning outcomes; no-learning, rote learning, and meaningful learning.

- No-learning occurs when students can neither recall nor apply relevant knowledge.
- Rote learning occurs when students can recall relevant knowledge but cannot apply the learning or transfer it to a different situation.
- Meaningful learning is when a student possesses relevant knowledge that can be recalled and used to solve current problems and transfer the learning to new situations.

Anderson and Krathwohl (2001) see learning outcomes as a set of educational objectives to promote the transfer of learning to new situations. Their objective is to assist educators in formulating, teaching, and assessing learning outcomes with the goals of retention and transfer. Retention refers to the past for recalling what was presented in lessons. Transferring refers to the future in using the learned material in new situations and learning new material (Anderson & Krathwohl, 2001). This resonates with the informative-transformative learning of Kegan (2009) and Newman (2012).

Raelin (2007a) concludes that through a discourse-in-action mechanism, reflexive practice improves human agency (in other words, ongoing life) and "*action in the world*" (pp.73-74). While reflection may benefit learning, the benefits of reflection are derived through action, as shown in the change from no learning to rote learning to meaningful learning (Anderson & Krathwohl, 2001). Consequently, knowledge of what motivates action is of more value than knowledge of what motivates reflection. Hence, it would be advantageous to determine the factors that lead novices and beginner reflective practitioners to action. From the experiential learning perspective, factors that lead to action also lead to learning, thus influencing learning.

2.6.6 Reflective Practice Summary

This section reviews reflexive practice to provide a background for the potential relationship between reflection and learning mechanisms. Reflexive practice is a complex topic that operates at multiple levels, from non-reflection and non-learning to transformational reflexive practices. All experience levels can lead to a change of habits, but higher reflection levels are more likely to lead to learning, which can be applied in multiple contexts. Reflection may be subjectively restricted to the self (self-reflection) or objectively recognized in external

materials and people (reflex interaction). Likewise, a transformation may occur relative to others (reflective analysis) or the self (reflexive action). In either case, reflection is triggered through a disruption (Hibbert, 2013; Miettinen, 2000; Turnbull, 2008) which results in an interruption of a person's equilibrium (Cunliffe, 2004) and is a common factor in the reflective works of Archer (2010), Cunliffe (2016) and Dewey (Turnbull, 2008). Disrupting a person's equilibrium leads to reflection, which can be encouraged through multiple modes of reflection. Cunliffe (2004, 2016) suggests reflexive journals, while Archer (2010) prefers internal conversations that rely on further factors to bring about action. Archer (2010) suggests that these factors may originate externally in communication with others or internally either autonomously or through a sense of distress. Recently, Perusso et al. (2020) corroborated the need for dialogue to improve reflective practice. The inference is that it would be advantageous to determine the factors that lead novices and beginner reflective practitioners to action. From the experiential learning perspective, factors that lead to action also lead to learning and thus influence learning.

In the next section, a theoretical lens model that links the four levels of learning to the levels of reflection, reflexivity, and development of skills is presented. The theoretical lens model is followed by the research problem stated in experiential learning, and the research questions are reviewed.

2.7 Reflection on the Knowledge Gap

The reviewed literature reflects the importance of reflection and reflective practice concerning learning outcomes (Cunliffe, 2016; Hibbert, 2013; Miettinen, 2000; Moon, 2000; Perusso et al., 2020; Schön, 1983). Retentive knowledge is a tenet in learning at the absolutist level (Helsing et al., 2004). However, gaps become evident when questions cannot be answered (Kember et al., 2008) and learning cannot solve problems or be transferred to new situations (Anderson & Krathwohl, 2001). Four levels or states of learning are proposed, starting with the absolutist level, which begins with no learning and leads to rote learning (Anderson & Krathwohl, 2001) characterized by habit and non-reflection (Kember et al., 2008). In the second and transitionist level (Helsing et al., 2004), learning moves beyond objectivity and leads to subjectivity characterized by rote learning (Anderson & Krathwohl, 2001) and comprehending (Kember et al., 2008). In the relativist third level (Helsing et al., 2004), the

learner begins to reflectively rely on self to apply objective knowledge in multiple situations (Kember et al., 2008). Learners move beyond rote learning toward meaningful learning (Anderson & Krathwohl, 2001) and start to solve situational problems. At the contextist fourth level (Helsing et al., 2004), learners master the ability to apply absolutist knowledge in different contexts through critical reflection (Kember et al., 2008) and meaningful learning (Anderson & Krathwohl, 2001). Fourth level mastery may cycle and revert to the first level when the context can no longer be supported by the knowledge of the master/expert.

A move can be seen between self and others in the levels, which can be material or social (Archer, 2007). At the absolutist first level, the disruption in a person's equilibrium results in the need for knowledge acquisition. The self is denoted in learning absolute knowledge from others with limited recognition of the other and equates to behaviourist teaching methods. Reflection at this level is limited and seen as habitual action and non-reflection. At the transitionist second level, others' knowledge is recognized as inadequate to provide knowledge to the self. Reflection at this level relates to reflective comprehension of what existing knowledge means and gaps in that knowledge. Knowledge will be short-lived if it is not reinforced. At the relativist level, the self is reflectively examined to apply absolutist knowledge in different situations. Self-reflection can result in reflexivity, which changes the person's actions and leads to long-term knowledge retention. At the contextist fourth level, knowledge from the lower levels is applied in multiple contexts, producing new knowledge to become absolutist knowledge for others. At this level, reflection is critical and changes behaviour (Kember et al., 2008). However, it may also lead to habitual action with non-reflection, which will continue until a disruption is encountered that affects the person's equilibrium and forces reflection (Archer, 2010; Cunliffe, 2016; Hibbert, 2013), which may lead to learning (Dewey, 1938; Kolb, 2015; Schön, 1983).

As reflection remains a complex topic, it is not clearly understood how reflection produces beneficial outcomes. Two views of reflection are pertinent to the study. The first regards reflection as a purely cognitive function, and the second as a combination of cognition with action, termed reflexivity or reflexive practice (Hibbert, 2013; Hibbert et al., 2010). Reflection and reflexivity may be considered a continuum from inaction to purposeful action (Finlay, 2008). However, since novices are not yet active practitioners, they may lack sufficient knowledge to reflect adequately (Perusso et al., 2020).

2.8 Theoretical Lens Model

Multiple mechanisms were identified from the reviewed literature that may lead to improved learning outcomes in experiential learning projects. A common theme of the mechanisms was the series of levels against which to measure the learning effects. Similarities between the levels allow mapping of the levels to one another. The four levels of learning (Helsing et al., 2004) map to the four levels of reflection (Kember et al., 2008), the four modes of reflexivity (Archer, 2007), the four stages of reflection (Daudelin, 1996), Kolb’s experiential learning model (Kolb et al., 2011), the three levels of learning outcomes (Anderson & Krathwohl, 2001), the four levels of assessment (Webb, 2002), the five stages of skills development (Dreyfus & Dreyfus, 1980), the four stages of competence (Broadwell, 1969), four learning theories (Bélanger, 2011; Hean et al., 2009) and the model for generating research questions (Cronjé, 2020). The mechanisms were consolidated into a theoretical lens model, as shown in Table 2.7.

Table 2.6. Theoretical lens model.

Level	1	2	3	4
Four Levels of Learning (Helsing et al., 2004)	Absolutist - Learners take an absolutist stance and expect clear instructions and rules on obtaining true answers.	Transitionist – Learners recognize the relative and incomplete nature of knowledge and seek to understand opportunities to apply the new knowledge and acknowledgement from educators.	Relativist - Learners recognise multiple non-finite versions of the truth. Reflective practices are essential for learners seeking affirmation from educators.	Contextist - Learners evaluate the contexts of information and the process by which it is acquired. Educators facilitate learning by using multiple teaching strategies and encourage argumentation.
Four Levels Reflection (Kember et al., 2008)	Non-reflection (Habit) - Habitual action takes place when a process is followed automatically without further consideration. Learners are absolutists, and paraphrasing is common.	Comprehending – Comprehending (understanding) occurs when learners seek to comprehend subject matter but do not include reflection. Learners reflect theory without application in practice.	Reflection - Reflection allows the learner to understand information by relating it to personal experience and applying it in practice. Learners include personal insights.	Critical reflection – Critical Reflection is the domain of Dewey, Mezirow and Habermas. Critical reflection has transformative properties and is most common in the early stages of understanding before assumptions become entrenched.
Four Modes of Reflexivity (Archer, 2007)	Communicative reflexives are internal conversations that require completion and confirmation by others before resulting in courses of action.	Autonomous reflexives are self-contained internal conversations that lead directly to action.	Metareflexives are critically reflexive internal conversations that are critical about effective action in society.	Fractured reflexives are internal conversations that intensify distress and disorientation rather than leading to purposeful courses of action.

Four stages of Reflection (Daudelin, 1996)	Articulation is the reflected upon problem statement.	Analysis is the act of looking for solutions that may resolve the doubt.	Assumption is the process of generating a hypothesis for overcoming doubt, which entails formulating a tentative theory and testing it.	Action ends the hypothesis and articulates a modified behaviour pattern that indicates that learning had taken place.
Experiential Learning (Kolb et al., 2011)	Concrete Experiences after an incident	Reflection through observation	Abstract Conceptualisation through thinking	Active Experimentation by doing
Three Levels of Learning Outcomes (Anderson & Krathwohl, 2001)	Transition from No Learning to Rote Learning	Rote learning occurs when students can recall relevant knowledge but cannot apply the learning or transfer it to a different situation.	Transition from Rote Learning to Meaningful Learning	Meaningful learning is when a student possesses relevant knowledge such that it can be recalled and used to solve current problems as well as transfer the learning to new situations
Four Dimensions of Knowledge (Anderson & Krathwohl, 2001)	Factual knowledge - the essential elements required in a discipline.	Conceptual knowledge - links factual knowledge into functioning units.	Procedural knowledge, the methods and techniques to put the conceptual knowledge into practice.	Metacognitive knowledge - the combination of cognition and the awareness of personal cognition
Four Levels of Assessment (Webb, 2002)	Recall - students can recall facts and definitions.	Skills and concepts - recalled concepts are combined to provide a solution to a problem.	Strategic thinking - higher thinking is used for reasoning and planning.	Extended thinking - higher levels of thinking using complex reasoning and planning occur over time.
Five Stages of Skills Development (Dreyfus & Dreyfus, 1980)	Novices learn from a reductive approach that decomposes situations into non-context abstract principles and formulas.	Competence from recurrent exposure to real situations.	Proficiency through the application of the guidelines in multiple situations.	Expertise occurs after the student has experienced many varied situations and begins to take appropriate action with little or no cognitive effort. / Mastery extends beyond cognition with "moments of intense absorption".
Four Stages of Competence (Broadwell, 1969)	The unconscious incompetent focuses on the task which and may be monotonous	The conscious incompetent knows that something is missing, and looks for help and is willing to try new things to improve knowledge	The conscious competent is confident in different settings, having experimented and adapted to different scenarios	The unconscious competent has attained a level that is adaptable to different contexts. They are confident in knowing but do not always know why they know. They operate at an implicit level of knowledge and may only be able to teach through experience. They are the traditional masters who share their expertise through apprenticeships
Four Learning Theories (Bélanger, 2011; Hean et al., 2009)	Behaviourism is a stimulus-response learning approach that focuses on behavioural changes as a learning outcome.	Cognitivism is a reaction to external factors. Cognitivism differs from behaviourism in explaining learning as an internal process used to deal with external changes.	Cognitive constructivism is triggered by cognitive conflict, which leads to knowledge being constructed in a context that must make sense in the learner's situation.	Socio-Constructivism occurs where social relationships mediate the learners' activities and influence their learning.

Model for Developing Research Questions (Cronjé, 2006)	Describe - When does...? What is...?	Explore - What is...? How does...?	Explain - How does...? Why does...?	Develop - Why does...? When does...?
Keywords	Absolutist knowledge, Habit, Non-reflection, Knowledge for self	Transitionist knowledge, Reflective Comprehension, Knowledge gap in knowledge for self	Relativist knowledge, Reflection, Knowledge of self	Context, Critical Reflection, Reflexive Action. Aesthetics and going beyond self

2.9 Research Problem, Aim and Questions

Educators consistently encounter difficulties setting learning objectives for formulating, teaching and assessing learning outcomes that transcend basic retention and lead to learning transfer to new situations (Anderson & Krathwohl, 2001). Reflective learning has been observed to improve competencies (Perusso et al., 2020), confirming the experiential learning proposition for the necessity of reflection for learning (Kolb, 2015; Miettinen, 2000). While authors such as Daudelin (1996), Mezirow (1990), Moon (2000), Schön (1983) and Walsh (2009) consider the how of reflection, there is a paucity of what students reflect upon that may lead to improved learning outcomes particularly in business process and enterprise systems education. Hence, this study aimed to explore multiple forms of student reflections to identify generative mechanisms that, should they exist, lead to improved learning outcomes in information systems courses. The generative mechanisms may help educators formulate, teach, and assess learning outcomes that transcend primary retention and improve learning transfer in new situations (Anderson & Krathwohl, 2001).

The overarching research question that guided the research process was:

- What do students undertaking a business process management experiential project reflect on that may improve learning outcomes?

Research question one is based on identifying tools that help use reflection as a technique for learning (Daudelin, 1996). The questions aimed to identify a set of learning influencer generative mechanisms (Learning Influencers):

- RQ1. What generative mechanisms influence learning outcomes in business process management experiential learning projects?

Research question two is based on the need to understand reflection as a technique for learning (Daudelin, 1996). The question aimed to identify how the learning influencer mechanisms can improve learning outcomes (Drivers of Effort):

- RQ2. How can the identified learning influencers improve learning outcomes?

Research question three is based on the need to understand the process of reflection (Daudelin, 1996). The question aimed to explore the potential of the learning influencers to improve learning outcomes.:

- RQ3. What effect do the learning influencers have on learning outcomes?

Research question four aimed to identify how the learning influencer generative mechanisms provoke improved learning outcomes (Disruption of Effort):

- RQ4. How are the learning influencer generative mechanisms activated?

Research question five aimed to identify how the learning influencer generative mechanisms can be assessed (Assessment):

- RQ5. How can the identified learning influencers be assessed?

2.10 Summary

In this chapter, the background literature reviewed for the study was presented, starting with a description of the literature review process, followed by a review of the types of knowledge and learning spaces. In the third section, experiential learning in the context of business process management education was reviewed. The fourth subsection reviewed student reflections for improved learning, and the fifth section sought potential mechanisms that may improve learning outcomes. The sixth subsection reviewed reflective practices in the context of experiential learning projects. The seventh subsection took a reflective stance in reviewing the literature and the knowledge gap. The eighth subsection combined potential learning mechanisms for improving learning outcomes from the literature review into a theoretical lens model. The ninth subsection revisited the research problem, aims and research questions.

Based on the paucity of understanding of the impact of reflective practice on improving learning outcomes in business process management experiential learning projects, a set of

action research interventions and analyses were planned and undertaken. The action research interventions provided insight into students' value-creating processes experienced in multiple contexts (Grönroos, 2011), potentially leading to improved learning outcomes.

In the next chapter, the philosophy guiding the research is presented.

3 Philosophy and Research Context

This study took an action research approach that is grounded in pragmatism. Action is so central to pragmatism that Goldkuhl (2012) suggested that pragmatism should extend beyond action research to practice research methodology. Pragmatism's focus on practice is supported by an ambiguous ontology (Putnam in Rorty et al., 2004). However, it makes generalising the observations to other circumstances problematic. A strong sense of structural mechanisms was observed during this study, necessitating a re-evaluation of the study's original purely pragmatist stance. A realist ontology with a practice component was required. Realism takes two primary forms; epistemological realism and ontological realism (Pleasants, 2003). Epistemological realism is best associated with Popper, who suggested that the scientific method generates theories considered literal truth of how the world operates (Cherryholmes, 1992). Truth is asserted through rigorous testing of non-trivial hypotheses that may be falsified with further research (Pleasants, 2003). In essence, epistemological realism separates scientific knowledge from scientific activities. Ontological realism is based on Bhaskar's critical realism, which suggests that an ontological reality exists that humans may not observe (Pleasants, 2003). At the start of the study, critical realism was considered for the study's underlying philosophy, but insufficient support was found for critical realism in action research studies at the time. Further literature searches provided a solution in pragmatist-critical realism, which combines pragmatism and critical realism (Johnson & Duberley, 2000), for which action research is the recommended methodology (Heeks et al., 2019).

The first section of this chapter provides a foundation of pragmatist-critical realism philosophy, followed by the research setting review.

3.1 Pragmatist-Critical Realism

Pragmatist-critical realism is a fusion of pragmatism and critical realism. It combines the practice components of pragmatism with critical realism's ontology (DeForge & Shaw, 2012; Heeks et al., 2019; Johnson & Duberley, 2000; Proctor, 1998). The pragmatist-critical realism philosophical stance applies to this study as the preferred methodology is action research (Heeks et al., 2019).

3.2 Foundation of Pragmatism

Charles Sanders Peirce's defining words "[c]onsider what effects, which might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the *WHOLE* of our conception of the object" are considered the foundation of the philosophical stance of pragmatism (Peirce, 1905, p. 171, capitalisation in original text). These words encapsulate pragmatism's essence in suggesting that our knowledge of any concept is intrinsic in the practical action produced from understanding the concept (Elkjaer & Simpson, 2011). The essence of pragmatism thus resides in the potential for practical action and not necessarily in taken action. Consequently, the extent of the pragmatist understanding that guides future action resides in conceptualising what practical action the pragmatist's understanding can conceive.

While writing this thesis, there was a worldwide pandemic resulting in an illogical panic hoarding of toilet paper. A recommended two- or three-week isolation period had been extended several times and forced stores to restrict toilet paper sales in some countries. Logically, food, water, medication and soap should be in demand, but excessive demand for toilet paper was illogical. The novel situation of a worldwide pandemic without precedent in the current generation had resulted in action that, although irrational, was pragmatic. Even though it was ultimately illogical, future knowledge may increase based on this pragmatic action causing knowledge to be derived from experience (Biesta & Burbules, 2003).

Pragmatism holds the potential for action based on the principle that belief changes as an action is undertaken. According to Elkjaer and Simpson (2011), Dewey's conceptualisation of pragmatism is how the environment is co-constructed by people. Truth is the outcome of successful action, which inspires further action. Consequently, pragmatism is not a predictor of human nature but a practical method for understanding human behaviour by linking knowledge and action (Elkjaer & Simpson, 2011). At the core of pragmatism is the practical effect of the interaction between people and their environment. It is manifested as actions and intended actions of concepts (Peirce, 1905) or ideas (Rorty et al., 2004). While pragmatists differ in their conceptions of the pragmatist philosophy with "*quibbling over differences*", a pragmatic core adheres to the concepts of the classical pragmatists Peirce, James and Dewey (Rorty et al., 2004, p. 86).

Whereas classical pragmatism was based on empiricism and the scientific method, Rorty embraced a relativist view (Rorty et al., 2004). Contemporary pragmatism rejects empiricism's correspondence theory of truth, which assumes that a finite truth exists as absolute truth cannot be justified by humans. A community of peers must justify the extent to which truth and reality can be known. Pragmatist concerns revolve around the justification of empirical tests amongst a like-minded community in an environment where chance and change can reify the environment (Rorty et al., 2004; Shusterman, 2010). Consequently, justification is formed between humans for pragmatists, whereas correspondence to reality requires a non-human entity (Rorty et al., 2004). Conant (in Rorty et al., 2004, p. 74) suggests that pragmatists are neither concerned with trans-human nor non-human entities. Nevertheless, though philosophically important, arguments about truth are of little value and result in philosophers distancing themselves from the title of a pragmatist. Peirce went so far as to use the term *pragmaticism* over *pragmatism* (Plowright, 2016).

Rorty recommends that pragmatists ignore empiricist inquiry, which uses sensation to understand reality and suggests that inquiry should result in "*reweaving a network of beliefs and desires*" (Rorty et al., 2004, p. 76) which looks to experience and potential future action. While experience represents a causal relationship between humans and the environment, pragmatism extends beyond sensation to incorporate concepts (Rorty et al., 2004). The gist of the pragmatic maxim is that action is the practical effect produced by thoughts (Plowright, 2016); it is not necessarily action taken but the propensity for action (Dewey, 1925). Peirce contrasts to Cartesian thought-based introspection, which seems clear but may not be actionable (Plowright, 2016). By focusing on consequents instead of antecedents, pragmatism encourages scientific methods to determine potential actions that may become habits. Semiotics is vital to Peirce's pragmatic stance (Plowright, 2016), with signs tied to action and habit. As forms of belief, habits negate doubt which is a significant part of Peirce's belief system. Through empirical research using inferential logic, doubt leads to belief based on induction through a process of abduction (Plowright, 2016). In Peirce's view, induction is a test of boundless non-original suggestions, for which abduction is used to limit hypotheses based on their applicability (Chomsky, 2006).

3.2.1 Pragmatist Categories

Central to Peirce's thinking is the pervasive categories of firstness, secondness and thirdness. Peirce was particularly interested in refuting Cartesian duality through the use of triadic relationships. With few exceptions, Peirce uses sets of threes (Plowright, 2016).

- **Firstness**

Firstness is represented by monads and is potential which can only be experienced. It is not the actualisation but the possibility of actualisation. Firstness is linked to freshness, freedom and feeling and exists purely as an emotion disjointed from the feeler. Firstness is the quality or disembodied feeling which is not determined by other ideas but by reflective curiosity (Plowright, 2016, p. 81). It is the one or monadic (Brent, 1993).

- **Secondness**

Secondness is the embodiment of firstness and is represented by dyads. It is about linkedness, relation, opposition and struggle (Plowright, 2016, p. 82). Secondness recognises otherness and acknowledges both action and reaction with the potential for conflict. Hence it holds the potential for interaction and transaction. It is linked to time and space and is not restricted to material objects but includes cognitive thoughts. Comparisons about an item's firsts - or qualities - is a second which embodies firsts (Plowright, 2016). Secondness is where reality and truth exist, according to Peirce. Individual facts arise through their interaction with other facts (Plowright, 2016). Dewey referred to generic interactions in nature as transactions and experiences between living organisms and their environment (Biesta, 2014). Truth is found in the concept of consequences that lead to action. It is not the actual consequence but the potential to become a practical action that gives meaning to something. Consequently, it is Peirce's "principal operative concept" (Samuels, 2000, p. 213).

- **Thirdness**

Thirdness is the law or generality represented by triads that refers to not only that which exists but to everything that could possibly be conceived to exist (Plowright, 2016). Whereas secondness is the specific, thirdness is the generic and the mediator of seconds (Parmentier, 1994). Thirdness links the past and the present with the hope of the future and extends beyond qualities independent of time and what exists in time. Thirdness is what may exist in the future, and thus, it allows for predicting. Without thirdness, life exists only in the present, reacting to events as stimulus-response entities.

Peirce regards thoughts as signs (Samuels, 2000) which are understood as a triadic relationship between sign, object and interpretant. Thus, thirdness is a manifestation of thinking that mediates between sign and object, enabling an understanding of propositions and concepts that may be applied in the future (Plowright, 2016). Plowright (2016, p. 86) uses the example of a rabbit hole to explain secondness and thirdness. A person walking through a field steps in a rabbit hole and sprains an ankle. The combination of rabbit-hole-walker is two separate dyadic events that exist as secondness, not a triad. Thirdness requires a mediator such as a farmer who notices the rabbit holes and considers options for limiting the dangers of stepping in the holes by erecting fences to keep the rabbits out of the field. Thirdness provides future possibilities by drawing on generalities.

Categories Summary

The categories bind Peirce's semiotics, pragmatism and method of inquiry (Plowright, 2016). Peirce's concepts of "*being*" and "*substance*" can assist in understanding the categories. For example, "*The stove is black*" shows the substance "*stove*" having the quality "*black*" linked by "*is*" (Plowright, 2016, p. 78). Quality is the initial concept providing the ability to understand the object based on its substance. This allows the formulation of testable propositions. Substances may have many qualities or attributes that emerge over time and are cognitively linked to understanding the substances (Plowright, 2016). Secondness results in a dichotomy that sets the quality (black) apart from the human agent and anything else such as green or stove. Rorty's notion of inquiry suggests a (re)weaving of experience and action as a thirdness to resolve the dichotomy of humans and other concepts, resulting in a relatedness between the variables of ideas and concepts. Hence, an experience is a causal relationship between humans and their environment extending beyond sensation to include concepts (Rorty et al., 2004). Accordingly, Peirce's firstness "*feeling*" leads to secondness as specific interactions (or transactions) which is experienced and generalised in thirdness (Plowright, 2016).

Applying pragmatism

Rorty equates pragmatism with the practice of making our way in the world (Rorty et al., 2004). For Rorty, pragmatism is a "*second stage of enlightenment*" (ibid., p.77). The first enlightenment saw people reduce their dependency on mythology to move through the world by scientific understanding. The second enlightenment recognised that scientific

reasoning is not sufficient. Moral and intellectual forces from communities of human activity replace science and the gods of mythology. Consequently, human practice may derive from communities without scientific rationality or the grace of a god without diminishing the place of mythology and scientific enquiry. Building on these underlying structures, pragmatism looks to human actions to define the world. It suggests that human actors' experiences – whether mythos or logos – are subject to human interpretation for action. Pragmatism believes that within communities with similar morals and intellect, there is a likelihood that similar actions – or intentions to act - will ensue and change “*the real world*” (Rorty et al., 2004, p. 79).

Pragmatism is not concerned with arbitrary beliefs of real and true (Rorty et al., 2004). Truth and reality are concepts that cannot be defined; therefore, it is a waste of time to argue about undefinable meanings. On the other hand, concepts can be extended through peer justification (Rorty et al., 2004). Shusterman (2010) argues that pragmatism is a unity of practice and theory as humans create action before rational thought. Change and chance are integral to our lives, and while facts may be discovered, they are also created through human activity. Pragmatism uses praxis to support concepts as part of philosophy, and theory emerges from experiences which may guide further experience. Thus, humans need good beliefs to guide action without the need for an absolute truth. Consequently, pragmatists insist on warranted belief rather than absolute truths (Rorty et al., 2004; Shusterman, 2010). Warranted belief is contextual for meaning through language and culture relevant to each community (Shusterman, 2010). Pragmatism must be viewed as holistic and future-looking based on empirical experienced-based actions that aim to improve lives (Shusterman, 2010). Shusterman (2010) suggests that a central tenet of pragmatism is plurality, embodied in thirdness and resulting in pragmatism being contextual. However, people are creatures of habit, and whereas science and rational thought are fundamental to pragmatism, people may not take a rational stance (Shusterman, 2010). Habits make life bearable for many people and become entrenched, which requires a disruption to change.

Peirce is more pedantic than the other classical pragmatists regarding concepts becoming more accurate the more they work (Rorty et al., 2004). The obscure style, unfinished writing and isolation from James and Dewey made Peirce unpopular. Dewey and James regarded things as true if they work and solve real-world problems (Wehrwein, 2019) but differed in

their focus on body/mind (James) and means/ends (Dewey) (Wehrwein, 2019). Dewey sees means-ends as reifying each other through action with no causal outcome to motivate action. For Dewey, action is taken in anticipation of the end's potential benefits reconstituted by action (Wehrwein, 2019).

Democracy for Dewey was fundamental. Democracy is the intelligent actions taken by a community to solve problems against a background of morality defined by the community's shared habits. Values are reconstructed over time, and pragmatic philosophy results in pursuing a method derived from experience in contrast to pure reasoning (Wehrwein, 2019). Thus, knowledge creation is limited. Initially, this appears to be a restrictive view of knowledge creation based solely on experience. Nevertheless, Webb (2004, p. 487) points out that experience refers to *“the totality of transactions between sentient organisms and their enviroing situation ... that means the history and the ongoing process of such transactions between organism and environment”*.

The notion of habit as temporal social *“conjoint”* actions is essential to Dewey's social ontology, which brings forth a domain of entities (Testa, 2017). Actions equate to life processes rather than intentional action, which Dewey considers as a secondary habit. Habit is imperative as Dewey regards human activity as always arising from prior action (Testa, 2017). Prior actions with current activity mean that habit is modified through action and is not repetitive. The social activities that constitute habit are part of a social form of life and thus need to be considered in conjunction with the community. This requires reflective and critical thought leading to reflective habit (Testa, 2017). Dewey refers to the process of habit-formation as habituation which leads to patterns of action (Testa, 2017). The key to habituation, according to Testa (2017), is to recognise the patterns.

While pragmatism has been accused of being an American-centric philosophy, Biesta and Burbules (2003) point out the prevalence of pragmatism forms, including the Europeans Quine, Davidson and Putnam. Goldkuhl is another European author who recommends pragmatism as an alternative to interpretive, positivist and critical epistemologies (Goldkuhl, 2012). Although pragmatism has realist roots (Dewey, 1905), it is not the relationship between concepts as much as the transactions (secondness) between them that lead to a beneficial outcome (Cherryholmes, 1992).

3.2.2 Pragmatism and Education

Biesta (2014) summarises Dewey's theory of action as a theory of experimental learning by which living organisms adapt to their environments through predispositions or habits. Education is neither about reality nor absolute truth but acquiring a composite and adaptable set of predispositions-for-action (Biesta, 2014). Experience-based, experiential and experimental learning involves trial and error with critical thinking and reflection to produce intelligent action. Central to Dewey's work was reforming education by teaching people to think for themselves (Rorty et al., 2004). Dewey has been linked to auto-didacticism (Jabeen & Rafiuddin, 2015) in contrast to behaviourism which considers students empty vessels that education seeks to fill. Dewey relates education to democracy to fulfil students' needs (Virani, 2015) and society (Madkour, 2015). Thinking without action is of little use if it is not reflected in practice. Dewey thus advances a constructivist tradition, and like Mezirow and Schön, acknowledges learning as derived from reflection of learner experiences (Justice et al., 2020).

The transactional view of education is communication-centric concerning the relationship between learner and content and, hence, concerns the process of education (Biesta, 2014). According to pragmatism, truth is valid in action: the reactions to the agent's environment influences the agent. Education is a coordination process of the individual in their social and physical environment. In Peircean terms, it is thirdness where learners and content are seconds. Transactions are enacted through the experiences of organisms in their environment, which modifies the environment and leads to the creature benefitting or suffering from the consequences of their actions (Miettinen, 2000). Knowing supports action by contemplating the relationship between action and outcome (Biesta, 2014), and learning starts with the *"transformation of disturbed and unsettled situations into those more controlled and more significant"* (Dewey in Biesta, 2014, p. 37). Disruption does not produce knowledge until it is coupled to action, proving the efficacy of the learning. Disruption is, thus, the first step in transformative learning (Mezirow, 1990).

Action alone is not sufficient without associated reflection in producing knowledge (Biesta, 2014). Thus, knowledge is not a static, objective reality but a temporal reconstruction of human actions. The potential for error - or fallibilism - occurs due to an unknown future impacted by others rather than a lack of theoretical precision (Biesta, 2014). Knowing arises through disruption of habit and provides the wherewithal to plan actions intelligently. When

disruptions occur, the learning organism employs reflection to investigate the situation (Miettinen, 2000). Learning occurs by habitually choosing the most advantageous actions making learning a predisposition for action in response to the world (Biesta, 2014). In contrast to the spectator view of reality, living organisms have the potential to participate in reconstructing their environments in an unfinished universe. Reconstruction is the outcome of inquiry, a self-correcting process that revises experiences in cycles of experience, reflection, and adjusted action (Ormerod, 2006). Consequently, for the educator, education becomes a critical process of judging the right skills requiring critical reflection on the part of the learner rather than a selection of generic and arbitrary skills (Biesta, 2014).

3.2.3 Application of Pragmatism in Research

Goldkuhl (2008) identifies three forms of pragmatism – functional, referential and methodological - and advises that information systems research should embrace all three.

- **Functional Pragmatism**

Functional pragmatism is *knowledge-for-action*, where action is the purpose of knowledge and answers “*why*” questions. This makes pragmatism a practical theory.

- **Referential Pragmatism**

Referential pragmatism is *knowledge-about-action* which answers “*what*” questions and sees action as the object.

- **Methodological Pragmatism**

Methodological pragmatism is *knowledge-through-action* and answers “*how*” questions with action as the medium.

As knowledge-for-action, knowledge-about-action and knowledge-through-action increase knowledge through action, knowledge is restricted to personal experiences (Goldkuhl, 2012). Consequently, Goldkuhl (2012) argues that pragmatism should be combined with the interpretivist social construction of knowledge-for-understanding.

3.2.4 The Problem of Pragmatism

Although pragmatism is based on and remains associated with realism, it centres on the practical implications of everyday life and ignores ontology (Johnson & Duberley, 2000). During this study's analysis phases, four mechanisms that support learning were identified and confirmed in the literature. The learning structure revealed an ontology that did not fit

pragmatism due to the lack of relevance of ontology in pragmatism (Heeks et al., 2019). Thus, a research philosophy was required that acknowledged a realist ontology with persistent structures and mechanisms that could influence everyday life practices and supported the study's action research method. Heeks et al. (2019) point out two concerns of pragmatism that were observed in this study. First, pragmatism is fundamentally concerned with practice with limited interest in the nature of reality and how the knowledge of reality is understood. Heeks et al. (2019) describe pragmatism as “*orthogonal to the continuum*” (p.2) of the research paradigms, which stretch between positivism and interpretivism. A second challenge was the multiple variants of pragmatism and a lack of a consistent metaphysical position (Heeks et al., 2019). Pragmatist thinkers have embraced various positions, such as Dewey, a positivist (Turnbull, 2008), Peirce, a realist and Rorty, an anti-realist (Biesta, 2014). The solution for this study was to reposition from purely pragmatic to pragmatic-critical realism (Johnson & Duberley, 2000), also referred to as pragmatist-critical realism (Heeks et al., 2019). The latter term is preferred in this study.

3.2.5 Critical Realism

Critical realism is similar to pragmatism in many ways. Critical realism has a striated view of the world which influences how the world is experienced - the real, the actual and the empirical (Bhaskar, 2008). The striations resemble Peirce’s classifications of firstness, secondness, and thirdness (Plowright, 2016). For both pragmatism and critical realism, reality is unknowable (Heeks et al., 2019; Johnson & Duberley, 2000). Both pragmatism and critical realism promote mixed-methods approaches for research (Mingers, 2001). Each philosophy starts with a problem and relies on abduction to understand the situation (Heeks & Wall, 2018; Miettinen, 2000) and both rely on the potential for action. Pragmatism considers the potential for action (Plowright, 2016; Wehrwein, 2019), while Bhaskar deems one theory preferable to another if it has the potential to achieve “*a new order of epistemic (explanatory and/ or taxonomic) integration, or at least show grounded promise of being able to do so*” (Bhaskar, 2009, p. 55).

Critical realism differs from pragmatism in identifying ontological structures in the real domain, which cause the mechanisms in the actual domain (Heeks et al., 2019), while pragmatism ignores ontology (Johnson & Duberley, 2000). The pragmatist reasoning is that no habitual action can be formed if something is not knowable, and there is no pragmatic

value in pursuing the notion. Whereas critical realism lacks a formally structured methodology, pragmatism encourages methods that lead to habits that determine action. Peirce's pragmatism is woven around semiotics, whereas a similar concept of affordances has been a recent addition to critical realism (Bygstad et al., 2016; Volkoff & Strong, 2013).

Critical realism is a research paradigm located on a continuum between positivism and interpretivism (Heeks et al., 2019). Critical realism can overcome Cartesian dualism by accepting that there is an objective view of reality that is positivist, but, like interpretivism, the knowledge of that reality is socially constructed (Heeks et al., 2019). Critical realism creates knowledge of reality and not reality itself (Willig, 1999) and is critical because all viewpoints are mediated by perceptions and theoretical lenses (epistemic relativity). It does not accept judgmental relativity regarding all views as equally valid (Mingers et al., 2013). Consequently, critical realism accepts an ontology beyond human comprehension and epistemology that exists through social practices. Like social constructionism, which views knowledge as localised and potentially applicable in other circumstances, critical realism considers socially constructed knowledge potentially applicable to different situations. On the other hand, critical realism seeks potential objective mechanisms that could cause the observed phenomena. The potential mechanisms have the capability of producing similar results in alternate situations but are themselves guided by deeper structures that may result in dissimilar outcomes. In these situations, the mechanisms and structures, if they exist, do not change. Only our understanding of the mechanisms change (Heeks & Wall, 2018; Willig, 1999).

The striated ontology of critical realism used to explain a socially constructed epistemology over a realist ontology is depicted in Figure 3.1. At the lowest level, observable transient phenomena and events occur in an empirical domain that human senses can observe and test. The empirical domain exists within the greater actual domain in which transient events exist that may either be experienced or that cannot be experienced (non-events) by humans. Mechanisms and structures bring about the events in the actual domain with enduring structures in the real domain (Heeks et al., 2019; Heeks & Wall, 2018; Mingers, 2004; Willig, 1999). The lower levels (empirical domain to actual domain) are considered transitive, and the higher levels (actual domain to real domain) are intransitive.

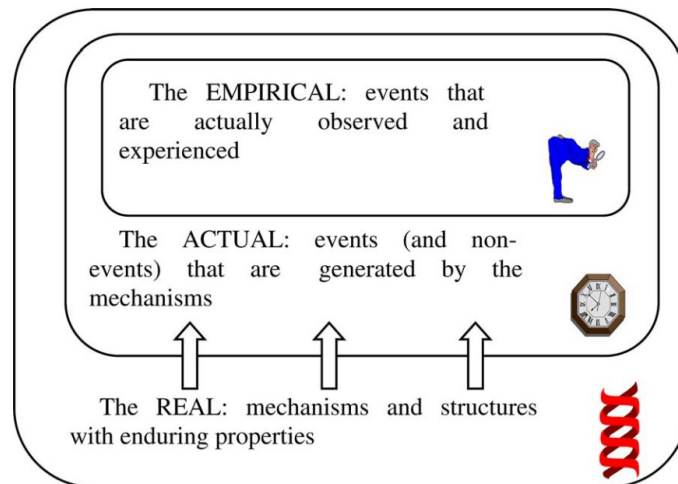


Figure 3.1 The stratified ontology of critical reality (Mingers, 2004).

Social practices are infinitely variable and do not endure in the same way as structures. Nevertheless, the concepts, relationships and structures used in social practices must pre-exist their use (Mingers et al., 2013). If a practice had to create the relevant structures each time it was used, actors outside the practice would have to relearn the practice each time. Hence social practices must have a degree of persistence or morphostatic properties (Archer, 2010). Most social practices' performance is based on a structural domain of mechanisms - materials, resources, concepts, practices and relationships - that exist and endure. These mechanisms may not be observable in the real and actual domains (intransitive) but are detectable in the empirical domain (transitive) (Mingers et al., 2013). Critical realism revolves around identifying structures in the real domain and the possible generative mechanisms that cause the events to occur in the actual and empirical domains. Identifying structures and mechanisms that may not be observable is accomplished through a process of retrodution (Mingers et al., 2013).

Retrodution is fundamentally the same as Peirce's abduction used in pragmatism (Heeks & Wall, 2018). Retrodution starts with an observed event and proposes hypothetical structures and mechanisms that could generate the observed event if the structures and mechanisms existed. The third phase seeks to test the potential explanations, eliminate those that do not fit the observed outcome, and substantiate the belief in the most likely explanations (Mingers et al., 2013). The common critical realist method is known as "DREI" and seeks to describe the event, retroduce explanatory mechanisms, eliminate incorrect hypotheses and identify

adequate mechanisms. Bhaskar added to the DREI acronym to become DREIC, where C stands for correction. Correction relates to updating the understanding of the potential mechanisms in the light of new knowledge (Edwards et al., 2014). A similar abductive process is retrodiction which is comparable to retroduction. Elder-Vass (2007) argues that retroduction identifies the mechanisms from outcomes (hence inductive), and retrodiction analyses how the mechanisms interact in the causation of actual events (or outcomes and thus deductive).

Critical realism resists reductionism, with Bhaskar warning of the epistemic fallacy of reducing our knowledge of the world to our experiences (Mingers et al., 2013). While this is contrary to the pragmatist view of practices shaping our world, it provides the opportunity for conceptualising controlling influences that may affect practices. Critical realist mechanisms offer a starting point for abduction in pragmatism. Simultaneously, pragmatist observations of practice in the critical realist empirical domain can help confirm or refute the abductively derived mechanisms and allow retrodictive (deductive-abduction) testing.

3.2.6 Pragmatist-Critical Realism

The combination of pragmatism and critical realism has been promoted for at least four decades, with Proctor (1998, p. 354) citing Putnam's 1981 "*pragmatic realism*". Like pragmatism, critical realism accepts multiple forms of knowledge with independent mixes of ontology and epistemology, requiring a range of analysis methods (Mingers, 2001; Mingers et al., 2013). In addition to social and material objects, Mingers et al. (2013) include conceptual objects. The combination of pragmatism and critical realism provides an eclectic methodology to address ontology, epistemology, methodology, and axiology. Heeks et al. (2019) recommend action research with grounded theory for analysis. Although critical realism has been hostile towards statistical methods because they assume a degree of closure seldom present (Olsen & Morgan, 2005), there is now a greater acceptance of their value (Mingers, 2004; Pratschke, 2003).

Rather than grounded theory as the preferred analytic method for theory development proposed by Heeks et al. (2019), this study used reflexive thematic analysis (Braun & Clarke, 2019). Thematic analysis is theoretically flexible and supports a critical realist approach (Braun & Clarke, 2006). Braun and Clarke (2006, p. 13) find that "*thematic analysis overlaps with some forms of 'discourse analysis' (which are sometimes specifically referred to as 'thematic*

discourse analysis”’. Thematic discourse analysis supports a critical realist framework (Sims-Schouten et al., 2007; Willig, 1999). Similarly, critical realism and pragmatism are linked to social constructivism (Goldkuhl, 2012; Heeks et al., 2019), a tenet of thematic analysis and connected through practice (Willig, 1999). Social practices create empirically determinable objects - social and material - in the social environment governed by mechanisms that may or may not be observable to human actors (Willig, 1999).

In sum, combining pragmatism and critical realism to supplement shortcomings in each approach into pragmatist-critical realism (Heeks et al., 2019; Johnson & Duberley, 2000) provided a practical philosophy to underpin and support this study.

3.3 Research Setting

This study's setting is the experiential learning projects of four courses with business process management content at the University of Cape Town's information systems department. The University of Cape Town is the oldest South African University and top-ranked of the 26 public universities in South Africa regarding academic staff input, undergraduate to masters throughput and a high level of knowledge output (UCT, 2020). Founded in 1829 as a high school for boys, the University of Cape Town developed into a fully-fledged university after 1880, aided by funding from private sources and the government and increased demand for diamond and gold mining skills. The University of Cape Town was formally established as a university in 1918. With over 80 specialist research units, the University of Cape Town has more than a third of South Africa's A-rated researchers who have taught and supervised over 100 000 alumni (UCT, 2020). The Information Systems Department is attached to the Commerce Faculty, one of six faculties at the university. The other faculties are Engineering & the Built Environment, Law, Health Sciences, Humanities and Science.

The University of Cape Town courses were selected as the research setting because these courses are at the highest immersion level of integrated practicum according to the classification of Guthrie and Guthrie (2000). At the time of this study, none of the other top five South African Universities offers a course at the same level of immersion (Flügel et al., 2014). The integrated practicum was based on a project that simulates enterprise system software in a live industry situation and instruction in theory with hands-on experience of an enterprise system.

3.3.1 Information Systems Courses Setting

The courses had similar content for enterprise systems and business process management at the undergraduate and postgraduate levels. The current study's focus was restricted to the business process management aspects and the experiential learning project. However, there was a significant crossover between the enterprise systems content and the business process management content.

Both undergraduate and postgraduate courses aimed to teach the application and integration of enterprise systems and business process management principles. The undergraduate courses introduced students to enterprise systems and business process management technologies that impact companies' business practices. The postgraduate course aimed to prepare students for specific roles, such as business process practitioners, enterprise system business analysts, enterprise systems managers, and systems integrators. All courses included a business process management experiential learning project which provided the research data for this thesis.

The courses included coursework, half-term tests, summative assessment exams, and the business process experiential learning projects. The undergraduate courses were group projects, and the postgraduate projects were undertaken individually. The coursework included business architecture, enterprise systems, strategic information technology management and business process management. The course convener, assistant lecturers and guest lecturers, supported by a team of tutors, conducted the lectures, in-class exercises, and assignments. Presentation slides, in-class task requirements, the course readers, assignments, additional resources and the project brief were uploaded to a hosted learning management system to which each student, lecturer and tutor had access. Feedback on tasks, projects and exams were provided to the students on the learning management system, which had several options for notifying students of updates to the course.

In preparation for the courses' business process aspects, an 80-page business process management reader was provided to the students for a background to the courses and the projects. The course readers summarised the literature on business processes related to business process management, future trends, business process modelling, business process redesign, measuring business process effectivity, business process improvement, standards,

governance and roles, and compliance and risk management. The readers included business process management systems and introductions to cloud computing, open-source software, and applying systems development and information technology operations (commonly referred to as DevOps) to business process management systems.

As part of the experiential learning projects, students were tasked with presenting their projects. An international consulting firm oversaw the projects and presented awards to the top three project teams for the undergraduate courses.

3.3.2 Business Process Management Experiential Learning Project

Except for the final assessment exam, the business process experiential learning project was the most significant deliverable from each course. Students were supplied with a 19-page project specification document (Appendix G). The projects required students to prepare a business process scoping, business case, analysis and design document following the BPTrends Methodology (Harmon, 2019). Students selected an existing business process in an operational enterprise and had to interview relevant stakeholders. The resulting analysis and design were based on the process steps determined from the stakeholder interviews and not espoused process steps from company records. The undergraduate groups were provided with a choice of companies that actively used enterprise systems and agreed to allow the groups to redesign an existing process. The postgraduate course students were required to source their own companies for their projects.

A typical project timeline for the projects was:

- 17th August – Form Groups & Select processes
- 1st September - 16th October – Facilitator Evaluation [2%]
- 21st and 22nd September – Presentation [3.5%]
- 30th October 12pm - Documentation Hand-in [12.5%]
- 8th November - Thank & Celebrate

The final project documentation structure was included in the project brief provided to the students and included the number of potential marks per section.

The typical requirements for the structure and presentation of the report were:

- Title page and Plagiarism Declaration
- Table of contents
- Introduction [2.5]
- Process Scoping and Stakeholder analysis [10]
- Business Case [5]
- Business Process Analysis [15]
- Business Process Steps [10]
- Suggested Process Redesign [10]
- Process Reporting [16]
- Conclusion [2.5]
- Project Learnings and Group Self-Assessment [9]
- Appendices

The project learnings and self-assessments were the focus of this thesis.

3.4 Ethics

Ethics approval, shown in Appendix A, was obtained from the University of Cape Town ethics committee before commencing with the study. Ethics approval was granted for using the students' reflections, which are common university property and specific approval to interview university staff and students. Ethics approval was also provided for research in an external company. During the research iterations, it was decided to restrict the research to the research projects. This followed Dick (2003), who notes that action research does not require a precise research question at the start of the research.

3.5 Summary

In this chapter, the philosophy and setting of the action research study were discussed. The underpinning philosophy of pragmatist-critical realism is described, and its relevance for information systems research is defended. The research setting of an experiential learning project in enterprise systems and business process management courses in the information systems department at the University of Cape Town is briefly described in the second section of the chapter.

In the next chapter, the research design and research methods are presented.

4 Research Design and Methodology

As action research is the preferred research method for a pragmatist-critical-realism study (Heeks et al., 2019), a series of action research cycles were undertaken to explore the research problem and answer the research questions. Care had to be taken to avoid the inherent shortcoming of action research where practice takes precedence over theory. Several authors such as Baskerville and Pries-Heje, (1999), Dick (2003) and Manuell and Graham (2017) promote alternative methodologies to support theory development in action research studies. However, the methodologies must align with the study's philosophy (Braun & Clarke, 2006), and unlike theory-building under a pragmatist paradigm with its agnostic ontology, action research theory in the paradigm of pragmatist-critical-realism must acknowledge the critical realist perspective.

In the following sections the research design and analysis methods are described. First, an overview of action research is provided, followed by a discussion of theory application in action research. In the third section, the analytic methods are described, which support the research method described in the fourth section.

4.1 Action Research

Action research as a strategy was approached per Greenwood (2007, p. 131), who argues that action research is neither a single technique nor a method but a strategy for living in the world that uses multiple methods and techniques. Greenwood (2007, p. 147) summarises action research as *“a commitment to living in the world as it is in hopes of helping to make it somewhat better in the future.”* Accordingly, Greenwood (2007) applies action research pragmatically as a research strategy and terms it pragmatic action research following Dewey's pragmatism. Pragmatic action research emphasises reflection and the pragmatic application of methods and techniques in a manner that supports the tangible needs of people and circumstances (Greenwood, 2007, p. 131). Nevertheless, action research does not have one distinct and definitive form but is an ongoing cycle of knowledge creation cogenerated through combinations of action and research, reflection and action (Greenwood, 2007).

According to Greenwood (2007), accepting action research as a method is axiologically limiting as it reduces the ability of action research to bring about “*democratic, just, fair, and/or sustainable human situations*” (Greenwood, 2007, p. 133). Greenwood considers all theories, methods, or techniques valid for action research providing they are pragmatically valid. This resonates with Susman and Evered (1978), who observe a range of philosophical viewpoints that legitimise action research where each viewpoint provides suitable methods and techniques. Although this fits the pragmatist stance, it highlights its practice-based nature and potential for limiting knowledge generation beyond the research context.

However, the use of action research has been contentious in information systems research due to a lack of methodological rigour (Davison et al., 2004). Davison et al. (2004) propose canonical action research to overcome this criticism and limit the confusion of academic research with consulting practice. Davison et al. (2004, p. 69) propose five principles for action research: the principle of the researcher–client agreement; the principle of the cyclical process model; the principle of theory; the principle of change through action; and the principle of learning through reflection. While each principle is necessary, this study's interest is in the fifth principle, learning through reflection. The researcher-client agreement positions research and ensures validity, and the cyclical process model provide reliability for the research process. Theory is important for academia and practical use in the future, while change through action is essential for a practical outcome. Principle five, learning through reflection, is pivotal as reflection holds the potential to act as a mediator between action and research (Levin & Martin, 2007). Consequently, action research can be used to mediate the struggle between action and research (Davison et al., 2004). This is reminiscent of Peirce’s thirdness (Peirce, 1905). Individually, action and research represent the firstness of qualities that hold potential but have no substance. The often awkward relationship between action and research represents a struggle between the quality (research) and existential facts (action). According to Peirce (1905), this necessitates a mediator to provide cognitive generalisation or general principles towards the future.

Action Research and the Cyclical-Process Model

In the 1940s, Kurt Lewin introduced action research to produce theory while modifying the social system. Lewin’s concepts originated from a critical social perspective during the latter parts of World War II. Lewin conceived of a spiral of planning, action, and evaluation to

improve a specific situation that produces a theory useful in similar situations (Susman & Evered, 1978). Lewin makes specific reference to action, research and training as “*a triangle that should be kept together for the sake of any of the corners*” (Lewin in Susman & Evered, 1978, p. 588) and thus exhibits a Peircean triad.

Susman and Evered (1978, p. 588) promote a five-phase cyclical process model of diagnosing, action planning, action taking, evaluating and specifying learning. In its simplest form, action research is a cycle of look, think and act, sometimes stated as plan, act, observe and reflect (Dick et al., 2009). Heeks et al. (2019) propose a four-phase applied pragmatist-critical-realist action research methodology cycling through planning, acting, observing and reflecting. Planning comprises four steps: clarify the problem; identify the purpose of an intervention; propose mechanisms for the intervention, and design the intervention and methods. These steps correlate to the approach of Susman and Evered (1978). Clarify and identify the problem equates to diagnosis, where the potential generative mechanisms are added to the traditional action research cycle and include retroduction. The term intervention is preferred over taking action by Davison et al. (2004), who also use reflection instead of specifying learning. Design an intervention equates to action planning, acting equates to intervention and observing to evaluation. Reflecting is the equivalent of the specifying learning step of Susman and Evered's (1978). Reflection is central to action research and this study, although, for Heeks et al. (2019), reflecting is active and indicates reflexivity.

The action planning phase of the cyclical-process model resembles the critical-realist retroductive approach, which Dick et al. (2009) describe as hovering “*uncertainly and eclectically somewhere between a Rortian pragmatism and critical realism*” (p.8). Dick (2003) poses questions in the action planning phase that resonate with the retroductive approach. Dick (2003) asks what salient issues exist and why they are significant. Assuming that the identified issues are valid, what would the desired outcome be and why, and what actions could bring about this outcome and why? This resonates with the retroductive approach in asking what mechanisms exist in the actual domain that could generate events in the empirical domain (Heeks et al., 2019). Critical realism digs deeper to identify the potential mechanisms' ontology and how the mechanisms may impact the broader society in the research context (Johnson & Duberley, 2000). The iterative retroductive process (Bygstad et

al., 2016; Fletcher, 2017) can be considered reflexive. Reflexivity is evident in the reflecting step of Heeks et al. (2019) when evaluating outcomes against emancipatory purposes. This form of reflexivity fosters praxis which combines practice and theory (Dick et al., 2009). Susman and Evered (1978) take a narrower view of praxis when separating practice from theory and techne. They trace praxis back to the Aristotlean meaning, which refers to acting in a manner that brings about change in conditions and includes changes in the person bringing about the change.

The action research approach shown in Figure 4.1 was inspired by Davison et al. (2012). Steps one through four indicate the iterative action research cycle from project start to project end. Central to the diagram is the theoretical components which are linked to steps one, two and four. A dotted line between the focal and instrumental theories boxes indicate that the theories can influence one another.

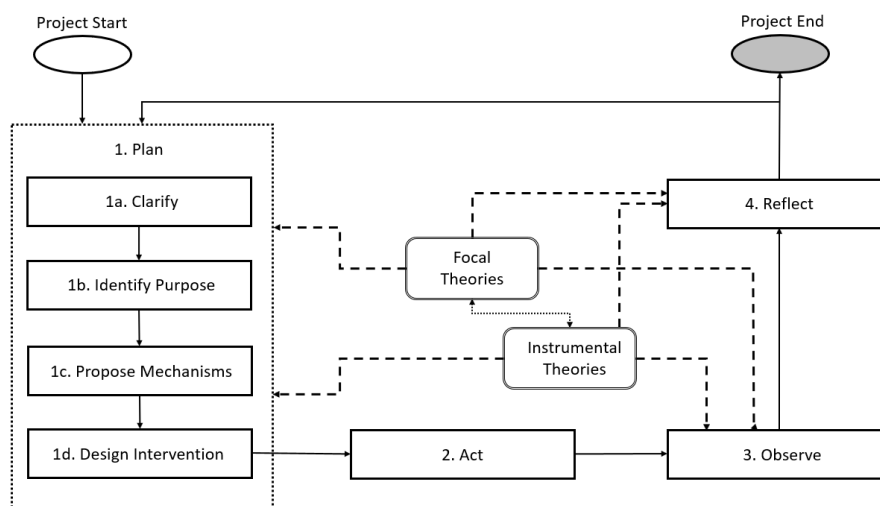


Figure 4.1. Enhanced cyclical pragmatist-critical realism action research model. (Adapted from Davison et al. (2012)).

4.2 The Role of Theory

From the initial stages of the study, theory was central in the study as it is typically poorly described in action research studies (Dick, 2003). Dick (2003) surmises that this is due primarily to the practitioner-centric use of action research, whereby theory takes a low prevalence. Using grounded theory has been recommended to encourage theory in action research (Baskerville & Pries-Heje, 1999; Dick, 2003; Susman & Evered, 1978). Greenwood

(2007) describes action research as a strategy that demands a method for analysis for which grounded theory has a clear association with action research (Iivari & Venable, 2009). However, grounded theory needs to be done by experienced researchers, which questions the method's validity amongst inexperienced researchers (Dick, 2003). Acknowledging that grounded theory is not beyond a well-supervised novice's capabilities, Dick (2003) argues for a less demanding and more accessible theory development method.

Susman and Evered (1978) recommend that theory drive the problem diagnosis and the potential course of action. Davison et al. (2012) separate theory into two purposes within the action research cycle to improve rigour and quality and overcome research-practices gaps. The first purpose is the instrumental theory, and the second is the focal theory. The theories inform the research and provide a lens through which to assess the cyclical process model steps. The theories are used in guiding diagnosis, action planning, evaluation, and reflection. However, intervention is excluded based on the assumption that the intervention will be improved by following the theories in the other steps because the intervention is not under the researcher's control.

- **Focal Theory**

Focal theories are the cognitive or cerebral part of the change and can be considered higher-level or overarching. They support the rationality of action-taking. Examples of focal theories provided by Davison et al. (2012, p. 766) are the theory of planned behaviour (Ajzen, 1991), adaptive structuration theory (DeSanctis & Poole, 1994), and punctuated equilibrium theory (Gersick, 1991). In this study, two focal theories were used (a) experiential learning from Kolb (2015) and Dewey (1938) and (b) the reflective practitioner theory of Schön (1983).

- **Instrumental Theory**

Instrumental theories provide the theoretical underpinning for analysis and thereby may provide *explanatory mechanisms*. Davison et al. (2012, p. 766) state that “*an instrumental theory is used to explain phenomena ... tools that are used to establish and verify focal theories*”. This resonates with critical realism in the theory-based explaining of phenomena. Instrumental theories analyse the applicability of the focal theory and provide a mechanism for rationally selecting focal theories applicable to the situation.

Instrumental theories are used during the evaluation phase to verify that the focal theory adequately supports the intervention. In this study, instrumental theories were developed from the data and supported primarily by the levels of learning of Helsing et al. (2004) and abductive reasoning (Bhaskar, 2008; Chomsky, 2006; Fletcher, 2017; Peirce, 1905; Plowright, 2016).

4.2.1 Action Research Cycles

The pragmatist-critical realist approach for understanding how the world is understood and how it works (Heeks et al., 2019) was operationalised through four action research cycles: ARC1, ARC2, ARC3, and ARC4 between 2016 and 2018, with different respondents for each cycle. The project started with the view that students are not “*getting it*” in a business process management course (Garbutt & Seymour, 2015) which is a familiar complaint amongst educators (Braun & Clarke, 2019, p. 592). The project ended with a set of proposed mechanisms. The cycles differed regarding the respondents' reflective practices and a change of lecturing staff in the last cycle. The action research cycles were analysed using reflexive thematic analysis followed by partial least squares based structural equation modelling over the consolidated data. After exiting the action research cycles, a further review of the data was undertaken to provide insights into the most significant influencer of learning outcomes. The sections below describe the research process. An overview of the research process is provided in Table 4.1.

Table 4.1. The research process.

Step	Heeks, Ospina & Wall (2019)	ARC1	ARC2	ARC3	ARC4	Consolidation	Practical Outcome
1	Plan						
- 1a	Clarify the problem	Not learning. Students were “not getting it”.	Reflection after the event and too late to translate into action	Reflection is still too late to make meaningful changes to action	The same educators for ARC1, ARC2 and ARC3		
- 1b	Identify the purpose of an intervention (identify demi-regularities)	Reflective Practice– After Experience	Reflection – During Experience	Reflection – TEUQ, Reflection Before Experience	Reflection – TEUQ, Lecturers		
- 1c	Propose mechanisms for the	Abduction – Reflective Practice	Retrodiction – Reflective Practice	Retrodiction – Reflective Practice, TEUQ	Abduction – Reflective Practice		

Step	Heeks, Ospina & Wall (2019)	ARC1	ARC2	ARC3	ARC4	Consolidation	Practical Outcome	
	intervention (abduction)		Abduction - TEUQ		Retrodiction - TEUQ			
- 1d	Design an intervention and methods	Reflection on action	Reflection in action	Reflection for action	Educators changed			
2	Act	The project was undertaken with intervention applied						
3	Observe	Reflexive Thematic Analysis (RTA)				PLS-SEM	RTA Refining	
4	Reflect (retroduction or retrodiction)	Retrodution – Inductive - TEUQ Retrodiction – Deductive – Reflective Practice	Retrodution – Inductive - TEUQ Retrodiction – Deductive – Reflective Practice	Retrodiction – Deductive - TEUQ Reflective Practice	Retrodiction – Deductive – TEUQ Retrodution – Inductive – Reflective Practice	Retrodiction – Deductive - TEUQ	Retrodution – Inductive - Effort	

Legend: TEUQ – Task, Effort, Understanding, Quality themes initially identified in ARC1. PLS-SEM – partial least squares structural equation modelling. RTA – Reflexive Thematic Analysis.

The action research cycles followed the canonical structure of Susman and Evered (1978), which was refined to align with pragmatist-critical realism described by Heeks et al. (2019). The only methodological differences between cycles occurred during the application of the abductive approaches. In each cycle, there were four steps where abduction was applied: Step 1(b) - Identify the purpose of an intervention where demi-regularities identify the purpose of an intervention; Step 1(c) - Propose mechanisms for the intervention where potential generative mechanisms were proposed; Step 1(d) - Design the intervention and methods where potential generative mechanisms were tested; and Step 4 – Reflect where, through thematic analysis and reflexivity, student reflections were combined with that of the researcher. The reflexive nature of the researcher’s reflections was subjective as experienced personally (“I”) but objective as to how the reflections of respondents led to personal learning (me or beyond I) and improved learning in others (them) (Burkitt, 2012; van Zyl, 2015).

Step 1 - Plan

The planning step was the equivalent of diagnosis by Susman and Evered (1978). Heeks et al. (2019) expand planning to clarify the problem, identify the purpose of an intervention, propose mechanisms for an intervention, and design the intervention and methods.

Step 1a - Clarify the Problem

Each action research cycle identified the problem from the outset, and each reflection step was described in broad terms (Heeks et al., 2019). In this study, students in higher education

business process management and enterprise systems courses were not “*getting it*”. Limited learning in the classroom was carried through into real-world experiential learning projects. On the other hand, real-world experiences were not significantly carried back to learning in the classroom.

Step 1b - Identify a Specific Problem and Purpose of an Intervention

In this step, a specific problem was specified to be addressed. The study's overall problem was the apparent lack of learning transferred between the classroom and real-world situations. The study's departure point was that the level of education was suitable and required no change in practice, and, secondly, experiential learning was effective. The experiential learning theories of Kolb (2015) and Dewey (1938) provided three demi-regularities - experience, reflection and improved learning outcomes. The only factor that was not regulated in the courses was the reflection on experiences. This led to the intended purpose of exploring student reflections, leading to improved learning based on experiential learning theory.

Step 1c - Propose Mechanisms for the Intervention

The primary mechanism proposed for the study was reflection which leads to improved learning outcomes. For the first two cycles, Schön (1983) provided two reflection–on–action and reflection–in–action forms. Reflection-on-action and reflection-in-action are comparable to content reflection and process reflection (Mezirow, 1990). The third form of reflection proposed by Mezirow (1990) was critical reflection considered in this study as a depth of reflection rather than a different reflection type. Van Manen (1992) provided a third form of reflection – reflection-for-action – included in the third and fourth cycles. In the fourth cycle, a teaching mechanism that considers educator influence on learning was hypothesised.

Step 1d - Design an Intervention and Methods

Interventions and methods were planned from the proposed mechanisms. In the first cycle, marks were increased to encourage reflection-on-action. In the second cycle, students were tasked to maintain reflective journals for reflection-in-action. In the third cycle, students had to reflect on how they were going to approach the project. In the final cycle, lecturers were substituted. No other significant changes were made in each cycle.

Step 2 - Act

In step two, the proposed interventions were implemented and monitored. In each of the cycles, the researcher provided input through lectures and discussions regarding reflective practices. Beyond marking the reflections submitted by the students, little input was required for the first three cycles. In the final cycle, the researcher assisted with lecturing and monitoring and assessing the experiential learning projects.

Step 3 - Observe

Observations provided the data for the research. In each of the cycles, the primary data came from the written reflections of the students. In each cycle, the student reflections and the reflective method applied were evaluated. Thus, both the research and the action components were evaluated (Heeks et al., 2019). The student reflections were evaluated using reflexive thematic analysis and combined with student marks in a quantitative analysis using partial least squares based structural equation modelling.

The student reflection documents were imported into Atlas.ti version 7 to analyse the students' reflections. Each document was read multiple times. The first reading was for grading, which provided an overview of each reflection individually and a high-level view of the reflections from a group perspective. These actions supported the initial familiarisation with the data phase (Braun & Clarke, 2006). Following the data familiarisation, initial codes were identified for each case. In the first two cycles, the analysis was performed on a grounded basis with no preconceived concepts except for acknowledging the potential for existing knowledge to influence the process (Charmaz, 2016). Findings for the first two cycles provided similar codes combined into a codebook and applied to the second set of action research cycle analyses. The third phase of the thematic analysis process combined relevant codes into potential themes reviewed in phase four. Before preparing the current report, the final phase was to refine the themes and confirm that the identified data features were applicable to each theme.

Step 4 – Reflect

A reflective abductive approach was used throughout the study to evaluate the mechanisms based on the observed data. The action research cycles used an inductive method to analyse the data, revealing potential generative learning mechanisms confirmed in the literature.

The cycles incorporated the two forms of theory, focal theory and instrumental theory, as Davison et al. (2012) proposed. Both forms of theories were applied to the action research phases of planning (diagnosis and action planning), observing (evaluation) and reflecting (reflection). Focal theories provided the intellectual basis for the acting phase (intervention). Instrumental theories were used to explain phenomena, including supporting the focal theories. In the current study, focal theories included the reflective practices of Schön (1983) and Van Manen (1992). Instrumental theory (TEUQ) was inductively generated from the research data in the action research cycles. TEUQ is the acronym for undertaking tasks, applying effort, increasing understanding and pursuing quality mechanisms generated from the thematic analysis process.

4.3 Reflexive Thematic Analysis

The study combined qualitative analysis methods – reflexive thematic analysis – and quantitative analysis methods – partial-least squares structural equation modelling. Mixed methods are relevant for pragmatic approaches (Zachariadis et al., 2013) and critical realist approaches (Mingers, 2001) and hence also pragmatist-critical realist approaches (Heeks et al., 2019). In this section, reflexive thematic analysis as the qualitative method is discussed. This is followed in the next section by the quantitative analysis method of partial least squares structural equation modelling.

Dick (2003) recommends a simplified approach to action research analysis that compares two data sets and seeks to explain similarities and differences and condones “*some other methodology*” which may even “*mix and match*” methodological features (Dick, 2003, p. 10). Nevertheless, any methodology must align with the study's philosophy (Braun & Clarke, 2006). Braun and Clarke (2006) provide reflexive thematic analysis guidelines for reasons similar to Dick (2003). Braun and Clarke (2019) include critical realism when describing reflexive thematic analysis based on the critical realist view of Willig (1999). Their pragmatist view is seen in the centrality of reflexivity and the researcher's role in knowledge building (Braun & Clarke, 2019, p. 594). Following the suggestion of an alternative qualitative analysis method for action research (Dick, 2003), reflexive thematic analysis of Braun and Clarke (2006) was the selected method for qualitative analysis in this study. Reflexive thematic analysis combines practice, theory and self-reflection (Braun & Clarke, 2019, p. 589). The

stated aim of Braun and Clarke (2006) was to provide an adequate outline of the theory, application, and evaluation of thematic analysis in an accessible manner.

Clarke and Braun (2013, p. 120) describe thematic analysis as an “*analytic method, rather than a methodology*”. Over the past decade and a half, Braun and Clarke (2006, 2012, 2013, 2019) have undertaken extensive work on thematic analysis. They consider the six-phase process from their seminal 2006 paper to be persistently valid (Braun & Clarke, 2019), and, consequently, it was followed in this study. Thematic analysis is suitable for a breadth of research studies. It supports a range of research questions, can analyse multiple forms of data, and handle large or small data sets producing either data-driven or theory-driven analyses (Clarke & Braun, 2013). Reflexive thematic analysis reflexively identifies themes (Braun & Clarke, 2019) that can be likened to generative mechanisms (Bhaskar, 2008; Heeks et al., 2019). Initially, Braun and Clarke considered a theme to be nothing more than a theme that provided a theoretical construct which they state as “[t]hemes **are** themes” (Braun & Clarke, 2019, p. 593). Over the years, they revised their view to differentiate themes between simple domain summaries and patterns of shared meaning underpinned by a central meaning-based concept (Braun & Clarke, 2019). Patterns of shared meanings resonate with generative mechanisms, which are augmented by reframing the initial themes from “*emerging*” from the data to “*being generated*” by the researcher (Braun & Clarke, 2019, p. 593). This should not be confused with the generative mechanisms nor emergence in critical realism. The description of generating initial themes by Braun and Clarke (2019) relates to abduction, whereby plausible mechanisms are conjectured from theory and data (Heeks et al., 2019).

The six phases of thematic analysis, depicted in Table 4.2, are presented linearly but were performed iteratively (Braun & Clarke, 2006). The phases begin with familiarisation with the data with initial codes generated for interesting features during the second phase. Phase three collates the generated codes into groupings for initial themes. The themes in this study were identified as generative mechanisms (Bhaskar, 2008) for learning. In phase four, the themes are reviewed, and links between themes are identified. In phase five, themes are iteratively refined in terms of the initial codes and codes' grouping. The iterative cycle of action research integrates with phase five iterations and encourages robust refining of themes. The final phase provides guidelines for producing the research report.

Phase three applied an abductive approach, and phase four used retroduction to inductively generate the generative mechanisms (Elder-Vass, 2007).

Table 4.2 Phases of thematic analysis (Braun & Clarke, 2006).

Phase	Description of the process
1. Familiarising yourself with your data	Transcribing data, reading and re-reading the data, noting down initial ideas.
2. Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes	Checking in the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic “map” of the analysis.
5. Defining and naming themes	Ongoing analysis to refine the specifics of each theme and the overall story the analysis tells, generating clear definitions and names for each theme.
6. Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating the analysis back to the research question and literature, producing a scholarly report of the analysis.

Reflexive thematic analysis was used for each action research cycle and identified a set of learning influence generative mechanisms to answer the first research question. The second research question sought a pragmatic solution derived through an abductive process. During the identification of the most significant generative mechanism (effort), there was evidence of overlap with the other generative mechanisms (task, understanding and quality). Deductive thematic analysis was used to reanalyse the effort generative mechanism using the codes from the qualitative phase to consider the impact of effort on learning reflexively. The review outcome was linked to the depth of knowledge model of Webb (2002) to determine potential assessment links. The two-fold aim was to identify the significant mechanism effort's breadth and depth in line with Webb (2002) and Coker et al. (2017).

Thematic analysis was used to reanalyse the four action research cycles' consolidated findings using a two-phase approach. The first phase did a straightforward search for the word “*effort*” and highlighted every instance of the word by changing its font to uppercase, increasing the font size and changing the font colour to amber. The findings were then re-read to find any

areas that the students considered effort but did not use the word effort in, such as “*work*”, “*difficult*”, “*struggle*”, “*try*”, and alternatives of these words, for example, “*tried*”. All student reflections containing these words were imported into a Microsoft Word document and annotated with the cycle and team codes. Each paragraph in the new document was analysed for completeness, and superfluous sentences were deleted. Where paragraphs did not provide enough information for analysis, as students often reflected in a disjointed manner, data surrounding the references were added to the new document. The document was then re-read to identify and codify factors that may be considered as drivers of effort. These codes were then categorised and organised into themes.

4.4 Partial Least Squares Based Structural Equation Modelling

Selecting appropriate quantitative analysis methods and statistical models is challenging in any study and more so for studies with low response rates (Saunders et al., 2009). Two well-known multivariate data analysis methods are partial least squares based structural equation modelling (commonly referred to as PLS-SEM) and covariance-based structural equation modelling (referred to as CB-SEM) (Lowry & Gaskin, 2014). Covariance-based structural equation modelling is better suited to theory-testing as it is based on factor analysis. Partial least squares based structural equation modelling is more suited to theory-building as it is based on principal component analysis (Lowry & Gaskin, 2014). Partial least squares based structural equation modelling is widely used in management research, including accounting research, business management research, international business research, operations management research, supply chain research (Rigdon et al., 2017) as well as information systems management (Rigdon et al., 2017; Urbach & Ahlemann, 2010). Partial least squares based structural equation modelling was selected as the study's quantitative analysis had a small sample size, was exploratory, and the exogenous variables were hypothesised as formative (Chin, 2010; Hair et al., 2017). SmartPLS version 3.3.3 software (Ringle et al., 2015) was used to assess the outer models (the measurement models) and the inner models (the structural models). Assessments used non-parametric evaluation criteria through bootstrapping and blindfolding (Hair et al., 2017). Hair et al. (2017) recommend a set of heuristics for evaluating the partial least squares based structural equation modelling results.

Data for the structural equation modelling was derived from the qualitative findings and grades for each cycle. The grades for a mid-term test (Test), the experiential learning project excluding the reflection component (Project), the marks for the reflection section (Reflection), and the final examination (Exam) were aggregated for each student group. The total mentions per student group for each qualitative theme were divided by the total mentions of the themes to quantify the qualitative findings for the outer measures.

Table 4.3 provides an overview of a systematic evaluation of the assessment process. Although standard goodness of fit criteria is not applicable, other model fit criteria have been proposed using non-parametric evaluation criteria through bootstrapping and blindfolding (Hair et al., 2017). Model fit starts with evaluating the reflective and formative outer measurement models. In this study, the outer model was formative and thus, performing reflective evaluation did not make sense (Chin, 2010). The outer measurement model evaluation is followed by assessing the inner structural model for statistically significant path estimates with high explained variance (R^2 values) for the endogenous variables. In some cases, advanced techniques may be required to provide in-depth clarifications.

Table 4.3 Evaluation of PLS-SEM results (Adapted from Hair et al., 2017).

Systematic Evaluation of PLS-SEM Models
Formative Measurement Models
<ul style="list-style-type: none"> • Convergent validity • Collinearity between indicators • Significance of outer weights
Evaluation of the Structural Model
<ul style="list-style-type: none"> • Coefficients of determination (R^2) • Predictive relevance (Q^2) • Size and significance of path coefficients • f^2 effect sizes • q^2 effect sizes

4.4.1 Formative Measurement Model Assessment

Formative measurement models differ from reflective measurement models in their lack of covariance. Internal consistency cannot be evaluated similarly since formative measures are assumed to fully capture the construct they describe. Formative measure evaluations must

establish content validity by ensuring that the indicators capture the construct's significant facets. Hair et al. (2017) suggest that the formative constructs be identified using a rigorous qualitative approach and recommend a thorough literature review to ensure adequate theoretical grounding. This was undertaken in the background review documented in Chapter 2. Three cyclical steps are recommended by Hair et al. (2017) to validate the formative indicators. Step 1 assesses the convergent validity for high correlations, indicating that two or more indicators are conflated. Step 2 determines collinearity issues where indicators correlate highly, and Step 3 evaluates the statistical significance of the contribution of the indicators to the construct.

Step 1: Assess Convergent Validity

Convergent validity tests redundancy between indicators by evaluating the path coefficient's strength as formative and the path as reflective. According to Hair et al. (2017), this should be between 0.70 and 0.80 with an R^2 of between 0.50 and 0.64.

Step 2: Assess Formative Measurement Models for Collinearity Issues

Collinearity issues were evaluated using the variance inflation factor (VIF), defined as the reciprocal tolerance or standard error. A tolerance of 0.20, translating to a variance inflation factor of 5 ($1/0.20$), is considered to indicate a potential collinearity issue. A variance inflation factor of 5 means that the standard error has doubled ($\sqrt{5} = 2.24$). Outer weights can also be assessed when the collinearity is below the critical level (Hair et al., 2017). For critical levels of collinearity, the formative measurement model must be dismissed.

Step 3: Assess the Significance and Relevance of the Formative Indicators

Outer weights resulting from a multiple regression was used to evaluate the relevance of the formative indicators. The outer weights were determined using a bootstrapping procedure. For formative measures, R^2 should be close to 1.0 as the formative indicators are assumed to explain the construct fully. Constructs using formative indicators are considered emergent rather than latent variables using reflective indicative (Chin, 2010). Unlike independent reflective indicators, formative indicators may have a low or insignificant outer weight with higher numbers of indicators. Hair et al. (2017) suggest grouping indicators for overcoming the significance issue. This was not necessary for the current study, as there were only four

formative indicators. Outer weights above 0.70 were considered strong, with a minimum outer weight of 0.40.

Although loadings do not make sense for formative measurement assessment, they were presented and assessed for completeness (Chin, 2010).

Dealing with Nonsignificant Indicator Weights

As formative indicators define the construct, they are not summarily discarded and must be further assessed. When the outer weight is low, outer loadings are evaluated. An outer loading of 0.50 or higher is considered absolutely important but not relatively important and should be retained. A non-significant indicator with a loading below 0.50 should be deleted only after assessing its theoretical validity (Hair et al., 2017).

Bootstrapping Procedure

Partial least squares based structural equation modelling relies on bootstrapping for nonparametric testing due to the data assumed not being normally distributed. Non-normal distribution means that standard parametric tests were not applicable. The bootstrapping procedure draws many bootstrap samples from the original sample with replacement. The recommended number of bootstrap samples is 5000 (Hair et al., 2017), but similar results can be obtained at lower numbers of samples. The original number of samples are selected for testing with replacement to provide the bootstrap samples. There is no requirement that all the samples be selected, while some may be selected more than once. Thus, each set comprises the same number of samples as the original, with the samples differing between sets.

For validity of the bootstrapping samples, the confidence interval must be tested. This is typically at a minimum level of a 95% confidence level ($p \leq 0.05$). A commonly recommended approach is Efron's bias-corrected and accelerated bootstrapping method (BCa or bca) (Hair et al., 2017). Bias-corrected and accelerated bootstrapping is an alternative to the studentised approach and adjusts for biases and skewness in the bootstrap distribution. For a confidence level to be acceptable, no zero value must exist in the confidence level range.

4.4.2 Structural Model Assessment

The inner model (or structural model) was assessed after establishing the measurement model's latent variables' reliability and validity. Structural models are assessed to test the relationship between endogenous and exogenous variables. A series of assessments were performed to evaluate the exogenous variable's substantial impact on an endogenous variable. The assessments included the coefficient of determination value (R^2) to evaluate the model's predictive accuracy, the effect size (f^2) of the coefficient of determination, predictive relevance (Q^2) to evaluate the model's predictive relevance and the effect size (q^2) of the predictive relevance (Hair et al., 2017).

Step 1: Collinearity Assessment

Collinearity is identical to the formative measurement assessments and requires that each set of predictor variables be examined. As partial least squares based structural equation modelling was initially designed for predictive purposes, it is not suited for model fit testing (Hair et al., 2017). Hair et al. (2017) believe that the existing model fit tests should be restricted to explanatory (i.e. reflective) models since the model fit seeks to assess how well the hypothesised model fits the empirical data.

Step 2: Structural Model Path Coefficients

A nonparametric bootstrapping routine was used to calculate the standard error of coefficient estimates to examine the coefficient's statistical significance (Hair et al., 2017). The path coefficients estimate the strength of the hypothesised relationships between the constructs. Path coefficients should be between -1 and +1, with the outer bounds representing the strongest relationships. The significance of the relationship was determined through a bootstrapping procedure, which computed t-values and p-values. Although significance levels of 10% ($p \leq 0.10$, two-tailed t-value = 1.65, one-tailed t-value = 1.28) is acceptable, it is more common to use a 5% level ($p \leq 0.05$, two-tailed t-value = 1.96, one-tailed t-value = 1.65) and less frequently a 1% level ($p \leq 0.001$, two-tailed t-value = 2.57, one-tailed t-value = 2.33) (Hair et al., 2017). This study used a 5% significance level.

Step 3: Coefficient of Determination (R² Value)

The R² coefficient of determination value was used to evaluate the structural model. The coefficient of determination measures the model's predictive accuracy and is calculated as the squared correlation between actual and predictive values of a specified endogenous construct. The R² values represent the exogenous variables' combined effects on the endogenous latent variables and represent the variance in the endogenous constructs explained by all the exogenous linked constructs (Hair et al., 2017). Thus, it is considered as a measure of in-sample predictive power. R² ranges from a value of 0 to 1, with a typical range of 0.75 being described as substantial, 0.50 as moderate and 0.25 as weak (Hair et al., 2017). However, in some areas, such as consumer behaviour, a level of 0.20 may be considered sufficient. Consumer behaviour resonates with the behavioural aspect of reflection and learning influencer generative mechanisms in this study. Consequently, the level of 0.20 was accepted as minimal for the current study. Nevertheless, Hair et al. (2017) warn that the R² value is inadequate for understanding the model. It may be falsely impacted by including non-significant constructs that can increase the R² value of the endogenous variables.

Step 4: Effect Size f²

The change in R² value can be measured when an exogenous variable is excluded from the model to reduce the potential for error in the coefficient of determination. The change is referred to as the f² effect size (Hair et al., 2017). The effect size shows the impact of a specific predictor latent variable on an explicit endogenous variable.

The formula for f² is as follows (Chin, 2010):

$$f^2 = R^2_{\text{included}} - R^2_{\text{excluded}} / 1 - R^2_{\text{included}}$$

The f² effect size represents a large effect at a value of 0.35, a medium effect at 0.15 and a small effect at 0.02. Below a value of 0.02, no effect is indicated.

Step 5: Blindfolding and Predictive Relevance Q²

Blindfolding was used to cross-validate the model's predictive relevance for each endogenous variable using the Stone-Geisser value. Q² value indicates the model's predictive relevance (out-of-sample predictive power) and should be greater than 0. Q² is obtained by performing

a blindfolding technique (Hair et al., 2017) with a suggested omission distance of 7 to yield cross-validated redundancy Q^2 values of all the endogenous variables. The blindfolding technique reuses the sample by omitting every n -th (for example, the 7th) data point in the endogenous construct's indicators to use the remaining data points as parameters. The omitted data points are treated as missing values and dealt with in the same manner as other missing values in the study. N should be set between 5 and 10, although Hair et al. (2017) provide an example at an n -value of 3. Resultant Q^2 values above 0 reflect the predictive power of the endogenous construct.

Step 6: Effect Size q^2

The q^2 effect size for assessing the Q^2 predictive relevance's relative impact is analogous to the f^2 effect size for assessing R^2 . The q^2 effect is the difference between Q^2 with constructs included and constructs excluded using an omission distance as per the f^2 computation. Like f^2 effect size, the q^2 effect size represents a large effect at a value of 0.35, a medium effect at 0.15 and a small effect at 0.02. Below a value of 0.02, no effect is indicated (Hair et al., 2017).

The formula for q^2 is as follows (Chin, 2010):

$$q^2 = \frac{Q^2_{\text{included}} - Q^2_{\text{excluded}}}{1 - Q^2_{\text{included}}}$$

4.4.3 Mediator and Moderator Analysis

Partial-least square path models are used to validate cause-effect relationships, which entail exogenous constructs directly affecting endogenous variables (Hair et al., 2017). Third variables may change the relationship between the constructs, thereby impacting the cause-effect relationship. Two types of change are moderation and mediation. Moderation occurs when the cause-effect relationship differs in strength or even direction through a third variable's influence. For example, a student's likelihood of undertaking a computer programming course may differ based on gender. Mediation ensues when a third variable (mediator variable) varies with changes in the exogenous construct, which causes the endogenous construct to change. Because the mediator changes the underlying relationship between the constructs, Hair et al. (2017) indicate that strong theoretical support is required for meaningful results. A range of mediation can occur from non-mediation to full mediation depending on the significance of the relationships between the exogenous, endogenous and

mediator constructs. In this study, mediation (Hair et al., 2017) was analysed. Full mediation occurs when the direct relationship between the endogenous constructs is not significant but is significant in the mediator variable's indirect relationship.

4.4.4 Application of Partial Least Squares Structural Equation Modeling

The action research cycles' reflections and assessment grades were consolidated and analysed using partial least squares based structural equation modelling. The number of mentions for each of the four influencer themes was summed by theme and apportioned a weighting per respondent team. This allowed for an analysis of similar magnitude (0 to 100) to the reflection grades per team. The reflection grade, influencer apportionment, knowledge before project (the mid-semester test grade), project grade and learning outcome grade (the business process management portion of the final examination) were used as exogenous and endogenous variables in the reflective learning model. The model was tested using partial least squares based structural equation modelling. The model assessment was performed in Smart-PLS version 3.3.3 with the outer formative model (Influencers), and the inner structural model was tested following Hair et al. (2017).

4.5 Summary

This chapter described action research and the role of theory in action research, analysis methods, and research methods. Action research is the preferred research method for pragmatist-critical realist studies (Heeks et al., 2019). Theory used in this study is described from two perspectives – focal theory and instrumental theory (Davison et al., 2012). Data collection and analysis methods are characteristically mixed in research for both pragmatism and critical realism philosophies (Zachariadis et al., 2013). This study used reflexive thematic analysis (Braun and Clarke 2006, 2019) for qualitative analysis and partial least squares based structural equation modelling (Hair et al., 2017) for the quantitative analysis method. Over four action research cycles, the research method observed, adjusted, and analysed student reflections from business process projects as part of higher education enterprise systems and business process management courses.

In the next chapter, the action research cycle findings are presented and the data analysed.

5 Findings: Identifying the Generative Mechanisms (Learning Influencers)

The findings and observations from the four action research cycles are reported in this and the next chapter. The four cycles, referred to as ARC1, ARC2, ARC3 and ARC4, took place between 2016 and 2018. A summary of the cycles is provided in Appendix B. In this chapter, the first three research questions are addressed. The first research question [RQ1] sought to identify mechanisms that students consider beneficial to learning in a business process experiential learning project. The second research question [RQ2] sought to understand how the identified learning mechanisms can lead to improved learning outcomes. The findings from the second research question led to the third research question [RQ3], which sought to identify the impact of the learning influencers on learning outcomes.

A literature search revealed the reliance on reflection for experiential learning (Boud et al., 1985; Dewey, 1938; Kolb, 2015). From a realist perspective, reflection is a learning mechanism, is poorly understood and difficult to teach (Moon, 2009). Although reflection is most effective within an iterative process of experience-reflection-action (Dewey, 1938; Kolb, 2015), people hold the potential to react contrarily in similar circumstances (Schatzki, 2016). Thus, any mechanisms that generate learning are only guidelines and do not guarantee a causal outcome. From the pragmatist practice perspective, learning may occur even from the potential for action (Dewey, 1938; Schatzki, 2016). Thus, when reflection on an experience is not put into action, learning cannot be proven even if learning occurred. This study set out to identify a set of mechanisms that, if they exist, could lead to the potential for learning through action and prior learning, whether in the classroom, from direct experience or indirect experience as reported by others.

In the start phase of the action research, the constructs of Kolb's experiential learning (Kolb, 2015) supported by Dewey's transactional approach (Dewey, 1938) were identified, and actions were planned for the study. The action research cycle start phase was followed by four plan – act – observe – reflect action cycles before exiting the action research cycles. Each of the four cycles followed the cycles suggested by Heeks et al. (2019) and Susman and Evered (1978).

5.1 ARC1 - Reflection-On-Action

The first cycle (ARC1) was undertaken in 2016 during an undergraduate course. The business process management project followed experiential learning principles to reinforce learnings from the lectures and provide realistic experience in business environments. Students in teams had to learn to analyse a business process and propose changes to current processes, supporting why the suggested changes would be beneficial. The student teams were tasked with preparing a report to management with their findings and suggestions. Each team needed to learn to manage the project, their team, time, and communications to prepare the report. As part of the experiential learning process, students reflected on their project experiences and included them in the final report. Before submitting the final report, the teams had to present the preliminary findings to a team of academics, delegates from a professional management company and the business project sponsors. Although the teams emphasised that they had applied much effort to their projects, the presentations revealed how they were coping with the projects. The projects provided insight into the complexities of business processes that they had tried to learn as an academic exercise for many students. The presentations provided feedback, which students could incorporate into their final reports. Several teams reported on the feedback from the presentations in their reflections. The reflections showed several common factors that became the themes of this study. One overarching commonality was the apparent justification for the highest grade for their projects. In addition to the justification of grades, students justified lower-quality projects by blaming factors beyond their control. In 2016, a significant factor beyond their control was a series of campus disruptions at their peak between presentations and the final project submission. The disruptions were brought about by the violence of the #FeesMustFall protests, resulting in a campus shutdown after property was vandalized, incidents of petrol-bombing, human excrement smeared, and a nail-bomb detonated (Hodes, 2017). The shutdown on campus forced students to make alternative arrangements to complete their projects as they relied on the campus community and infrastructure.

The students rallied, and all 15 full-time undergraduate student teams with four to five students per team submitted their final projects. Twelve teams (80%) completed the reflection section.

Step 1 - Plan

A plan was prepared to examine and analyse student teams' reflections on their experiences during business process projects. The four subsections of the plan clarified the problem, identified a purpose for intervention, proposed mechanisms and designed an intervention (Heeks et al., 2019).

Step 1a - Clarify the problem

A recurring complaint voiced by the course convenor was that students “*don't get it*”. This is a common complaint in education; for example, Braun and Clarke have a similar issue regarding their step by step thematic analysis approach (Braun and Clarke, 2006, 2019). The current study started with the observation that the course convenor considered student grades for the business process capstone projects below average, supported by findings from a preliminary study of the same business process management courses (Garbutt and Seymour, 2015). Even though individual students produced high grades, a low overall transfer of knowledge was observed. An initial investigation of the curriculum showed that the course contents were on par with industry requirements. The initial investigation findings were updated and presented at Conf-IRM 2019 (Garbutt and Seymour, 2019). Excerpts are summarised in Figure 5.1, which shows the examined course topics mapped to the Gartner business process management skillset (Searle & Cantara, 2013). Five skills from the Gartner set - denoted as * and ** - were not explicitly examined in the course, while two skills - (denoted as *** - were not specified in the Gartner skillset but were examined. *Change Management, Methodology Toolbox, Business Process Management Product Knowledge, and Agile Development* were not mappable to examined grades. Conversely, *Systems Thinking and Reflection* are not part of the Gartner skillset. Although Gartner dropped *Business Process Optimization* skills in 2016 (Searle & Cantara, 2016), it proved to be a significant part of the course work.

The mapping of the examined grades to Gartner's skillset requirements showed that the business process courses did not require significant modifications. Likewise, it was accepted that the advocated BPTrends method was suitable for process analysis and intervention. The BPTrends method is a tried and tested analysis method adding value to organisations by improving customer service through business process changes. It subscribes to various instrumental practices and thinking practices, including lean, six sigma, and business process

modelling standards (Harmon, 2019). Consequently, there were no rational reasons to change the teaching content nor the process analysis method. An underexplored area that had initiated the original 2015 research was reflection which is indispensable to experiential learning (Dewey, 1938; Kolb, 2015). Reflection is particularly relevant to practitioners (Schön, 1992) and fundamental to combining theory and practice (Kolb, 2015; Nowacek & Mountin, 2012).

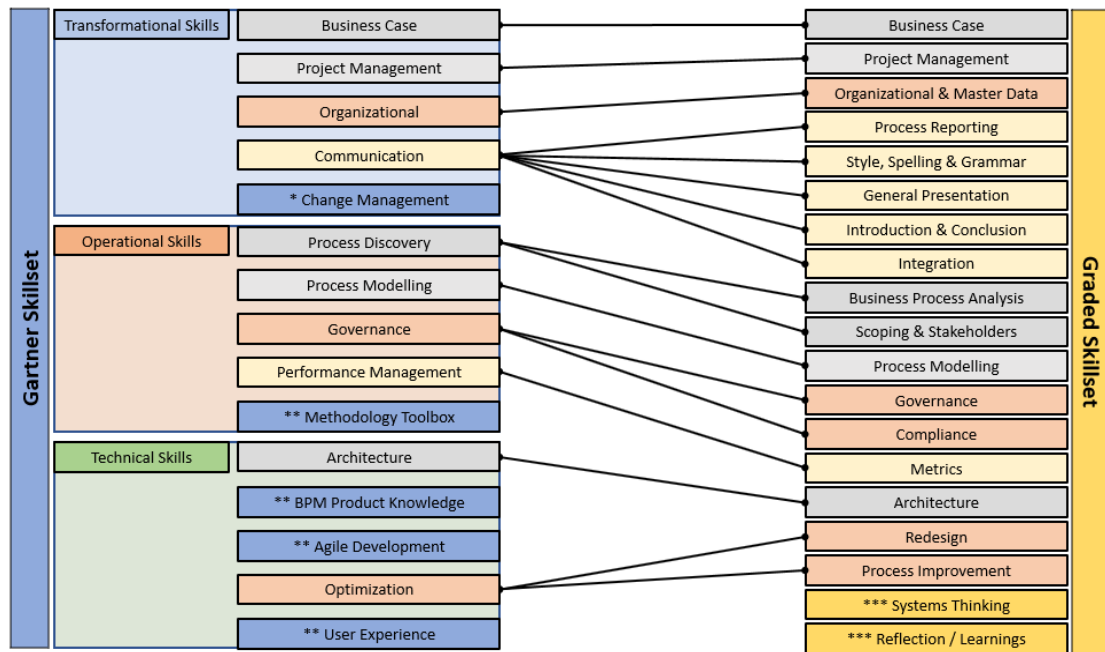


Figure 5.1. Mapping the Gartner skillset to examined grades.

The business process management experiential learning projects that were the setting for this thesis were dictated by sponsor companies and evaluated by them. Consequently, there was little room to influence the experience and outcome of the projects. Some influence could have been placed on project outcomes, but the researcher was predominantly an observer with limited access to the students and the sponsors. On the other hand, the research could have promoted changes to the coursework before the project, but this was not done for two reasons. The first was the research's focus, which was limited to the projects, and the second was because of the existing coursework's overall level of relevance.

Recognising the importance of reflection in learning, a course of action was agreed upon with the course convener. This represents the researcher-client agreement phase of Davison et al. (2004). The original agreement was for a minimum of three action research cycles with student reflection analysis during the project. In retrospect, the three cycles provided an

opportunity to investigate reflection-on-action, reflection-in-action (Schön, 1983) and reflection-for-action (Killion & Todnem, 1991; Van Manen, 1992).

Step 1b - Identify the purpose of an intervention

The study's purpose was to identify how learning outcomes can be improved through experiential learning and reflection. The purpose of the first intervention (ARC1) was to improve the feedback from the students' reflections. Three demi-regularities consisting of experience, improved learning and reflection were derived from Kolb's experiential learning theories and Dewey (1938).

- Experience - Lecture content and the business process project in live organisations provided the experience component.
- Improved Learning – The mechanism of learning is at the core of education and experiential theory.
- Reflection – Reflection is key to learning in experiential learning models.

Step 1c - Propose mechanisms for the intervention

For this study, reflection was the fundamental mechanism of learning from experience. A mechanism was proposed, which increased the mark for reflection on the rubric to improve reflection. The basis for this was that students work for marks but will ignore marks if the effort exceeds the mark's perceived value.

Step 1d - Design an intervention and methods

From earlier studies, it was noted that the reflection section had been poorly answered. The maximum marks for the reflection section were increased to elicit higher quality responses. A marking rubric (ARC1 Rubric in Appendix C) was prepared for inclusion in the undergraduate course project handouts. An overview of the importance of reflection and how to reflect was prepared for presentation to the students. A summary of the guidelines from the presentation is presented in the section ARC1 Guidelines in Appendix C.

Step 2 - Act

Three interventions were implemented based on the diagnosis and action planning. No change was made to the reflection requirements from earlier projects beyond the marks for reflection increased from 5% to 9%. Students were required to reflect on the project in their

hand-in document at the end of the project. This form of reflection is known as reflection-on-action (Schön, 1983). The prepared presentation on reflection was delivered to the students. They were encouraged to follow the guidelines and use the provided project marking rubric (shown in ARC1 in Appendix C) to self-assess their work and assist with their reflections.

Step 3 - Observe

The proposed intervention with the increased mark, the inclusion of the rubric for self-assessment, and the encouragement to reflect produced a more comprehensive outcome than the 2015 study (Garbutt & Seymour, 2015). Responses by each team who completed the self-assessment section related primarily to the rubric. Examples of the student reflections are presented in Appendix D. In Appendix D the section ARC1 P4 is an example of a template-based reflection, and ARC1 P11 is a free-form team reflection. Both forms of reflection focused on behaviour rather than learnings or environmental factors. However, some teams considered the impact on the stakeholders and, in one case, the general public for their process improvement in a public sector organisation.

Analysis of Student Reflections

The student reflections were extracted from the student projects and analysed using thematic analysis. As the 2015 study (Garbutt & Seymour, 2015) had identified topics that the students identified as necessary to accomplish the project, these were noted but not prioritised in the analysis. The analysis began by coding narratives within and among the student reflections to identify salient themes. The initial codes (or sub-codes, according to Gibson and Brown (2009)), were reviewed and grouped into code families in Atlas.ti version 7. After grouping the initial codes into code families, the code families were arranged into categories. The categories were then compiled into themes through an inductive reflective iterative analysis of the initial codes in conjunction with the original text. The process was guided by Braun and Clarke (2006) and reviewed based on Braun and Clarke (2019).

Analysis of the reflections section of the projects revealed 29 initial codes, as shown in Table 5.1 in descending order of the number of occurrences registered in the reflection texts. The initial coding revealed two interlinked areas of reflection: issues that the students faced and motivations for achieving a high grade for the project.

The initial sub-codes were grouped into categories from which four main themes were identified. The four themes generated from the thematic analysis (Braun & Clarke, 2006) were: (a) application of business process management and business skills, (b) applied effort, (c) resultant understanding and (d) subjective quality of the assignment. These were ultimately revised to undertaking tasks, applying effort, increasing understanding and pursuing quality and labelled as Influencers of Learning.

Table 5.1. Initial codes for ARC1.

Initial Code	ARC1	Initial Code	ARC1	Initial Code	ARC1
Engaging with Stakeholders	30	Communicating	12	Business Process Metrics	5
Effort in General	29	Analysis Skills	10	Master Data Identification	5
Understanding in General	26	Confidence	9	Scaffolding	5
Communication Channels	23	Managing Time	9	Business Intelligence Reporting	4
Quality in General	23	Division of Labour	8	Business Process Modeling	4
Business Process Knowledge	18	Interview Techniques	8	Negative Emotions	3
Team Building	16	Managing the Project	8	Task in General	3
Project Planning	14	Environmental Issues	7	Efficacy	1
Business Process Improvement	12	Technology Issues	7	Meta-Cognitive Reflection	1
Business Specific Knowledge	12	Experiential Learning	6		

The initial codes shown in Table 5.1 were revised in conjunction with the initial codes from the other cycles. The final revised labels for the themes, categories and codes are shown in Table 5.2 and discussed in the following sections. For consistency, only the final code, category and theme names are shown. Table 5.2 is sequenced by theme and the descending number of observations from the combined totals across all cycles. This allows for comparisons of the relative importance of each code to be compared progressively from ARC1 through ARC4.

Table 5.2. Themes, categories, and codes for cycle ARC1 (presented in the sequence of the final code count total over the cycles).

Theme	Category	Code	ARC1
Undertaking Tasks			42
	Managing Business Processes		39
		Applying Business Process Knowledge	23
		Modeling Business Processes	4
		Improving Business Processes	12
	Undertaking General Tasks		3
Applying Effort			143
	Applying Effort in General		29
	Managing Projects		22
		Prioritising Project Tasks	14
		Managing the Project Tasks and Milestones	8
	Engaging with Stakeholders		38
		Managing Stakeholder Interactions	30
		Expanding Interviewing Techniques	8
	Managing Time		9
		Using Time Efficiently	9
	Managing Teams		24
		Building Team Cohesiveness	16
		Delegating Tasks	8
	Expanding Business Skills		21
		Exploring Business Specific Knowledge	12
		Expanding Business Intelligence Skills	4
		Identifying Master Data	5
Increasing Understanding			48
	Acquiring Knowledge in Context		12
		Learning Through Scaffolding	5
		Reflecting on Personal Attitudes	1
		Learning Through Experience	6
	Increasing General Understanding		26
	Acquiring Analysis Skills		10
Pursuing Quality			85
	Improving Communication		35
		Conducting Communications	12
		Using Communication Channels	23
	Acting in Accordance with Personal Attitude		13
		Acknowledging Negativity	3
		Being Confident	9
		Being Efficacious	1
	Reacting to Environmental Factors		14
		Resolving Technology Issues	7
		Being Aware of Interconnected Contexts	7
	Pursuing General Quality		23

A thematic mapping, depicted in Figure 5.2, was generated for the themes, categories and codes identified in ARC1.



Figure 5.2. ARC1 thematic map showing themes, categories, and codes.

Influencers of Learning

The four themes – undertaking tasks, applying effort, increasing understanding and pursuing quality – identified from the initial codes were observed as mechanisms that acted as

motivators or influencers for the projects. The influencers followed a pattern that, on an investigation, resonated with the levels of learning reported by Helsing et al. (2004), as depicted in Table 5.3. Undertaking tasks was absolutist in following and demanding a finite solution for a problem or assignment. Applying effort was transitionist requiring more effort to find a finite solution unknown to the learner. Increasing understanding took a relativist stance in recognising that the answers may be relative to a situation. Pursuing quality was contextist in the critical view of solutions being contextual and differing between contexts.

Table 5.3. Learning influencers linked to levels of learning identified by Helsing et al. (2004).

Category	Levels of Learning (Helsing et al., 2004)	ARC1
Undertaking Tasks	Level 1 - Absolutist	42
Applying Effort	Level 2 - Transitionist	143
Increasing Understanding	Level 3 - Relativist	48
Pursuing Quality	Level 4 - Contextist	85

1. Undertaking Tasks (n=42)

Undertaking the business process management project as a task was the intrinsic objective of the project. This mechanism guided the work and was fundamental to obtaining a good grade. When a project or job task is not undertaken as per the guidelines, the project cannot produce its intended outcome. Nevertheless, the project may not be a failure as the outcome could hold value. Students showed that they were trying to find a definitive or absolute outcome to their project in their task-oriented reflections.

“It was demanding trying to work out how to apply what we have learnt in class ... we had to sit together and try [to] work out what was required [of] us ...” (ARC1 P5).

Task was absolutist (Helsing et al., 2004) and comprised hard skills directly related to the assignment at hand, in this case, the business process projects. Consequently, the dominant category for undertaking tasks was managing business processes (n=39) and undertaking general tasks (n=3).

- **Managing Business Processes (n=39)**

Managing business processes required applying business process management knowledge (n=23), improving business processes (n=4) and modeling business processes (n=12).

- **Applying Business Process Knowledge (n=23)**

Students reflected on their need to apply business process knowledge.

“We think this was the hardest section in the project as it needed one to understand the process and each and every step in it.” (ARC1 P10).

- **Modeling Business Processes (n=4)**

Students regularly mentioned business process modelling using business process management notation (collaboration diagrams).

“Designing collaboration diagrams helped each team member visualize the reconciliation process and to more easily suggest ways that the process can be improved ...” (ARC1 P7).

- **Improving Business Processes (n=12)**

The task of identifying process improvements helped students to improve their knowledge of their business processes.

“Our knowledge of the reconciliation process and [the enterprise software] system improved as each team member could actively discuss any flaws in the current process using the various diagrams ...” (ARC1 P7).

- **Undertaking General Tasks (n=3)**

Students reflected on performing the guideline task list in a manner that sought to justify higher grades.

“We feel the introduction clearly states the purpose for this investigation and what is to follow. The conclusion states the main improvements to be made to the current process.” (ARC1 P8).

Undertaking Tasks Extended by Applying Effort

Applying effort was observed to be an extension of undertaking tasks. Several teams revealed how they put effort into the project, which they explicitly linked to improved grades.

“A really good effort was put into process improvement, the team made sure to read the section on process improvement in the course reader ... The team put a major effort into

the reports, since this counts a significant amount towards the [project grade] ...” (ARC1 P10).

2. Applying Effort (n=143)

Applying effort was required to accomplish the task, which takes energy and determination. Effort is transitionist (Helsing et al., 2004) with an absolutist base that requires knowledge to supplement classroom learning. Consequently, applying effort was observed to expand knowledge of the curriculum topics and benefit from experiential learning.

Applying effort (n=143) included engaging with stakeholders (n=38), applying effort in general (n=29), managing teams (n=24), managing projects (n=22), expanding business skills (n=21), and managing time (n=9).

- **Engaging Stakeholders (n=38)**

The students recognized that engaging with stakeholders was critical to their projects. Engaging with stakeholders (n=38) required managing stakeholder interactions (n=30) and expanding interviewing techniques (n=8).

- **Managing Stakeholder Interactions (n=30)**

Managing stakeholder interactions required effort from the teams. A frequent complaint was the lack of access to stakeholders.

“[The client’s staff] were inaccessible due to being overworked ... This meant that we could not get any additional feedback from relevant stakeholders as they did not have the time to answer our questions ...” (ARC1 P3).

- **Expanding Interviewing Techniques (n=8)**

Once access to stakeholders was gained, interview techniques were a cause of concern.

“The second learning experience which members of the group had was the ability to attain [sic] certain information ... We had to learn how to clarify certain information points as well as ask questions in such a manner that information flowed naturally and opened more topics for discussion. Instead of reading a bullet point list of information, we had to create that list through asking questions and interpreting answers correctly.” (ARC1 P12).

- **Applying Effort in General (n=29)**

Students frequently reflected on how much effort each task took but seldom reflected on what they put effort into or how they went about it.

“Great effort was put into the introduction and conclusion ... Major effort was put into self-analysis of the team ... Lots of effort, stands out as superior. Good use of tables and figures, perfect headings and titles. One document with high clarity graphics. Crisp, consistent, aesthetically pleasing” (ARC1 P 7).

- **Managing Teams (n=24)**

Managing teams required effort for building team cohesiveness (n=16) and delegating tasks (n=8).

- **Building Team Cohesiveness (n=16)**

Teams had to apply effort to building a cohesive team. Links between building team cohesiveness and delegating tasks, and resolving conflict were evident.

“We found it important that each member has their own responsibilities, goals, and deadlines” (ARC1 P8).

“... being in a multi-disciplined team (from an academic point of view), was a bit challenging at first for all team members; however, we eventually realized the benefits that the project would gain from this ...” (ARC1 P14).

Students who had worked together previously had an advantage as they already knew each other and how to manage themselves.

“As far as team dynamics were concerned, the group gelled together fairly well. We attribute this to working together during a project [previously].” (ARC1 P12).

- **Delegating Tasks (n=8)**

Some teams attempted to be more efficient by delegating tasks to team members who could work independently, thereby avoiding team management issues.

“The main lessons that we learnt in terms of project management is communication and delegation of duties. Tasks were divided and given to the group member who was best at the task.” (ARC1 P01).

However, the delegation of duties was a paradox and not advised by some teams.

“... teamwork needs constant communication and collaboration. A project is not successful if all team members work individually and only look out for themselves ...” (ARC1 P13).

- **Managing Projects (n=22)**

Delegation of tasks emphasised the importance of managing projects with one team bemoaning the late appointment of a project manager.

“Eventually, [a team member] took on the role of Project Manager and with it the responsibility of bringing the group together ...” (ARC1 P3).

Managing projects (n=22) required prioritising project tasks (n=14) and managing the project tasks and milestones (n=8).

- **Prioritising Project Tasks (n=14)**

Project management started with prioritizing project tasks which, in hindsight, was inadequate.

“... things we would do differently regarding the outcome of this project. ... Set meeting dates in advance so that we could meet more regularly. Manage our time better. Meet up more often as a whole team to work on the project.” (ARC1 P11).

- **Managing the Project Tasks and Milestones (n=8)**

Students reflected on the need for managing project tasks in retrospect. Several teams suggested that project planning should have been done earlier in their project.

“... once we met, our understanding of the project requirements became clear. This should have been done closer to the start of the project ...” (ARC1 P08).

- **Expanding Business Skills (n=21)**

Limited knowledge of business skills was a common cause for concern that required effort.

“... make sure all team members understand the business process well before we start the process ...” (ARC1 P4).

Expanding business skills required exploring business-specific knowledge (n=12), expanding business intelligence skills (n=4) and identifying master data (n=5).

- **Exploring Business-Specific Knowledge (n=12)**

Exploring business-specific knowledge took effort from the students who had little or no previous business experience.

“At first, the process of the project was very unclear but as the meetings unfolded we formulated a good idea of what needed to be done ...” (ARC1 P11).

- **Expanding Business Intelligence Reporting Skills (n=4)**

Expanding business intelligence skills was observed to require effort. Students noted links between business intelligence reporting, metrics and improving business processes.

“... all reports are directly linked to KPIs and we feel [the client] will find them useful assessing the process efficiency ... and use them to make continual improvements ...” (ARC1 P14).

- **Identifying Master Data (n=5)**

Students consistently had difficulties in identifying master data that was related to metrics.

“We struggled to understand what represented organizational and master data for our process ... Considerable effort was given in selecting few metrics that truly measure the process at hand ...” (ARC1 P14).

- **Managing Time (n=9)**

Effort expended on managing time (n=18) required using time efficiently (n=9).

- **Using Time Efficiently (n=9)**

Students recognised that making efficient use of available time required effort. In most cases, this was observed retrospectively.

“During the course of this project we were able to improve some skills such as improved time management and organisation ... this became even more difficult due to occasional closure of the university. This problem was resolved by group members making sacrifices by rescheduling their other meetings that were causing the conflict ...” (ARC1 P9).

Applying Effort Leads to Increasing Understanding

Teams observed that the applying effort produced increased understanding.

“... it was not an easy process to comprehend initially ... [the project] provided us with a great opportunity to gain a better understanding of analysing existing business processes, and how to improve/redesign those processes. ...” (ARC1 P7).

3. Increasing Understanding (n=48)

Increasing understanding was perceived as increased comprehension and learning that proceeded from applying effort when undertaking tasks. Increasing understanding transitioned from the absolutist viewpoint used in undertaking the tasks and applying effort to viewing knowledge relative to each situation.

“We think we were able to show our understanding of the business process clearly ... we currently have a very good understanding of the current business process and the steps involved in it ...” (ARC1 P9).

Increasing understanding (n=48) required increasing general understanding (n=26), acquiring knowledge in context (n=12), and acquiring analysis skills (n=10).

- **Increasing General Understanding (n=26)**

Teams mentioned increasing their understanding in several contexts. Frequently generic mention of understanding appeared as proof of learning.

“This project provided us with a great opportunity to gain a better understanding of analysing existing business processes, and how to improve/redesign those processes ...”
(ARC1 P07).

- **Acquiring Knowledge in Context (n=12)**

Acquiring knowledge in context (n=12) showed learning through experience (n=6) but required learning through scaffolding (n=5) and reflecting on personal attitudes (n=1).

- **Learning Through Experience (n=6)**

Learning through experiences offered a broad skill set, as shown by one team.

“... some of our learning experiences are listed below: How to deal with a real-world scenario ... Interaction - meeting new people and communicating professionally with them ... Problem solving skills - the project made us think on a broader scale to come up with solutions ... The ability to work as a team ... How to carry out presentations in front of professional business analysts ...” (ARC1 P11).

- **Learning Through Scaffolding (n=5)**

Learning by experience was aided by scaffolding for increasing understanding. The course reader was a common source of reference outside of the lecture room.

“A really good effort was put into process improvement, the team made sure to read the section on process improvement in the course reader ...” (ARC1 P10).

- **Reflecting on Personal Attitudes (n=1)**

Reflecting on personal attitude took the form of metacognitive reflection (reflecting on reflection) for increasing understanding, which was beneficial for students' attitudes. However, they did not directly connect it to learning.

“We feel reflecting back on the good times and bad times of doing this project came up the most when we were drawing up the learnings. We are going to miss this project, it was an intense year, coupled with the unrest of campus. This project and the year was truly a challenge and preparing these learnings made us realize we managed to come up from it.” (ARC1 P14).

- **Acquiring Analysis Skills (n=10)**

Acquiring analysis skills increased understanding. Nevertheless, the teams regarded understanding in terms of the effort needed to perform the task rather than recognising each situation's relativity.

“This project provided us with a great opportunity to gain a better understanding of analysing existing business processes, and how to improve/redesign those processes. ...”
(ARC1 P7).

Increasing Understanding Leads to Pursuing Quality

Increased understanding was observed to lead to a pursuit of quality. While quality is subjective and contextual, some teams considered quality as an extension of effort and understanding.

“We think this is an exhaustive list of the stakeholders and their functions. We think the business case goes straight to the point ... We think we were able to clearly show our understanding of the business process. We think we did well here because we believe that we currently have a very good understanding of the current business process and the steps involved in it ...” (ARC1 P9).

One team's project for an offshore company provided insight into operations in diverse situations. The team noticed multiple views of the situation, which benefitted from input from multiple disciplines. Their reflections showed appreciation for undertaking the task, which required applying effort and increasing understanding with an outcome of quality.

“... it became evident that it is pivotal to the innovation process to have team members with different backgrounds contributing to the project. ... This was not an easy task as [the client] is [an offshore] company and works in extremely different ways, however, we put in weeks and weeks of hard work in order to map everything out perfectly. Hence, we feel that this aspect of the project was done close to 100%. If we had not perfected this, then the project as a whole would be greatly misunderstood and would have led to failure ...”
(ARC1 P14).

4. Pursuing Quality (n=85)

In doing excellent work, pursuing quality was highlighted by several teams as justification for higher grades. This was similar to the justification for applying effort and, to a lesser extent, increasing understanding.

“We feel this is a particularly strong section of our report. Considerable effort was given in selecting few metrics that truly measure the process at hand, all reports are directly linked to KPIs and we feel [the client] will find them useful assessing the process efficiency and effectiveness of their new platform and use them to make continual improvements ...”
(ARC1 P14).

Quality is contextist (Helsing et al., 2004) and differs from situation to situation. Pursuing quality (n=85) required improving communication (n=35), pursuing general quality (n=23), reacting to environmental factors (n=14), and acting in accordance with personal attitude (n=13).

- **Improving Communication (n=35)**

Communication was a common thread in the student reflections and showed an underlying perspective of context. Communication varied from client to client, from team to team and from team member to team member.

“The communication with stakeholders has improved our professional communication skills. Being aware that our emails with the stakeholders were being assessed, made us put a lot more effort into making sure they were as professional as possible ...” (ARC1 P6).

“Overall, we managed to work well as individuals as well as a team; and in order to overcome our problems faced we agreed that communication would play a vital part in the completion of this project ...” (ARC1 P11).

Improving communication (n=35) required using communication channels (n=23), and communicating (n=12).

- **Using Communication Channels (n=23)**

Multiple modes of communication were used by teams, including face-to-face meetings, emails and WhatsApp.

“Team communication was a big problem in this time and continued to be as there was not a single form of communication that was ideal for the full group ... the only form of communication we could use to contact her was through email. The rest of the team used a Whatsapp group ... Next time, a single form of communication should be decided on for team discussions ...” (ARC1 P3).

- **Conducting Communications (n=12)**

The teams reflected on how they conducted communications and how they should have communicated.

“We could have communicated more efficiently, had more meetings and also distributed tasks earlier on ...” (ARC1 P6).

- **Pursuing General Quality (n=23)**

Several teams emphasised the general quality of their projects. Their reflections showed the subjectiveness of quality.

“Excellent analysis and suggestions in terms of controls, changes and HR impact. It is well explained ... we feel that we have made good recommendations and that these recommendations will only help to make the entire reconciliation process more efficient.” (ARC1 P7).

- **Reacting to Environment Factors (n=14)**

Changes in the environmental milieu were beyond the teams' control and resulted in contextual changes to the learning process. Reacting to the environmental factors (n=14) required the teams to resolve technology issues (n=7) and be aware of interconnected contexts (n=21).

- **Resolving Technology Issues (n=7)**

Technology failure and software issues were a cause of concern for several students. The campus shutdown resulted in students not having access to adequate technology and forced them to find alternatives which negatively impacted their perceived project quality.

“Restricted Access to Campus Facilities: UCT provided the primary access to fast internet as well as certain software such as ARIS ... Without ARIS, we had to learn a new software

(draw.io) to complete the BPMN diagram online. Although this is a free application, it does not produce diagrams to the same quality that ARIS does ...” (ARC1 P03).

- **Being Aware of Interconnected Contexts (n=7)**

Students provided lists of contextual impacts from the campus shutdown due to the FeesMustFall student protest action. They included access issues, time management and emotional attitude. The students appealed to undertaking the task and applying effort in justifying their perception of the quality of their project.

“The student protests caused many changes to the way in which the semester was run, and placed a lot of stress on all students and staff. The specific consequences are ... Difficulty in convening as a team ... Restricted Access to Campus Facilities ... Emotional Stress Caused ... Changes to Course Schedule ... Impact on [the client] ... Condensing of the Semester ... Despite all the challenges faced, we managed to overcome the obstacles and compiled a report of which we believe covers the brief, and provides a viable solution for the redesign of the process ...” (ARC1 P3).

While one team suggested that the campus closure negatively impacted the quality of their project, *“We believe that the conditions have had a significant effect on the final product of this report. ...” (ARC1 P6)*, another team embraced the opportunity to complete the project *“If not for the #feesmustfall protests it would have been exceptionally difficult for us to cope with the work load and everything that was required of us ...” (ARC1 P13).*

- **Acting in Accordance with Personal Attitude (n=13)**

Personal attitudes resulted in actions that impacted quality. The quality implications were contextual and differed between clients, teams and team members. Acting in accordance with personal attitudes (n=13) resulted in students acknowledging negativity (n=3), being confident (n=9) and being efficacious (n=1).

- **Acknowledging Negativity (n=3)**

Some teams acknowledged negativity when they reflected on feelings of anxiety and uncertainty.

“Anxiety and uncertainty concerning the completion of the academic year was an issue which impacted members of our group ... Uncertainty concerning deadlines resulted in some anxiety where demands from the other courses that our team members are registered in weighed heavily on us ...” (ARC1 P3).

- **Being Confident (n=9)**

Some students observed improved confidence, which they linked to an improved quality of life.

“The skills and knowledge acquired during this project was both academically and non-academically focused. ... Working with stakeholders instilled a level of confidence and responsibility in each group member. Upon meeting our stakeholders, we immediately felt a sense of responsibility as we were keyed [sic] with helping to improve a business and the lives of employees.” (ARC1 P07).

- **Being Efficacious (n=1)**

Teams started to show attitude changes which improved their confidence in their ability to produce the intended result.

“Despite all the challenges faced, we managed to overcome the obstacles and compiled a report of which we believe covers the brief, and provides a viable solution for the redesign of the process.” (ARC1 P03).

Step 4 – Reflect

The inductive thematic analysis of the reflections from the first cycle showed an interlinked set of variables that could be considered from the perspective of four themes - task, effort, understanding and quality. Each appeared as an influencer of learning (a sense of experience leading to potential action (Plowright, 2016)) which students used to motivate potentially higher grades. Although meta-cognition was limited, students revealed multiple aspects of what they experienced during the project. Students repeatedly stated that their reflections and experience would lead to a change in future behaviour. However, it was not possible to validate if learning had taken place without a longitudinal study with the same individuals. Testing individual learning was made more difficult due to the reflections being team effort

and not individualistic. Likewise, predicted action would be difficult to monitor at an indeterminate future date and could be attributable to other influences.

Several themes relevant to business process management were observed during the analysis of the student reflections. The need for skills such as communication, stakeholder engagement, team management and project management were identified. Since these themes were neither novel nor uncommon in the literature, they were not reviewed further. Nevertheless, two factors were observed. First, students found reflection-on-action challenging to accomplish and too late to make behavioural changes in their current projects. The second factor was the observation of undertaking tasks, applying effort, increasing understanding, pursuing quality learning influencers exposed by the students. Of the four influencers, applying effort was mentioned most frequently by the students.

The first cycle's findings showed that students reflected negatively on what went wrong in their projects while promoting reasons for them to gain good marks. Reflection on the reasons for this revealed motivational influences for proximal motivations, and while there was some reflection for longer-term learning, this was limited. In cycle ARC1, the student reflections were after the experience, which was posited to be weakened by the euphoria of completing the project and the elapsed time between the experience and the reflections. This could result in the students forgetting specific details when under pressure to complete their projects.

5.2 ARC2 - Reflection-in-Action

The second cycle (ARC2) followed a process similar to the first cycle and comprised 16 part-time postgraduate students. The cycle took place in 2017 as part of a postgraduate diploma. The course was presented in four block weeks, culminating in a final exam in November 2017. The capstone project, which was the source of the qualitative data for ARC2, was a significant part of the coursework. Part of the capstone project requirements was to present the preliminary findings to a panel of academics. ARC2 differed significantly from the other cycles as the students were postgraduate, part-time and were employed. Consequently, they had some business experience that was mostly lacking in the undergraduates. Several of the ARC2 students also had families, which provided insights not found in the other cycles. A further significant difference to the other cycles was undertaking the projects as individuals compared to the undergraduate cycles undertaken in teams of four or five students. As the

students were working, they also had to find their own project settings. The preferred setting was at their place of employment.

Like ARC1, the second cycle (ARC2) was analysed using inductive reflexive thematic analysis and followed the enhanced cyclical pragmatist-critical realism action research model of plan, act, observe and reflect.

Step 1 - Plan

Planning was again separated into four subsections where the problem was clarified, a purpose for intervention identified, mechanisms proposed, and an intervention designed (Heeks et al., 2019).

Step 1a - Clarify the problem

Reflections on ARC1 inferred that although reflection was helpful, reflection-on-action can ignore forgotten problems or be superseded by more current or pressing issues. A method was required that encouraged students to reflect nearer to the time of action. One way of doing this is to keep a diary or journal of events as they happen (Cunliffe, 2016). Schön speaks of reflection-in-action in an “on-the-spot sense”, which is “centrally important to the artistry of competent practitioners” (Schön, 1992, p. 125). One student’s reflections resonated with this view when commenting: *“I was going to “backdate” the journals but ... I realized that 1) that would not be a true reflection of my learning over the course of the case study 2) I would never be able to recall what I was thinking/feeling at the time...”* (ARC2 P16).

Step 1b - Identify purpose of an intervention

The purpose of ARC2 remained the improvement of learning outcomes through experience and reflection. The three demi-regularities of experience, improved learning and reflection were retained from ARC1. The change in ARC2 was to improve reflection by moving it closer to the experiences of the students.

Step 1c - Propose mechanisms for the intervention

Students were encouraged to reflect-in-action through reflective journals as reflective journals are promoted for improving reflection.

Step 1d - Design an intervention and methods

In ARC2, the 2017 postgraduate class were required to perform reflection-in-action by maintaining journals during the project. For progress monitoring, they were required to submit reflective journals every week. This was easier to manage than ARC1 as the ARC2 group was small (n=16), and the projects were undertaken individually, unlike the undergraduate students in ARC1 who worked in groups. Regular submission and analysis of the reflective journals were hypothesised to provide opportunities for identifying issues arising during the project, which could be addressed timeously. This would benefit the students where, unlike the other cycles, they did not have dedicated tutors. A reflective journal presentation was prepared, including several guidelines for writing a reflective journal as a scaffolding aid. The guidelines summarized in section ARC2 in Appendix C included writing and storing journals, alternative sets of questions to aid reflection and an example of a reflective journal entry. A reflective journal template was provided to further assist with the reflections, as shown in Appendix C.

Step 2 - Act

The presentation on reflective practice was presented to the students before the start of their projects. Students were encouraged to make contact with the researcher regarding any issues or queries. Multiple reflection templates were supplied in the project brief as a scaffolding aid, including student projects from prior years. During the cycle, varying degrees of student interactions occurred between the students and the researcher. In addition to assisting with grading project progress presentations and marking the reflective journals, students requested clarification of reflective practice and in-depth help on the project. These interactions ranged from some classroom contact to one-on-one meetings with students.

Step 3 - Observe

The cycle produced a range of engagement from the students from very engaged to no engagement. Seven students (44%) supplied useable reflection sections, with a further seven students (44%) actively refusing to maintain journals even though the marks for doing so were almost 9% of the total project mark. One reflective journal was excluded from analysis as the reflections were personal and did not directly relate to the project. Examples of the individual reflections are presented in Appendix D under the heading ARC2. ARC2 P19 shows the predominant format for the reflections, which followed the proposed template. ARC2 P15

shows an example of a free-form reflection journal entry. However, in later entries, the student used the provided template. In retrospect, the multiple options may have confused the students looking for the most straightforward method for completing the reflection requirements. This highlighted the initial findings in ARC1, where students followed the task, which may not lead to understanding.

A second interesting observation was that the most engaged students obtained the highest reflection grades. It was also noted that the students who had the most one-on-one interactions obtained the highest exam grade even though they had neither the highest project grade nor the highest test grades. This indicated that there might be a correlation between one-on-one interaction and higher levels of learning. This was not explored further as individuals' reflections and interactions could not be separated from the group reflections in the other cycles. Students were expected to submit regular reflections on their progress. This was not popular amongst the students, who often struggled to complete the reflections, and some refused to maintain reflective journals. A common theme was students' unfamiliarity in reflecting, for which a single lecture on reflection practices was insufficient. This led to a proposition that students need training for reflection over an extended period.

Analysis of the ARC2 journals showed them to contain similar content to the reflections from the previous cycle. Justifications based on task, effort, understanding, and quality were noticeable, as were prevalent themes such as time management and communications. The following sections summarise the findings following the same format as the previous cycle.

Analysis of Student Reflections

For ARC2, the student reflections were extracted from the student projects and analysed using inductive reflexive thematic analysis in the same manner as ARC1. The process was guided by Braun and Clarke (2006) and reviewed based on Braun and Clarke (2019). The analysis began by coding narratives within and among the student reflections to identify salient themes reviewed and grouped into code families in Atlas.ti version 7. The initial codes were coded into code families and arranged into categories, and finally consolidated into themes. Four main themes similar to those observed in ARC1 were identified. The four themes were named the same as the first cycle themes – undertaking tasks, applying effort, increasing understanding and pursuing quality grouped under the label learning influencers.

The initial sub-codes are shown in Table 5.4 in descending order of the number of occurrences registered in the reflection texts. Similar to the first cycle, two overarching areas of reflection were observed: issues that the students faced and motivations for achieving a high grade for the project.

Table 5.4. Initial codes for ARC2.

Initial Code	ARC2	Initial Code	ARC2	Initial Code	ARC2
Communicating	63	Understanding in General	22	Business Specific Knowledge	7
Project Planning	61	Confidence	17	Learning from Effort	7
Effort in General	60	Business Intelligence Reporting	15	Meta-Cognitive Reflection	7
Business Process Modeling	47	Scaffolding	15	Unlearning	6
Managing Time	45	Interview Techniques	11	Appreciation	5
Business Process Knowledge	40	Quality in General	10	Business Process Metrics	5
Negative Emotions	35	Getting started	8	Interconnected Approach	3
Engaging with Stakeholders	30	Health	8	Experiential Learning	2
Technology Issues	30	Life Balance	8	Efficacy	1
Task in General	27	Positive Attitude	8	Judgement	1
Business Process Management	24	Analysis Skills	7	Managing the Project	1

As with ARC1, the initial codes were revised in conjunction with the other cycles' initial codes. The final revised labels for the themes, categories and codes are shown in Table 5.5 and discussed in the following sections.

Table 5.5. Themes, categories, and codes for cycle ARC2 indicating the changes between ARC1 and ARC2 with the new codes ().*

Theme	Category	Code	ARC1	ARC2
Undertaking Tasks			42	143
	Managing Business Processes		39	116
		Applying Business Process Knowledge	23	45
		Modeling Business Processes	4	47
		Applying Business Process Management Knowledge		24*
		Improving Business Processes	12	
Undertaking General Tasks		3	27	
Applying Effort			143	240
	Applying Effort in General		29	61
	Managing Projects		22	62
		Prioritising Project Tasks	14	61
		Managing the Project Tasks and Milestones	8	1
	Engaging with Stakeholders		38	41
		Managing Stakeholder Interactions	30	30

		Expanding Interviewing Techniques	8	11
	Managing Time		9	53
		Using Time Efficiently	9	45
		Starting Early		8*
	Managing Teams		24	1
		Building Team Cohesiveness	16	
		Delegating Tasks	8	
	Expanding Business Skills		21	22
		Exploring Business Specific Knowledge	12	7
		Expanding Business Intelligence Skills	4	15
		Identifying Master Data	5	
Increasing Understanding			48	66
	Acquiring Knowledge in Context		12	37
		Learning Through Scaffolding	5	15
		Reflecting on Personal Attitudes	1	7
		Learning Through Experience	6	2
		Learning from Effort		7*
		Not Forgetting Learnings		6*
	Increasing General Understanding		26	22
	Acquiring Analysis Skills		10	7
Pursuing Quality			85	188
	Improving Communication		35	63
		Conducting Communications	12	63
		Using Communication Channels	23	
	Acting in Accordance with Personal Attitude		13	66
		Acknowledging Negativity	3	35
		Being Positive		8*
		Being Confident	9	17
		Being Appreciative		5*
		Being Efficacious	1	1
	Reacting to Environmental Factors		14	49
		Resolving Technology Issues	7	30
		Being Aware of Interconnected Contexts	7	3
		Prioritising Life Balance		8*
		Appreciating Health		8*
	Pursuing General Quality		23	10

A thematic mapping was generated for the themes. Figure 5.3 includes all the categories, codes and sub-codes per theme, with the codes first observed in ARC2 indicated by an asterisk.

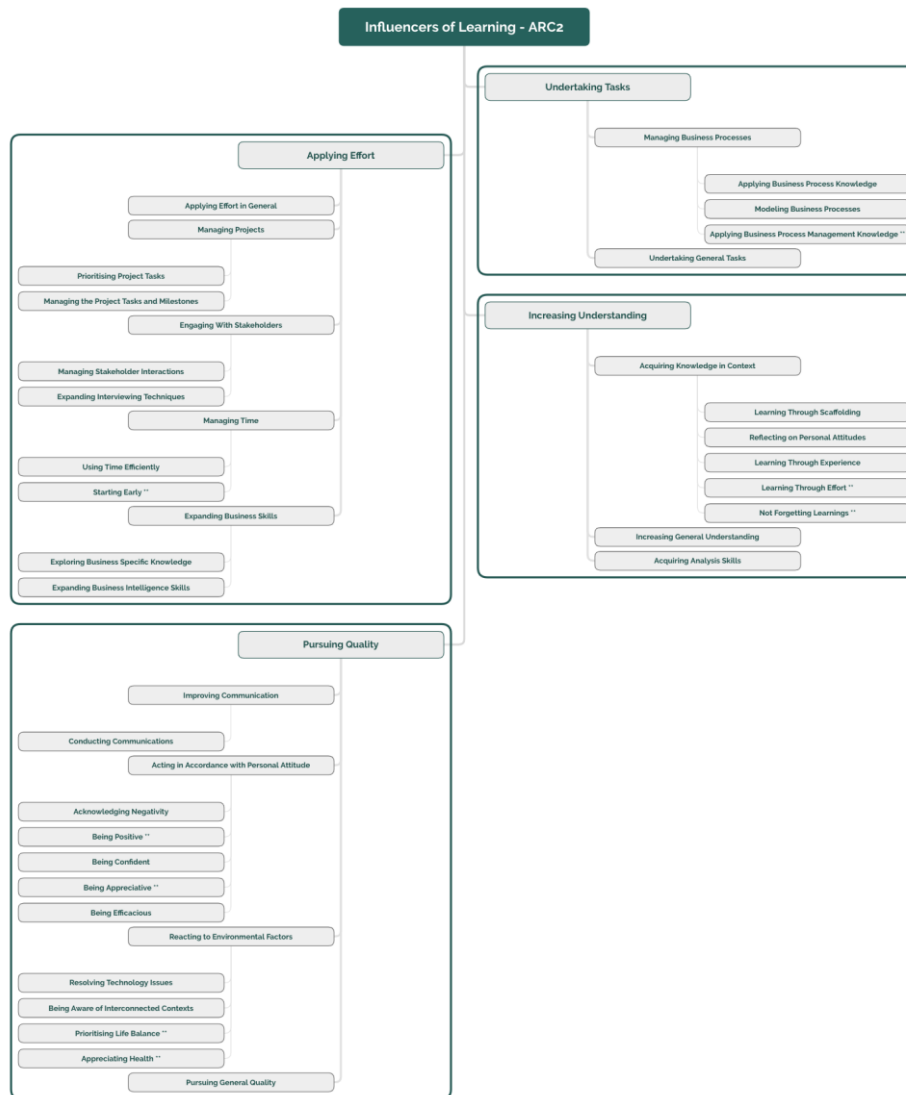


Figure 5.3. ARC2 thematic map showing themes, categories, and codes. The double asterisks (**) indicate new codes.

Influencers of Learning

The four themes - undertaking tasks, applying effort, increasing understanding and pursuing quality - observed in ARC1 were noted in ARC2 even though the analysis started as a blank slate in ARC2. In this cycle, applying effort was still noted as the most significant theme (287 mentions compared to 225 in ARC1), followed by pursuing quality (249 compared to 147 in ARC1). The third was undertaking tasks (214 compared to 77) before increasing understanding (82 compared to 63). Consequently, the four learning influencers were observed to be similar in the number of mentions for both cycles. For consistency, the four influencers are shown in the same order as the levels of learning of Helsing et al. (2004).

Eight additional codes observed in ARC2 that were not observed in ARC1 are described in each relevant theme and category.

- **Applying Business Process Management Knowledge (n=24) (Undertaking Tasks)**

Students were looking for an absolutist outcome when considering business process management requirements.

“Using the model, I was able to find what areas needed to be improved in the process. I was also able to identify stakeholders ... I was surprised to find how some things which I thought were enablers were in fact guides and vice versa.” (ARC2 P18).

When the students found the desired result, they showed the absolutist worldview, which was task-related and lacked appreciation for understanding. Some even noted when they did not conform to the examples provided to them.

“... Completed my introduction. Forgot to complete my root cause analysis ...” (ARC2-P21).

- **Starting Early (n=8) (Applying Effort)**

A common source of time management problems was getting started, which was mentioned repeatedly by the students.

“... I could [should] have started a lot sooner so that I had more time ... I need to start with the project as soon as possible and not procrastinate ...” (ARC2 P19).

- **Learnings from Effort (n=7) (Increasing Understanding)**

Students required effort for understanding which provided the ability to select appropriate actions from many available possibilities.

“I realized there are many approaches for business analysis that are taken by different authors and sources that I had read. Sifting through that information and getting information that is useful and relevant to this project proved to be daunting. That is also true for the modelling as there a lot of modelling tools, some of which I was not aware of ...” (ARC2 P20).

- **Not Forgetting Learnings (n=6) (Increasing Understanding)**

Not forgetting learnings was also noted whereby students ostensibly learnt in class but could not recall it in situ.

“After looking at the various google diagrams I felt like I remembered very little of [what was] explained. Also felt like I was second-guessing myself about the bits that I did recall ... I needed to wade into this myself, else I would not have properly understood, or appreciated the action.” (ARC2 P16).

- **Being Positive (n=8) (Pursuing Quality)**

While acknowledging the task's difficulties, some students showed a positive attitude that often related to quality.

“I was able to format the work in a presentable fashion. I am happy with the overall appearance of the work.” (ARC2 P18).

- **Being Appreciative (n=5) (Pursuing Quality)**

An attitude of appreciation that was related to being positive and considered contexts was noted.

“Overall, the assignment made me learn so much about our business and the sort of problems other employees within the business go through and things that I would not be privy to, and to that end it's been an eye opener ...” (ARC2 P15).

- **Prioritising Life Balance (n=8) (Pursuing Quality)**

A link was observed between family and academic life interwoven with emotion. This was not investigated further as the other cycles were group-based with full-time undergraduate students, whereas ARC2 were part-time working individuals.

“... I did not do much [on my project] because I spent some time with my family ... What caused me the most anxiety was visiting my father's grave, it's been a while ... being there today just brought back some feelings on the day we buried him ... So seeing that today is father's day, things were a bit emotional for me ...” (ARC2 P21).

- **Appreciating Health (n=8) (Pursuing Quality)**

Health issues were observed which were not observed for the ARC1 undergraduates. Students were impacted both by their own health issues and that of their families.

“Went to the Doctor and he booked me off sick .. I could not breathe properly and had a fever ... Could not really do much because I was really sick the weekend ... My daughter ... has an ear and throat infection, because she does not want to go to anyone else, my job was to put my little baby to sleep before I could start studying.” (ARC2 P21).

Step 4 – Reflect

As with ARC1, the ARC2 students were unaccustomed to reflecting, and a single lecture on how to reflect was insufficient. This led to the proposition that students need more lessons on reflection over a more extended period. This resonated with Helsing et al.'s (2004) observation of a lack of critical thinking in students, which only starts manifesting at the relativist (understanding) level and Perusso et al.'s (2020) recommendation for reflection training.

Several students refused to keep journals, while some appeared to backdate their journals. Thus, although reflective journals can be helpful in experiential learning, they proved challenging to produce. This was due in part to the amount of work involved and the lack of perceived benefit. Anecdotal findings from discussions with students indicated that the journals might become too personal. Some of the reflective journals showed that students only completed the journals to attract extra marks. On the other hand, the reflective journals provided rich data that could not be obtained from a summative reflection. Students either forget what they went through, highlighted specific perceived issues, and focussed on negative experiences or combinations of these issues. The journals also provided insights into persistent issues such as time management and planning. Week after week, reflections included references to time management and the need to start earlier. Furthermore, the weekly journals held the potential to highlight issues, such as the student who was suddenly unavailable for two weeks because of a death in the immediate family.

A pertinent finding was the similarity between ARC1 and ARC2 of undertaking tasks, applying effort, increasing understanding and pursuing quality as learning influencers. The second

cycle reinforced the relevance as the similarities were observed for two different samples (full-time-undergraduate versus part-time-postgraduate) using different data collection methods (reflection-on-action and reflection-in-action).

5.3 ARC3 – Reflection-for-Action

The third cycle (ARC3) was similar to ARC1 in content and was undertaken by full-time undergraduate students. ARC3 required students to reflect before action. Student teams were required to provide a reflection-for-action learning document showing how they prepared for their projects in addition to reflection-on-action. The research sample for ARC3 consisted of 16 full-time undergraduate student teams, of which fourteen teams (88%) completed the reflection section.

Step 1 - Plan

As for the first two cycles, planning was separated into four subsections where the problem was clarified, a purpose for intervention identified, mechanisms proposed, and an intervention designed (Heeks et al., 2019).

Step 1a - Clarify the problem

ARC1 exposed the difficulty in getting students to reflect, and ARC2 supported that finding even after having a dedicated lesson on reflection and access to the researcher. In ARC1, the increased marks for reflection may have provided more detailed reflection than the initial study (Garbutt & Seymour, 2015). However, the increased mark was not effective for ARC2. The student perception in ARC2 was the relatively low marginal value of reflection compared to the effort required, which led to students not completing the reflection journals. Without the project changing focus from business processes to reflection, no additional marks could be added to the reflection section. From the ARC2 observations, one-on-one interaction held the potential for student engagement; however, there were too many students to engage with on an ongoing basis. Thus, to assist the students with reflection in ARC3 relied on the course tutors.

ARC1 used reflection-on-action and ARC2 reflection-in-action, both of which consider experience as pre-existing reflection. These two cycles revealed student awareness of needing to prepare earlier and starting sooner: in other words, reflection-for-action (Killion &

Todnem, 1991). As there can be no reflection without related experience, the students had to rely on similar personal situations and the experiences shared by their tutors. Hence, the tutors played a pivotal role in ARC3.

Inductive reflexive thematic analysis (Braun & Clarke, 2006, 2019) used for cycles ARC1 and ARC2, which provided a provisional set of learning influencers, was continued in ARC3.

Step 1b - Identify purpose of an intervention

The purpose of the improvement of learning outcomes through experience and reflection remained for this cycle. The three demi-regularities of experience, improved learning, and reflection continued from ARC1 and ARC2. The primary purpose of ARC3 was to improve reflection by moving it before the experiences of the students. The students were also expected to reflect on the learnings gained from undertaking the project, which formed the primary research data in ARC3. This allowed a comparison between the cycles using corresponding data sources.

Step 1c - Propose mechanisms for the intervention

For this cycle, the mechanism of reflection-for-action (Killion & Todnem, 1991; Van Manen, 1992) was proposed in addition to the experiential learning and reflection-on-action mechanisms proposed in prior cycles. The need for a scaffolding mechanism (Vygotsky, 1978) identified in the first two cycles was proposed for this cycle, with scaffolding provided through tutoring.

Step 1d - Design an intervention and methods

Tutors were asked to assist the students and monitor the reflection section after being briefed on reflection requirements. The tutors were tasked with encouraging students to reflect on what they would do to resolve known and unanticipated issues arising during the projects.

Step 2 - Act

The ARC3 tutors were informed of the problems encountered in respect of student reflections in previous cycles. As the tutors were previous students of the underpinning courses for the project, they had experienced some of the issues. The tutors were tasked with helping the teams to reflect on what they could do to overcome issues before launching their projects. The tutors were asked to persuade the teams to keep journals or notes (reflection-in-action)

and consolidate reflections after the project (reflection-on-action). Neither of these were enforced, and no additional marks were provided for these reflections.

As part of their tutoring tasks, the tutors oversaw the completion of reflection write-ups. Regular, unstructured meetings were held with the tutors and with the teams on request. After the project hand-in, a debriefing was held with the tutors prior to analysing the reflection sections for the team projects. From the discussions with the tutors, an issue of conflict in the teams was raised and confirmed in the qualitative analysis. This observation confirmed the applicability of conflict found in Peirce's (1905) secondness and the awareness of overarching dualities.

Step 3 - Observe

ARC3 differed only slightly from the other cycles. Analysis of the ARC3 reflections was analysed using reflexive thematic analysis as in the prior two cycles. The codes, categories, and themes generated from ARC1 and ARC2 were similar even though they were coded in vivo. The ARC1 and ARC2 codes were exported and imported into a codebook in Atlas.ti for ARC3. ARC3 digressed from the Schön's (1983) reflective practice view of reflection-on-action and reflection-in-action to reflection-for-action (Killion & Todnem, 1991; Van Manen, 1992).

Analysis of Student Reflections

A meeting with one of the ARC3 teams late in the project cycle highlighted the persisting lack of understanding of reflection. A presentation based on Schön's (1992) concept of a debriefing was presented to the students. The concept of a debriefing appeared suitable for the situation where even though the student teams had completed a reflection-for-action at the start of the course and some had maintained journal notes during the project, they remained unsure of what was required for the final hand-in. Their concern was about "*how*" to present the reflection. They were looking for a formula or a recipe that resonated with the absolutist stance of Helsing et al. (2004) in undertaking a required task as was observed in the prior cycles. The limited ability to reflect extended to the tutors who had completed the course previously and had an experience of reflection but found it challenging to support the students in their reflections. Tutors indicated that they did not know how to advise the students on reflection. This was highlighted in an email from one of the students:

“Our tutor only let us know this week that we should contact you [the researcher] regarding reflections, and thus we have been unable to meet with you. We are hoping that you may be open to providing us tips and suggestions for our reflective section via email if possible.” Student R.

This was followed by email communications from other students who did not realise they could contact the researcher directly. Meetings with the students provided richer findings that supported the primary findings described below.

The thematic analysis of ARC3 showed the persistent overarching themes observed earlier. Table 5.6 shows the initial codes in descending order of frequency coded and categorised as shown in Table 5.6 and Figure 5.7. The same pattern of the strength of the constructs based on the number of mentions was observed as in the earlier cycles. Applying effort (n=116) was mentioned most frequently, followed by pursuing quality (n=43), undertaking tasks (n=31) and increasing understanding (n=17).

Table 5.6. Initial codes from the thematic analysis of ARC3.

Initial Code	ARC3	Initial Code	ARC3	Initial Code	ARC3
Task in General	31	Engaging with Stakeholders	9	Scaffolding	2
Effort in General	20	Positive Attitude	6	Communicating	1
Communication Channels	17	Team Dynamics	6	Getting started	1
Managing the Project	16	Experiential Learning	5	Meta-Cognitive Reflection	1
Interview Techniques	13	Understanding in General	5	Project Planning	1
Managing Time	13	Team Support	4		
Division of Labour	11	Quality in General	2		

As with the earlier cycles, the initial codes were revised in conjunction with the other cycles' initial codes. The final revised labels for the themes, categories and codes are shown in Table 5.7 and discussed in the following sections. Table 5.7 extends Table 5.5 from ARC2 to provide a progressive view of the coded findings. Although fewer codes were observed in ARC3 than in the earlier cycles, one new code was found.

Table 5.7. Themes, categories, and codes for cycle ARC3 Indicating the changes between cycles with new codes (*).

Theme	Category	Code	ARC1	ARC2	ARC3
Undertaking Tasks			42	143	31
	Managing Business Processes		39	116	
		Applying Business Process Knowledge	23	45	
		Modeling Business Processes	4	47	
		Applying Business Process Management Knowledge		24	
		Improving Business Processes	12		
	Undertaking General Tasks		3	27	31
Applying Effort			143	240	94
	Applying Effort in General		29	61	20
	Managing Projects		22	62	17
		Prioritising Project Tasks	14	61	1
		Managing the Project Tasks and Milestones	8	1	16
	Engaging with Stakeholders		38	41	22
		Managing Stakeholder Interactions	30	30	9
		Expanding Interviewing Techniques	8	11	13
	Managing Time		9	53	14
		Using Time Efficiently	9	45	13
		Starting Early		8	1
	Managing Teams		24	1	21
		Building Team Cohesiveness	16		4
		Resolving Conflict			6*
		Delegating Tasks	8		11
	Expanding Business Skills		21	22	
		Exploring Business Specific Knowledge	12	7	
		Expanding Business Intelligence Skills	4	15	
		Identifying Master Data	5		
Increasing Understanding			48	66	13
	Acquiring Knowledge in Context		12	37	8
		Learning Through Scaffolding	5	15	2
		Reflecting on Personal Attitudes	1	7	1
		Learning Through Experience	6	2	5
		Learning from Effort		7	
		Not Forgetting Learnings		6	
	Increasing General Understanding		26	22	5
	Acquiring Analysis Skills		10	7	
Pursuing Quality			85	188	26
	Improving Communication		35	63	18
		Conducting Communications	12	63	1
		Using Communication Channels	23		17
	Acting in Accordance with Personal Attitude		13	66	6
		Acknowledging Negativity	3	35	
		Being Positive		8	6
		Being Confident	9	17	

	Being Appreciative		5	
	Being Efficacious	1	1	
	Reacting to Environmental Factors	14	49	
	Resolving Technology Issues	7	30	
	Being Aware of Interconnected Contexts	7	3	
	Prioritising Life Balance		8	
	Appreciating Health		8	
	Pursuing General Quality	23	10	2

A thematic mapping depicted in Figure 5.4 was generated for the themes, categories and codes observed in ARC3.

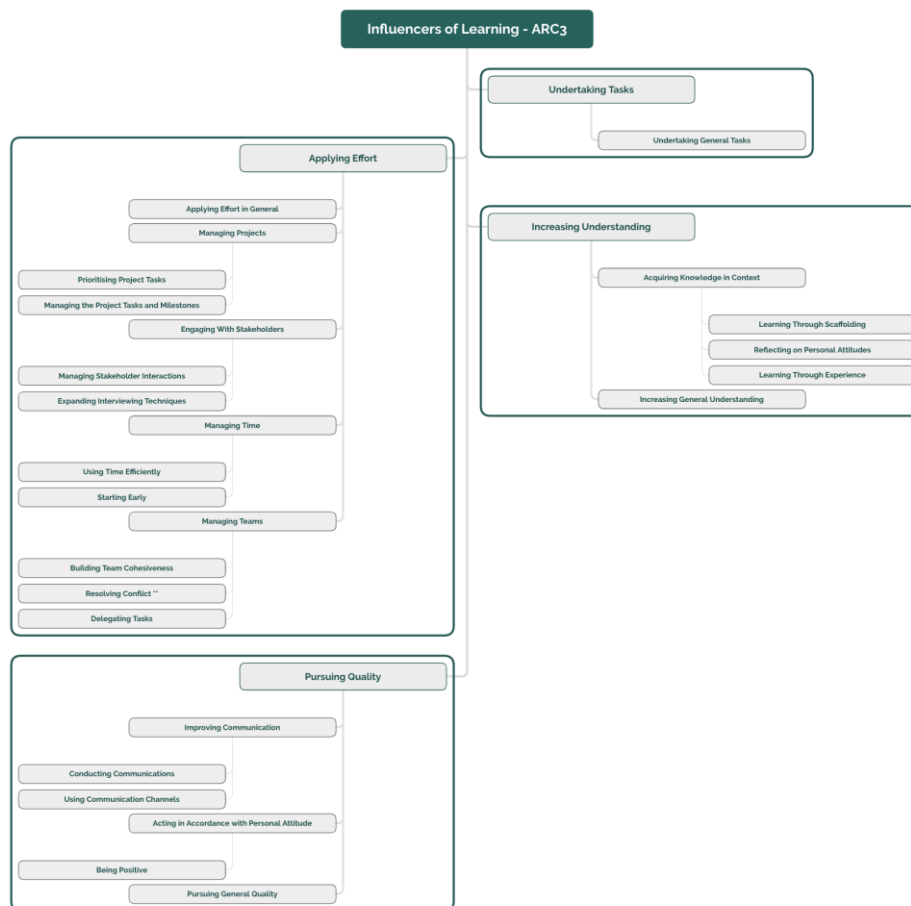


Figure 5.4. ARC3 thematic map showing themes, categories and codes. The double asterisks (**) indicate new codes.

Resolving conflict was the only new code observed in ARC3, indicated with the double-asterisk in Figure 5.4. It was associated with managing the team in the theme of applying effort.

- **Resolving Conflict (n=6) (Applying Effort)**

Conflict was explicitly stated by the teams in the third cycle and confirmed in the feedback from the tutors.

“... it resulted in conflict when we realised the disconnect between the work sections reflected in our poor marks. As such, it also led to us choosing an avoidant conflict resolution approach, in which we took no action to remedy any team member conflicts or potentially raise an issue with our stakeholders.” (ARC3 P25).

Whereas the reflections of the first cycles (ARC1 and ARC2) showed evidence of students searching for absolute answers and a need for business process management skills even though these were part of the coursework, ARC3 revealed higher levels of learning requirements. Thus, general themes for task were either not evident or played down. Helsing et al. (2004)'s perspective shows a transition from absolutist certainty to a relativist low-certainty and a contextist uncertainty state. Students appeared satisfied with their class learning, progressed beyond absolutist knowledge, and began taking a holistic view of applied business process management. From an existence, relatedness and growth perspective (Alderfer, 1969), students considered themselves existentially proficient and progressed into relatedness and growth. Nevertheless, according to Alderfer (1969), this is not always accurate as a person can start at any of the three levels – existence, relatedness or growth. Consequently, it is plausible that the students were unrealistically confident in their knowledge and could regress to the existence level should their perceived relatedness break down. An overview of the progressions from undertaking tasks to applying effort to increasing understanding and pursuing quality follows.

The Progression from Undertaking Tasks to Applying Effort

Once again, applying effort was observed to transcend undertaking tasks. One team acknowledged the task-oriented view but realised that they needed further knowledge that required additional effort.

“... I feel like we were not fully prepared, but it was a great experience how the team managed to cover their mistakes and deliver what is needed ...” (ARC3 P36).

Another team recognised that although they had completed the project requirements (the task), they should have put more effort into managing their time.

“In terms of meeting deadlines, we believe that we could have improved on this and managed our time better. However, we were still able to complete our work and carry out all the tasks which we were required to do ...” (ARC3 P28).

The Progression from Applying Effort to Increasing Understanding

Students showed the potential for transition to increasing understanding by applying effort. Their reflections provided insight into effort triggers. One team showed how an assessment triggered additional effort leading to increased understanding.

“The group believed that after an initial meeting with the project sponsor, we had a clear view of the process, but we were shown to be wrong after the presentation was made. Efforts were made thereafter to meet with and discuss the process with the various stakeholders, and we felt afterwards that our understanding of the process was at a much higher level than before.” (ARC3 P27).

Some students showed signs of transitioning from undertaking tasks to increasing understanding by applying effort deeper.

“Through several iterations of our understanding of the process we have learnt the true value of thorough analysis, for it was only after going over the analysis several times that we were able to get it right. We understand that the process of refining our understanding is always ongoing and we see ourselves making it even better with further analysis.” (ARC3 P32).

The Progression from Applying Effort and Increasing Understanding to Pursuing Quality

Student reflections on applying effort due to project complexity were often linked to pursuing a quality output. Context was provided in converting knowledge from the applied effort into the context of the client.

“A large amount of effort ... we persevered and with hard work came up with analysis and solutions that we think will benefit [the client]. We think that it was an overall good experience and we are happy with what we have learnt from this project.” (ARC3 P30).

The recognition of the relativity of increased understanding was shown in the reflections. The team who noted a proposed project which was not feasible revealed an appreciation of the context in the potential for a solution that was not practical for the situation.

“So, although a solution that solved all the problems existed, it was not feasible.” (ARC3 P24).

Step 4 – Reflect

ARC3 investigated potential mechanism changes by using reflection-for-action before the task, which could be identified in the analysis of the reflection-on-action submitted as part of the project. Reflection-for-action appeared to encourage planning while the reflections continued to support the task-effort-understanding-quality influence framework. Only one new code (resolving conflict) was identified in the analysis. However, several codes identified in the earlier cycles were not observed in ARC3. Most notable of these was the reduction in the range of codes on undertaking tasks and pursuing quality. Nevertheless, the frequency of the themes remained the same as in the prior cycles. Compared to ARC1 and ARC2, the ARC3 students reflected less on the business process management aspects (undertaking tasks) and more on communication (pursuing quality).

Although the student teams changed through each action research cycle, the major themes remained relatively constant, as did the teaching staff for the most part. This led to the consideration of whether similar results would be observed if the course work and project requirements remained constant with a change of the teaching staff. Serendipitously, the course convener was on sabbatical for the 2018 project, which allowed the study to be extended to a fourth cycle with alternate staff to that of the first three cycles.

5.4 ARC4 – All Reflection forms – How Students Reflect with Different Staff

The fourth cycle (ARC4) followed the structure of the earlier cycles but encouraged students to use all the reflection methods used in the prior cycles. Although adjustments to teaching staff were not planned as part of the research, the course convener's unavailability enabled this for the 2018 module. ARC4, therefore, differed appreciably from the other cycles due to teaching staff changes. One of the changes was the researcher's involvement in presenting the course's business process management and reflection components. This provided an

alternate dynamic to the first three cycles and an opportunity to validate findings from the other cycles.

The cycle continued as per the previous cycles and was subsequently analysed using reflexive thematic analysis. For ARC4, students were required to provide a reflection-on-action and were encouraged to reflect-for-action and reflect-in-action. Fifteen out of sixteen teams (94%) provided reflective documents. The student reflections confirmed both the problems of reflection for novices and the findings from the other cycles.

Step 1 - Plan

As with the other cycles, planning was separated into four subsections where the problem was clarified, a purpose for intervention identified, mechanisms proposed, and an intervention designed (Heeks et al., 2019).

Step 1a - Clarify the problem

Although the findings in ARC3 confirmed ARC1 and ARC2 with different cohorts of students, the lecturing staff were mainly the same. The use of tutors in ARC3 had proved beneficial in assisting students in their projects and reflections. However, tutors often struggled with the concepts themselves.

Step 1b - Identify purpose of an intervention

The purpose of the fourth cycle continued to be the improvement of learning outcomes through experience and reflection. The three demi-regularities consisting of experience, reflection and improved learning continued from ARC1, ARC2 and ARC3. The primary purpose of ARC4 was to confirm findings from the study in an alternate context by changing lecturing staff.

Step 1c - Propose mechanisms for the intervention

Educators profoundly influence students' learning outcomes, although they often experience constraints limiting their teaching effectiveness (Van Manen, 2008). In ARC4, a proposed mechanism of educator influence on student learning was tested by replacing lecturers with extensive experience in the courses with lecturers less experienced and whose lecturing style differed from the regular staff.

Step 1d - Design an intervention and methods

As the researcher was involved in the courses as part of this study and had previously undertaken the postgraduate course, the substitute course convener invited the researcher to lecture the course's business process management components and oversee the student reflections. Regular interactions were planned between the researcher and the substitute course convener. Planning was required for tutor improvement and regular feedback sessions with the head tutor.

Step 2 - Act

The intervention took the form of an ongoing interaction between the researcher, tutors, students and course convener. No curriculum changes were made from the previous cycle. As the researcher was not a lecturer at the university, the first task was to interact more closely with the substitute course convener. This was accomplished by sharing office space and having regular meetings with the substitute course convener. The availability of on-campus office space facilitated access to students and tutors. This made possible regular and ad-hoc meetings with tutors and ad-hoc meetings with students outside the lecture theatre.

Step 3 - Observe

The research sample for ARC4 comprised 16 full-time undergraduate student teams. Fifteen teams (94%) completed the reflection section from which the evaluation of the reflection findings took the same format as for ARC3. The structure of reporting the findings followed the earlier cycles.

Analysis of Student Reflections

As with the other cycles, the four themes of undertaking tasks, applying effort, increasing understanding and pursuing quality were observed. A similar pattern of the constructs' strength based on the number of mentions was observed earlier. Applying effort (n=155) was mentioned most frequently, followed by pursuing quality (n=74), increasing understanding (n=34) and undertaking tasks (n=33). Although the latter two themes changed from the other cycles, they differed by only one observation. Table 5.8 shows the initial code observations with the number of mentions of each code. As with the earlier cycles, the initial codes shown in Table 5.8 were revised in conjunction with the other cycles' initial codes. The final revised labels for the themes, categories and codes are shown in Table 5.9 and includes the codes

from all cycles for comparison. The logical sequence of task-effort-understanding-quality varied little from prior cycles.

Table 5.8. Initial codes identified for student reflections in ARC4.

Initial Code	ARC4	Initial Code	ARC4	Initial Code	ARC4
Effort in General	36	Understanding in General	14	Division of Labour	3
Task in General	33	Meta-Cognitive Reflection	12	Communicating	2
Communication Channels	24	Managing Time	11	Interview Techniques	2
Team Dynamics	21	Team Support	11	Learning from Effort	1
Managing the Project	18	Quality in General	9	Scaffolding	1
Engaging with Stakeholders	14	Project Planning	6	Siloed Thinking	1
Positive Attitude	14	Experiential Learning	5		

Table 5.9. Themes, categories, and codes for cycle ARC4, indicating the changes between cycles with the new codes ().*

Theme	Category	Code	ARC1	ARC2	ARC3	ARC4	
Undertaking Tasks			42	143	31	33	
	Managing Business Processes		39	116			
		Applying Business Process Knowledge	23	45			
		Modeling Business Processes	4	47			
		Applying Business Process Management Knowledge		24			
		Improving Business Processes	12				
	Undertaking General Tasks		3	27	31	33	
Applying Effort			143	240	94	122	
	Applying Effort in General		29	61	20	36	
	Managing Projects		22	62	17	24	
		Prioritising Project Tasks		14	61	1	6
		Managing the Project Tasks and Milestones		8	1	16	18
	Engaging with Stakeholders		38	41	22	16	
		Managing Stakeholder Interactions		30	30	9	14
		Expanding Interviewing Techniques		8	11	13	2
	Managing Time		9	53	14	11	
		Using Time Efficiently		9	45	13	11
		Starting Early			8	1	
	Managing Teams		24	1	21	35	
		Building Team Cohesiveness		16		4	11
		Resolving Conflict				6	21
		Delegating Tasks		8		11	3
	Expanding Business Skills		21	22			
	Exploring Business Specific Knowledge		12	7			
	Expanding Business Intelligence Skills		4	15			
	Identifying Master Data		5				
Increasing Understanding			48	66	13	33	

	Acquiring Knowledge in Context	12	37	8	19
	Learning Through Scaffolding	5	15	2	1
	Reflecting on Personal Attitudes	1	7	1	12
	Learning Through Experience	6	2	5	5
	Learning from Effort		7		1
	Not Forgetting Learnings		6		
	Increasing General Understanding	26	22	5	14
	Acquiring Analysis Skills	10	7		
	Pursuing Quality	85	188	26	50
	Improving Communication	35	63	18	26
	Conducting Communications	12	63	1	2
	Using Communication Channels	23		17	24
	Acting in Accordance with Personal Attitude	13	66	6	14
	Acknowledging Negativity	3	35		
	Being Positive		8	6	14
	Being Confident	9	17		
	Being Appreciative		5		
	Being Efficacious	1	1		
	Reacting to Environmental Factors	14	49		1
	Resolving Technology Issues	7	30		
	Being Aware of Interconnected Contexts	7	3		1
	Prioritising Life Balance		8		
	Appreciating Health		8		
	Pursuing General Quality	23	10	2	9

A thematic mapping, depicted in Figure 5.5, was generated for the themes, categories and codes identified in ARC4. In ARC4, no new codes were observed, and the mechanism themes, categories, and codes of ARC4 were similar to those of ARC3. There was clear evidence of progression from undertaking tasks to applying effort to increasing understanding and pursuing quality, as observed in prior cycles. Examples of student reflections on these progressions are shown here. As no new codes were observed, no further discussion on the individual code findings is presented.

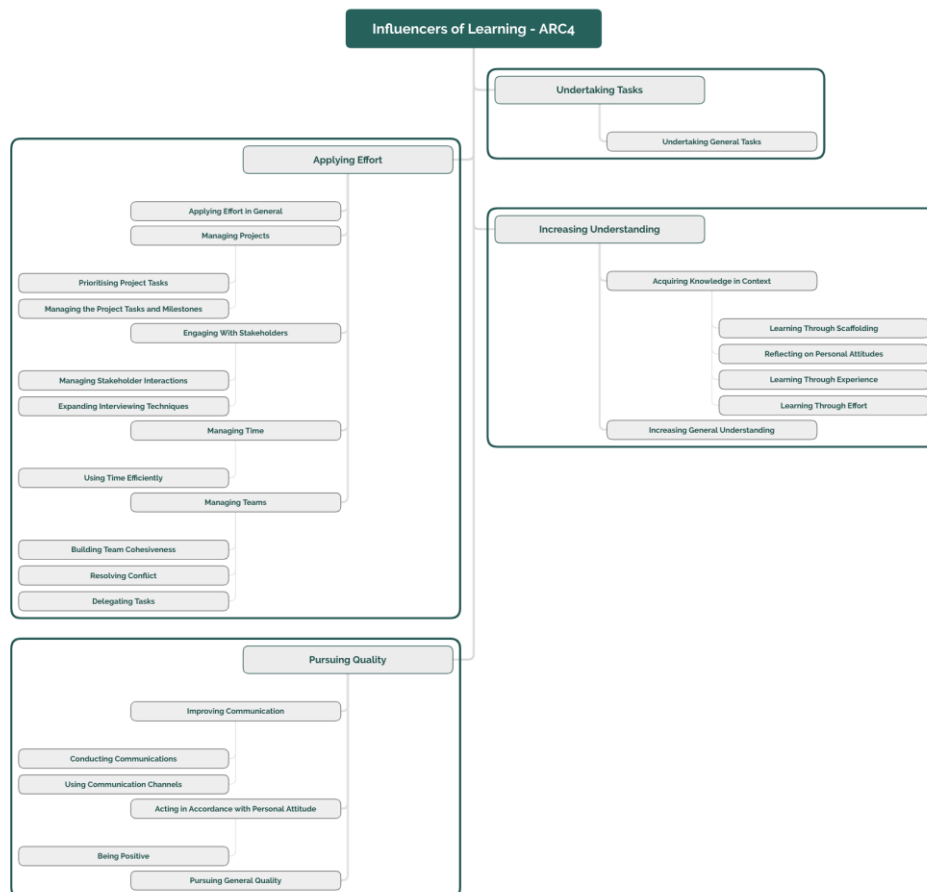


Figure 5.5. ARC4 thematic map showing themes, categories and codes.

The Progression from Undertaking Tasks to Applying Effort

Some task-oriented teams applied effort to improving marks but remained absolutist in undertaking the tasks and responding directly to feedback.

“After our team presentation, the panels gave feedback on the stakeholder diagram and the scoping diagram ... We improved on these comments.” (ARC4 P52).

Other students acknowledged that their tasks were not up to standard, but they fell short of moving to a higher level of transitionist effort.

“The presentation was taken well by the markers; however, in some ways, we had missed the point of the presentation ... Otherwise, I felt all in all this has been an extremely effective report, project, and most of all, team ...” (ARC4 P44).

The Progression from Applying Effort to Increasing Understanding

Whereas applying effort was posited as the transition from absolutist undertaking tasks to relativist increasing understanding, one team revealed that they applied effort to clarify aspects rather than increase understanding. This reinforced the assessment that students have stronger links to the absolutist view - focusing on external tasks - than the relativist view – focusing on learning.

“... as we continued with the assignment we found ourselves making minor changes to the diagram to just clarify some things ... we believe we gave a good effort and found ways for [the client] to [improve] their current process. This has also been an eye-opening experience for the team into real-world experience ...” (ARC4 P52).

Increasing understanding and resultant learning were seen in the awareness of a transition from one team's absolutist view to a relativist perspective. They remarked on the situational actions required in stakeholder management.

“An important lesson that resonated with our entire team (and the project as a whole) was the value of time. We quickly learned that in the corporate world, there is no guarantee that people will have time or make time for our requests ...” (ARC4 P50).

The Progression from Applying Effort and Increasing Understanding to Pursuing Quality

Some students recognised that they were task-oriented and expressed the desire to move beyond the absolutist view. One team expressly mentioned that they had learnt that applying effort and pursuing quality held higher value than focusing on undertaking tasks.

“While being goal-oriented is important, we learned that it’s better to focus on aspects of the project we can control (how much effort we put in, the quality of our work) than aspects we have no influence over (our result mark) ...” (ARC4 P50).

This team provided an interesting observation that effort and quality are under their control and therefore worthy of being pursued.

Step 4 – Reflect

ARC4 investigated student reflection in experiential learning in a business process course with similar content and student cohort as in the earlier cycles (ARC1 and ARC3) but with a change

in lecturing staff. The findings confirmed the earlier research findings and found no significant differences compared to the prior cycles.

5.5 Action Cycle Exit

The action research process exited after ARC4. Recurring observations were made of (i) reflection as beneficial but with limited mediation properties for learning and (ii) effort as the most significant influencer of the projects. After completing the three types of reflection - reflection-on-action, reflection-in-action, reflection-for-action - and a change of lecturing staff, it was expedient to exit the action research cycles. Davison et al. (2004) highlight potential difficulties in exiting the cycles, which they suggest should be "*related to the achievement of the specified objectives or to another explicit justification*" (p.73). Although a link between reflection and potential for improvement of learning outcomes was observed, there were no strong findings of reflection positively correlating to higher learning in the short term. Proving the effectiveness of reflection in improving learning was not possible from the reflections alone, and there was no indication that this would change in the context of this study. Simultaneously, the research objective of identifying what the students reflected on and how this could improve grades revealed no new themes in the last two cycles and was considered saturated. With the exhaustion of the forms of reflection and the change in lecturing staff, the decision was made to exit the action research cycles.

5.6 Consolidation of the Action Research Cycles

The qualitative analysis of the four action research cycles is summarised in Table 5.10.

ARC1 was initiated from the perspective that although experiential learning made reflection obligatory, students do not adequately reflect. Students were encouraged to reflect on action, but this appeared to lose essential details as they forget earlier experiences and remember selective experiences with no opportunity to adjust their projects in line with their reflections. In ARC1, four potential influencers of learning were observed: undertaking tasks, applying effort, increasing understanding, and pursuing quality.

ARC2 addressed the students' inability to make adaptations to their projects based on reflection. In ARC2, students were encouraged to maintain daily reflective journals for reflection-in-action. This proved to be unpopular amongst the students, but it provided rich

data for analysis. The observations of potential learning influencers persisted, while planning was highlighted as a significant issue. Students consistently reflected on the need to plan and start their projects early.

Table 5.10. Overview of the four action research cycles.

ARC	Diagnosis	Action	Evaluation
1	Students do not reflect	Reflection-on-Action. Increased reflection mark, provide reflection lecture	Reflection is after the fact and cannot be tested. Task-effort-understanding-quality learning Influencers noticed
2	No opportunity to modify the project from the reflection-on-action outcome	Reflection-in-action. Lecture and personal involvement	Journals were not popular, being too personal and too much effort but provided rich data. Task-effort-understanding-quality Influencers were still evident. Planning is an issue with a need to start early.
3	Journals took too much effort for too little reward. ARC1+ARC2 revealed a need for planning	Reflection-for-action. Involved the tutors for support.	Became a planning exercise with little reflection. Tutors lack reflection knowledge, and the lecturing staff was constant across cycles.
4	Same lecturers allow consistency but limit change	Change of lecturers improved supportive involvement for the tutors.	Task-effort-understanding-quality influence occurred irrespective of reflection type or lecturers

ARC3 aimed to address the lack of planning by encouraging the students to reflect for action. Student tutors assisted the students with their reflections before action as well as during and after action. This revealed weaknesses in the reflection knowledge of the tutors. The four potential learning influencer structure was confirmed during this cycle. The analysis identified that although the students in the three cycles had changed, as had their work experience (students compared to early working employees) and the courses differed (undergraduate and postgraduate), the lecturing staff were mainly the same.

ARC4 addressed the lack of lecturer change when the regular course-convenor was not available for the semester. Student tutors were provided more assistance than in the previous cycles, and reflection was continuously reiterated with the students who were encouraged to reflect for-action, in-action and on-action. The potential learning influencer mechanisms were shown to be consistent, irrespective of reflection mode, experience or lecturing staff.

5.7 Qualitative Findings Summary

The qualitative findings generated four potential learning influencers – undertaking tasks, applying effort, increasing understanding and pursuing quality - which resonated with the findings of Helsing et al. (2004). Undertaking tasks was related to level 1 absolutist, applying effort related to level 2 transitionist, increasing understanding related to level 3 relativist and pursuing quality to level 4 contextist. The learning influencers were consistent across cycles, albeit with varied strength, as shown in Table 5.11. Undertaking tasks (total count=249) is well commented upon but was significantly lower than the comments of applying effort (count=599). Increasing understanding (count=160) was the lowest influencer and significantly lower than pursuing quality (count=349). Based on the total comments for all cycles, applying effort was the most important influencer for the students, followed by pursuing quality, undertaking tasks, and increasing understanding.

Table 5.11. Overview of learning influencer observations for all action research cycles.

Learning Influencer Mechanism	Levels of Learning (Helsing et al., 2004)	ARC1	ARC2	ARC3	ARC4	Total
Undertaking Tasks	Absolutist	42	143	31	33	249
Applying Effort	Transitionist	143	240	94	122	599
Increasing Understanding	Relativist	48	66	13	33	160
Pursuing Quality	Contextist	85	188	26	50	349

Table 5.12 shows the themes, categories and code summarised for all the cycles. It allows for comparing the relative strengths of each theme, category and code across the entire study.

Table 5.12. Themes, categories, and codes for all cycles indicating the changes between cycles.

Theme	Category	Code	ARC1	ARC2	ARC3	ARC4	Total	
Undertaking Tasks			42	143	31	33	249	
	Managing Business Processes		39	116			155	
		Applying Business Process Knowledge	23	45			68	
		Modeling Business Processes	4	47			51	
		Applying Business Process Management Knowledge		24			24	
		Improving Business Processes	12				12	
	Undertaking General Tasks		3	27	31	33	94	
Applying Effort			143	240	94	122	599	
	Applying Effort in General		29	61	20	36	146	
	Managing Projects		22	62	17	24	125	
		Prioritising Project Tasks		14	61	1	6	82
		Managing the Project Tasks and Milestones		8	1	16	18	43
	Engaging with Stakeholders		38	41	22	16	117	

		Managing Stakeholder Interactions	30	30	9	14	83
		Expanding Interviewing Techniques	8	11	13	2	34
	Managing Time		9	53	14	11	87
		Using Time Efficiently	9	45	13	11	78
		Starting Early		8	1		9
	Managing Teams		24	1	21	35	81
		Building Team Cohesiveness	16		4	11	31
		Resolving Conflict			6	21	27
		Delegating Tasks	8		11	3	22
	Expanding Business Skills		21	22			43
		Exploring Business Specific Knowledge	12	7			19
		Expanding Business Intelligence Skills	4	15			19
		Identifying Master Data	5				5
Increasing Understanding			48	66	13	33	160
	Acquiring Knowledge in Context		12	37	8	19	76
		Learning Through Scaffolding	5	15	2	1	23
		Reflecting on Personal Attitudes	1	7	1	12	21
		Learning Through Experience	6	2	5	5	18
		Learning from Effort		7		1	8
		Not Forgetting Learnings		6			6
	Increasing General Understanding		26	22	5	14	67
	Acquiring Analysis Skills		10	7			17
Pursuing Quality			85	188	26	50	349
	Improving Communication		35	63	18	26	142
		Conducting Communications	12	63	1	2	78
		Using Communication Channels	23		17	24	64
	Acting in Accordance with Personal Attitude		13	66	6	14	99
		Acknowledging Negativity	3	35			38
		Being Positive		8	6	14	28
		Being Confident	9	17			26
		Being Appreciative		5			5
		Being Efficacious	1	1			2
	Reacting to Environmental Factors		14	49		1	64
		Resolving Technology Issues	7	30			37
		Being Aware of Interconnected Contexts	7	3		1	11
		Prioritising Life Balance		8			8
		Appreciating Health		8			8
	Pursuing General Quality		23	10	2	9	44

Figure 5.6 depicts the consolidated thematic map for the learning influencers, including the themes, categories and codes. The themes are reflected as mechanisms that influence learning. In the research setting, undertaking tasks related to business process management skills while applying effort comprises business skills, project management, stakeholder engagement, team management and time management. Increasing understanding

categorised analysis skills and learning and pursuing quality categorised attitude, communication and environmental factors. The first two influencers represented performing absolutist actions, while the second two showed evidence of relativist learning.

The overall findings revealed that students learn in an absolutist (yes/no) fashion and need to apply effort to fill gaps in their knowledge. Experiential learning used in business process management projects should provide opportunities to contextualise absolutist learning in a real-world situation where absolutist knowledge can transition to understanding and the more ephemeral context of quality. From the qualitative findings, students were observed to recognize a need for applying effort to complete their project tasks. However, the students identified context as an issue that moderates their desired outcome of a good mark.

A quantitative analysis was undertaken to test the relevance of the potential learning influencers and reflection to learning outcomes.



Figure 5.6. Full thematic map with themes, categories, and codes network diagram for all cycles.

5.8 Quantitative Findings

After exiting the fourth cycle, the findings were consolidated and quantitatively analysed using partial least squares structural equation modelling in SmartPLS version 3.3.3. The quantitative data were derived from the summarised qualitative findings of the student reflections (undertaking tasks, applying effort, increasing understanding and pursuing quality) and student grades (mid-term test, project, reflection and final exam). As the learning influencers were determined per group, the individual grades per student were aggregated by student group. A total of 63 groups were used for the quantitative analysis, as shown in Appendix E.

Quantitising qualitative data is common practice in qualitative and mixed methods research. However, it remains a contentious issue (Maxwell, 2010; Sandelowski et al., 2009). Sandelowski (2009) asserts that quantitising qualitative data is a pragmatic method of linking qualitative and quantitative variables to answer research questions and test hypothesised relationships between variables. Rendering qualitative data in a numerical form makes qualitative and quantitative data comparable (Sandelowski et al., 2009). While this is a “legitimate and valuable strategy” (Maxwell, 2010, p. 480), it lacks the precision of objective quantitative data. Hence, care must be taken to be explicit on how the quantitising was approached. Maxwell (2010) notes that while quantitised data supplements quantitative data, researchers must be aware of the potential of “reducing evidence to the *amount* of evidence” (p. 480, italics in the original) and the potential misuse of making a study appear more precise or accurate.

Quantitising data in this study was undertaken for three purposes. Firstly, it confirmed patterns of use commensurate with critical realism mechanisms and, secondly, it provided evidence of the qualitative interpretations (Maxwell, 2010). The third purpose was to confirm quantitative findings that may “assume greater uniformity than actually exists” (Maxwell, 2010, p. 479). Furthermore, the quantitised qualitative findings were used to “characterise the diversity of actions” of the students (Maxwell, 2010, p. 478). Diversity of action relates to the four learning influencer actions identified in the student reflections on their business process management projects: understanding tasks; applying effort; increasing understanding; and pursuing quality. Quantitising the data involved summarising the

thematic count of the four learning influencers derived from the qualitative data per student group to create formative outer variables of the learning influencers variable.

5.8.1 Partial Least Squares Based Structural Equation Model Definition

From the observations in this study and the literature, a set of hypotheses shown in Table 5.13 and depicted in the conceptual model in Figure 5.7 were generated. The hypotheses posit that the term test influenced the final examination (H1) and the experiential project (H2), while task, effort, understanding and quality as learning influencers influenced project (H6) and reflections (H7). Project is posited to influence the final examination (H3) and the reflections (H5). Reflections are posited to influence exam outcomes (H4).

Student marks were used for the measurements of test, reflection, project and exam. The outer measure from the qualitative findings per student group was quantified by dividing each measure by the total of the four measures. This quantification process provided the values for undertaking tasks, applying effort, increasing understanding, and pursuing quality. The outer measures formed the emergent variable titled reflective learning influencers, where the term reflective refers to the source of the outer measures. The reflective learning influencer emergent variable was formative as the measures were derived directly from the construct. All variable measures ranged between 0 and 100.

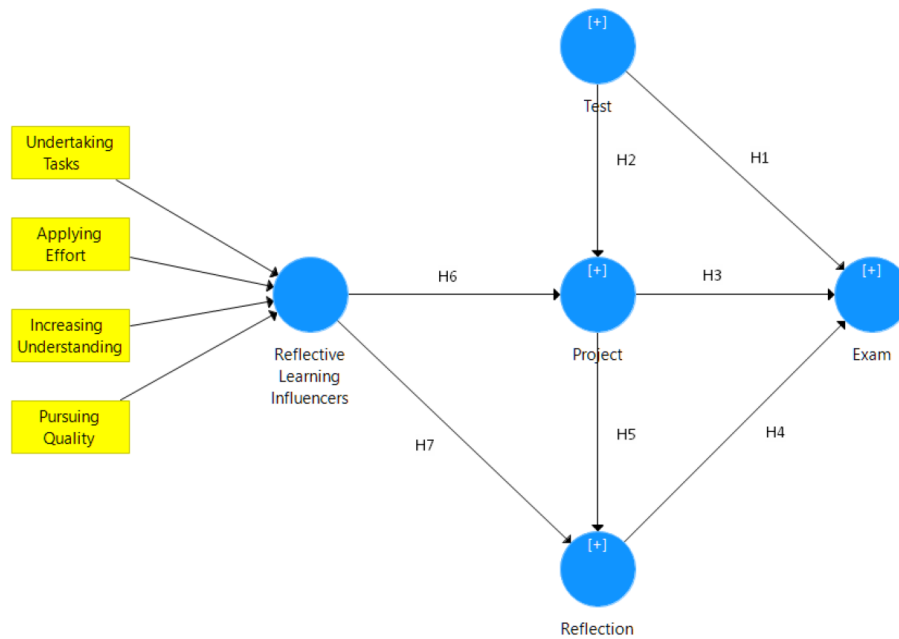


Figure 5.7. Exploratory conceptual model for the influence of reflective learning influencers on learning outcomes.

Table 5.13. Reflective learning influencer model hypotheses.

H1	The mid-term test positively influences the final examination.
H2	The mid-term test positively influences the experiential learning project outcome.
H3	The experiential learning project outcome positively influences the final examination.
H4	The student reflections positively influence the final examination.
H5	The experiential learning project outcome positively influences the student reflections.
H6	The reflective learning influencers positively influence the experiential learning project outcome.
H7	The reflective learning influencers positively influence the student reflections.

The path from test to reflection was not hypothesised as the mid-term test was not expected to influence reflection. Likewise, the learning influencers were not expected to influence the exam outcome directly.

5.8.2 Model Assessment

The conceptual model was analysed using the process recommended by Hair et al. (2017) and (Chin, 2010) described in Chapter 4, which resulted in the structural model shown in Figure 5.8.

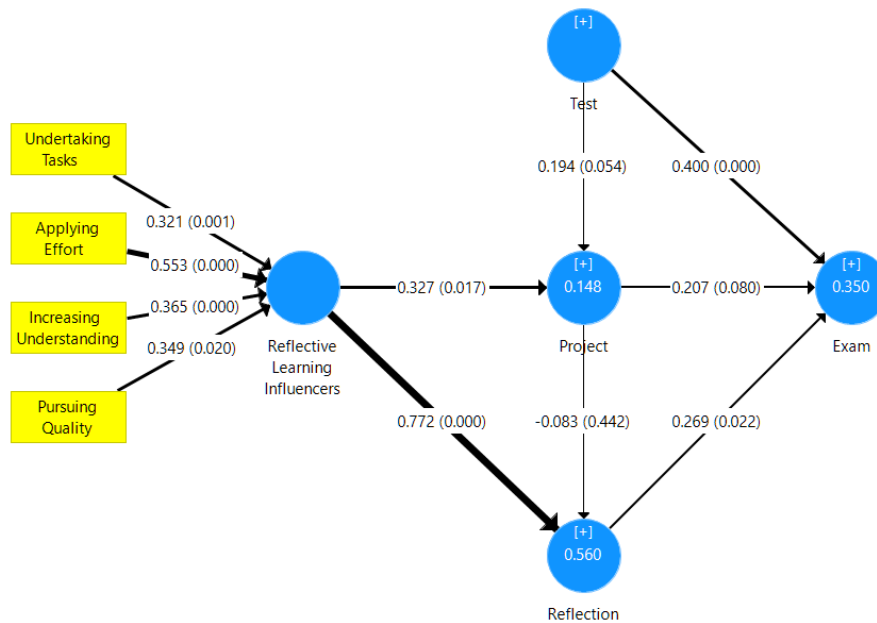


Figure 5.8. Experiential learning structural equation model showing outer weights and inner paths (p-values in brackets).

5.8.3 Formative Measurement Model Assessment (Outer Model)

The outer model was assessed following the guidelines of Hair et al. (2017).

Step 1: Assess Convergent Validity

The partial least squares algorithm parameters used to assess the model were set at a maximum of 500 iterations with a stop criterion of 7. The results of the outer measurement analyses are presented in Table 5.14.

Table 5.14. Outer model measurements.

Outer Measure	Outer Weight	Outer Loading	VIF
Undertaking Tasks	$\beta=0.321, p\leq 0.050$	$\beta=0.334, p\leq 0.050$	1.005
Applying Effort	$\beta=0.553, p\leq 0.001$	$\beta=0.836, p\leq 0.001$	1.444
Increasing Understanding	$\beta=0.365, p\leq 0.001$	$\beta=0.533, p\leq 0.001$	1.060
Pursuing Quality	$\beta=0.349, p\leq 0.050$	$\beta=0.674, p\leq 0.001$	1.378

Increasing understanding ($\beta=0.365, p\leq 0.001$), pursuing quality ($\beta=0.349, p<0.050$) and undertaking tasks ($\beta=0.321, p<0.050$) were further assessed using their outer loadings. The formative measures assessment results revealed that the outer weight for applying effort ($\beta=0.553, p\leq 0.001$) was greater than the weight threshold of 0.400 (Hair et al., 2017).

Although the other outer indicator coefficients were below 0.400, they had similar outer weights (β =between 0.365 and 0.321), and all were significant at $p \leq 0.050$.

Assessing the loadings for the outer indicators showed that applying effort ($\beta=0.836$, $p \leq 0.001$), pursuing quality ($\beta=0.674$, $p \leq 0.001$), and increasing understanding ($\beta=0.533$, $p \leq 0.001$) were absolutely important ($\beta > 0.500$) (Hair et al., 2017). Undertaking tasks ($\beta=0.334$, $p \leq 0.050$) was below 0.500 but was retained in the model as it was relatively important as shown in the weight assessment and theoretically valid (Hair et al., 2017) as shown in the literature.

The influence of the reflective learning influencers on project was weak and not significant, with an R^2 of 0.148 at $p > 0.050$. Removing the weak measures stepwise from weakest to less weak (undertaking tasks, pursuing quality, and finally increasing understanding) failed to increase any measures above $\beta=0.400$. However, deleting the three measures reduced the R^2 of project (0.142) and reflection (0.362). Although applying effort was the most significant influence on project, the three weaker measures were supported in the literature, and their deletion had a detrimental effect on the model (Helsing et al., 2004). Consequently, all outer measurements were retained.

Step 2: Assess Formative Measurement Models for Collinearity Issues

No collinearity issues were observed with the variance inflation factors (VIF) ranging from 1.005 to 1.444, as depicted in Table 5.14.

Step 3: Assess the Significance and Relevance of the Formative Indicators

R^2 determined through bias-corrected and accelerated bootstrapping with 5000 subsamples at a significance of $p \leq 0.05$ showed that exam ($R^2=0.350$, $p \leq 0.001$) and reflection ($R^2=0.560$, $p \leq 0.001$) were significant, but not project ($R^2=0.148$, $p > 0.050$). Although the reflective learning influencers were hypothesised to be crucial to the project outcome, the project itself was not significant. However, the learning influencers were significant for reflection. Consequently, the overall formative measures were significant.

5.8.4 Structural Model Assessment

Before testing the inner structural model, a standardised root means square residual (SRMR) value was evaluated using bias-corrected and accelerated bootstrapping. The standardised

root means square residual was determined to be 0.047 (for the saturated model and 0.050 for the estimated model), which is below the 0.080 ceiling and thus a good fit (Hair et al., 2017). The bootstrapping assessment showed that five paths were significant, as shown in Table 5.15.

Table 5.15. Structural model total effects assessment.

Path	Hypothesis	β	T-Statistic	P-Value	VIF
Test to Examination	H1	0.400	3.895	0.000**	1.048
Test to Project	H2	0.194	1.928	0.054	1.001
Test to Reflection	-	-0.016	0.704	0.482	-
Project to Examination	H3	0.185	1.429	0.153	1.070
Reflection to Examination	H4	0.269	2.283	0.022*	1.035
Project to Reflection	H5	-0.083	0.770	0.442	1.124
Learning Influencers to Project	H6	0.327	2.397	0.017*	1.001
Learning Influencers to Reflection	H7	0.746	7.241	0.000**	1.124
Learning Influencers to Examination	-	0.268	3.136	0.002*	-

** Significant at $p \leq 0.001$ * Significant at $p \leq 0.050$ VIF=Variable Inflation Factor β = coefficient

Step 1: Collinearity Assessment

Collinearity issues were evaluated using the variance inflation factor, which should be below 5 (Hair et al., 2019) or even lower than 4 (Garson, 2016). Table 5.15 shows that all variables are below 4, and thus multicollinearity was not a concern.

Step 2: Structural Model Path Coefficients

The results of the nonparametric bootstrapping depicted in Table 5.15 shows that both the paths from the learning influencers were significant. The path from learning influencers to reflection ($t=7.241$, $p \leq 0.001$) and the path to project ($t=2.397$, $p \leq 0.050$) were significant. The full path from learning influencers to exam was also significant ($t=3.136$, $p \leq 0.050$). The path from reflection to exam was significant ($t=2.283$, $p \leq 0.050$). Furthermore, the path from test to exam was significant ($t=3.895$, $p \leq 0.001$).

Consequently, the learning influencers were observed to impact the experiential learning projects, which in turn were observed to lead to improved examination outcomes. Examination results were also impacted by reflection. However, the most significant impact on examinations derived from the mid-term tests.

Step 3: Coefficient of Determination (R² Value)

The coefficient of determination (R²) value was used to evaluate the structural model. The predictive power of the overall model was weak with the endogenous variable exam (R²=0.350) below the recommended 0.500 (Hair et al., 2017). The predictive power of reflection (R²=0.560) was moderate (Hair et al., 2017), while the predictive power of learning influencers on project (R²=0.148) was insignificant. The R² value showed that the model explained 35% (p≤0.05) of the variance of learning outcome as measured by exam.

Step 4: Effect Size f²

The f² effect size was used to assess the potential for error in the model, which could reduce the model's predictive power (Hair et al., 2017). Reflection was removed from the structural model, and bootstrapping was rerun to assess the potential for error in the coefficient of determination brought about by the reflection variable. As shown in Table 5.16, this reduced the R² value to 0.279, indicating that reflection could influence learning outcomes. Thus, R² improved from 0.279 to 0.350 when reflection was included.

Table 5.16. R² Assessment with and without the reflection construct.

Construct	R ² Including Reflection	R ² Excluding Reflection
Exam	0.350	0.279
Project	0.148	0.175
Reflection	0.560	-

To test the size of the potential effect of reflection, f² effect sizes were calculated for exam and project.

- **Exam**

$$f^2 = (R^2_{\text{included}} - R^2_{\text{excluded}}) / (1 - R^2_{\text{included}}) = (0.350 - 0.279) / (1 - 0.350) = 0.071 / 0.650 = 0.109$$

As f² was between 0.020 and 0.150 (Hair et al., 2017), the effect of reflection on the exam was weak.

- **Project**

$$q^2 = (R^2_{\text{included}} - R^2_{\text{excluded}}) / (1 - R^2_{\text{included}}) = (0.148 - 0.175) / (1 - 0.148) = -0.027 / 0.852 = -0.032$$

As q^2 was less than 0.020 (Hair et al., 2017), no effect was noted for reflection on the project outcome.

f² Summary

With $R^2 > 0$ the model is predictive but the relative size of the predictability was low for exam ($0.150 < f^2 > 0.020$) with no effect for project ($f^2 < 0.02$) (Hair et al., 2017). Consequently, reflection exhibited a weak but significant effect on learning outcomes.

Step 5: Blindfolding and Predictive Relevance Q²

Blindfolding was used to cross-validate the model’s predictive relevance for each individual endogenous variable using the Stone-Geisser Q² value (Hair et al., 2017). As shown in Table 5.17, Q² predictive power was strongest for learning influencers on reflection (Q²=0.486) and weak on project (Q²=0.123). The predictive influence of Q²=0.267 for exam was observed. Q² was reduced for both exam (Q²=0.226) and project (Q²=0.115) when the reflection variable was removed. Nevertheless, all Q² values remained above 0 and were considered to have predictive capabilities.

Table 5.17. Q² Assessment with and without the reflection construct.

Construct	Q ² Including Reflection	Q ² Excluding Reflection
Exam	0.267	0.226
Project	0.123	0.115
Reflection	0.486	-

Step 6: Effect Size q²

To determine the q^2 effect, Q² was assessed for the structural model including and excluding reflection, as shown in Table 5.17. The Q² assessments, including reflection and excluding reflection, were used to assess the q^2 effect.

- **Exam**

$$q^2 = (Q^2_{\text{included}} - Q^2_{\text{excluded}}) / (1 - Q^2_{\text{included}}) = (0.267 - 0.226) / (1 - 0.267) = 0.041 / 0.733 = 0.056$$

As q^2 was between 0.020 and 0.150 (Hair et al., 2017), the effect of reflection on the exam was weak.

- **Project**

$$q^2 = (Q^2_{\text{included}} - Q^2_{\text{excluded}}) / (1 - Q^2_{\text{included}}) = (0.123 - 0.115) / (1 - 0.123) = 0.008 / 0.877 = 0.009$$

As q^2 was less than 0.020 (Hair et al., 2017), no effect was noted for reflection on the project outcome.

q^2 Summary

With $Q^2 > 0$ the model is predictive but the relative size of the predictability was low for exam ($0.150 < q^2 > 0.020$) with no effect for project ($q^2 < 0.02$) (Hair et al., 2017). Consequently, reflection exhibited a weak influence on learning outcomes.

5.8.5 Mediator Analysis

The mediator method proposed by Hair et al. (2017) was followed to test three mediation effects:

1. Mediation 1: The path from Test to Exam is mediated by Project
2. Mediation 2: The path from Influence to Reflection is mediated by Project
3. Mediation 3: The path from Project to Exam is mediated by Reflection.

Mediation 1: Test → Exam moderated by Project

Direct mediation between test and exam, shown in Figure 5.8, was significant but weak ($\beta=0.400$, $p \leq 0.001$). However, neither of the paths through project was significant. Consequently, there was no mediation of project for the test to exam path.

Mediation 2: Learning Influencers → Reflection moderated by Project

There was a strong direct path between learning influencers and reflection ($\beta=0.772$, $p \leq 0.001$) and a weak path between learning influencers and project ($\beta=0.327$, $p \leq 0.050$). As the path from project to reflection ($\beta=-0.083$, $p > 0.050$) was insignificant, there was no mediation observed between learning influencers and reflection.

Mediation 3: Project → Exam moderated by Reflection.

Neither the path between project and exam ($\beta=0.207$, $p > 0.050$) nor the path between project and reflection ($\beta=-0.083$, $p > 0.050$) was significant. However, a weak but significant path was

observed from reflection to exam ($\beta=0.269$, $p\leq 0.050$). Consequently, there was no mediation observed between project and exam.

Summary of mediation tests.

Whereas significant paths were observed between learning influencers and project, learning influencers and reflection, reflection and exam, test and exam, a series of mediation assessments revealed no mediation in the model.

5.9 Summary of Quantitative Findings

The proposed reflective learning model was assessed based on partial least squares structural equation modelling. The standardised root means square residual was a good fit at 0.047 (Hair et al., 2017). Based on the adjusted R^2 , the model showed a 35% explanation of variance of learning outcome. In the formative outer model, the most significant learning influencer was applying effort ($\beta=0.553$, $p\leq 0.001$) with undertaking tasks ($\beta=0.321$, $p\leq 0.050$), increasing understanding ($\beta=0.365$, $p\leq 0.001$) and pursuing quality ($\beta=0.349$, $p\leq 0.050$) having low but similar weightings.

Assessment of the inner structural model showed that the influencers of learning – undertaking tasks, applying effort, increasing understanding and pursuing quality – significantly predicted project ($\beta=0.327$, $p\leq 0.050$) and reflection ($\beta=0.772$, $p\leq 0.001$). The mid-term test significantly predicted exam ($\beta=0.400$, $p\leq 0.001$), while reflection significantly predicted exam ($\beta=0.269$, $p\leq 0.050$). No mediation was observed in the model, and the project was not shown to predict examination outcomes ($p>0.05$). However, a significant path was observed from learning influencers through reflection to exam.

The quantitative analysis confirmed hypotheses 1, 4, 6 and 7, as shown in Table 5.18. Thus, the mid-term tests influenced exam outcomes, as did student reflections. Although the experiential learning projects were not observed to influence exam outcomes directly, learning influencers significantly influenced the projects and student reflections. Student reflections, in turn, significantly influenced exam outcomes.

Table 5.18. Reflective learning influencer hypotheses findings.

H1	The mid-term test positively influences the final examination.	Accept*
H2	The mid-term test positively influences the experiential learning project outcome.	Reject
H3	The experiential learning project outcome positively influences the final examination.	Reject
H4	The student reflections positively influence the final examination.	Accept*
H5	The experiential learning project outcome positively influences the student reflections.	Reject
H6	The reflective learning influencers positively influence the experiential learning project outcome.	Accept*
H7	The reflective learning influencers positively influence the student reflections.	Accept*

5.10 Summary

The student reflections showed similar outcomes for each action research intervention across the four action research cycles of the experiential learning business process management projects. The first intervention – reflection-on-action – identified four motivators for learning which were confirmed in the other cycles. In cycle two, students were required to reflect-in-action by maintaining reflective journals. This cycle had the lowest response but the richest reflections. Cycle three – reflection-for-action – had similar outcomes to the first two cycles. The data from cycle three was not as rich as for cycle two. Cycle four encouraged the use of all three forms of reflection. Even though the lecturing staff changed, similar findings to the first three cycles were observed. A comparison of the influencers of learning across the cycles is presented in Table 5.19.

The four learning influencers answered research question one [RQ1], which sought to identify potential generative mechanisms influencing learning. The similarity in the influencer findings is observed in each influencer's percentage across the cycles. The net effect is a negligible difference in findings for the four learning influencers across the four cycles, irrespective of the action research or lecturing staff changes. This resonates with education research findings of no significant difference (Russell, 1999).

The qualitative analysis of the student reflections findings showed that applied effort was the most common influencer of learning. This finding was confirmed in the quantitative analysis, where applying effort was the most significant influencer. The other influencers of learning

were shown to support applying effort. Applying effort transcends an absolute answer provided by traditional education methods while epistemologically supporting an absolute answer or outcome, but this is unknown to the student learners at the time of learning. Students need to operate in an environment where information is readily obtainable but not supplied directly to ensure that effort is applied. These findings answered the second [RQ2] and third [RQ3] research questions which sought to identify how the identified learning mechanisms influence learning and what effect learning influencers have on learning outcomes.

Table 5.19. Learning influencers comparison across cycles.

Learning Influencer Mechanism	Levels of Learning (Helsing et al., 2004)	ARC1	%	ARC2	%	ARC3	%	ARC4	%	Total	%
Undertaking Tasks	Level 1 Absolutist	42	13%	143	22%	31	19%	33	14%	249	18%
Applying Effort	Level 2 Transitionist	143	45%	240	38%	94	57%	122	51%	599	44%
Increasing Understanding	Level 3 Relativist	48	15%	66	10%	13	8%	33	14%	160	12%
Pursuing Quality	Level 4 Contextist	85	27%	188	30%	26	16%	50	21%	349	26%

The question then is what action is required to provide scenarios where business process learners are forced to apply effort. According to the reflective literature (Miettinen, 2000; Schatzki, 2016; Turnbull, 2008), this requires a disruptive influence that forces the students to move beyond an absolutist frame of mind. The next chapter describes an analysis of the four action research cycles, which was explicitly undertaken to identify disruptors that may lead to applied effort. The identified disruptors are labelled drivers of effort.

6 Findings: Application and Assessment of Generative Mechanisms (Drivers of Effort)

This chapter continues the findings reported in Chapter 5, which showed evidence of four learning influencers with effort as the most significant learning influencer. In this chapter, methods for activating the effort learning influencer and assessing the learning outcomes are described. This is done in response to the fourth [RQ4] and fifth [RQ5] research questions, respectively. The answers require the identification of mechanisms to activate the effort influencer and assess learning outcomes. Whereas levels of learning were identified, learning should be considered a *“process of interaction between individuals and their environment that influences many dimensions of an individual’s life”* (Helsing et al., 2004, p. 159). In experience-based learning, breadth and depth are essential (Coker et al., 2017). Depth of learning is a product of effort applied over time which resonates with the findings in Chapter 5, which associated time with the applied effort generative learning mechanism. While the breadth of knowledge has been associated with improving working relationships (Coker et al., 2017), depth of knowledge has been linked to Bloom’s higher-order thinking skills (synthesis and application) and overall educational experience. Coker et al. (2017, p. 19) propose that *“in experiential learning depth should be taken more seriously across higher education.”* Thus, while breadth of knowledge is represented by content, learning should be assessed based on the depth of knowledge. Webb (2002) provides a method for assessing depth of knowledge using four levels of learning incorporated into the outcome of this study.

This chapter begins by reviewing data associated with applying effort to determine what aspects of applied effort may provide insight into improved learning. The review showed that each learning mechanism was embedded in applying effort, which led to reifying the learning mechanisms into four forms of effort. Epistemologically, Helsing et al. (2004) provide insight into how to assess the learning mechanisms in the classroom while the depth of knowledge model (Webb, 2002) provided support for assessing effort. Combining Helsing et al. (2004) and Webb (2002) provided a method by which the generative mechanism of effort can be planned prospectively and assessed retrospectively. The retrospective-prospective view combined with the effort drivers of learning from this study support a student-dominant

approach (Díaz-Méndez et al., 2019; Dziejwanowska, 2017; Guilbault, 2018) based on learner-centric reflection (Boud et al., 2005).

6.1 Depth of Knowledge and Learning Mechanisms

The four learning mechanisms identified in this study resembled the four levels of learning framework (Helsing et al., 2004), which was used to guide this study's findings. During the background research, links to other literature were repeatedly encountered. Dewey (1933; 1938) provided context for pragmatism, experiential learning and reflection, while the depth of knowledge from Webb (1997, 2002) closely resembled the learning influencers findings. From the research findings, applying effort was found to be the most significant learning mechanism. Further analysis of the findings endeavoured to identify how effort could be operationalised.

6.2 Analysis Method

The findings reported in Chapter 5 were reviewed to determine drivers of the influencers of effort that may answer the question: How can the identified learning mechanisms aid improved learning outcomes?

The data associated with the significant generative mechanism effort observed in Chapter 5 was used to identify the application of effort and linked to Webb's depth of knowledge model. The two-fold aim was to identify the breadth and depth of the significant mechanism of applied effort in line with Webb (2002) and Coker et al. (2017).

The analysis started by searching the consolidated findings from the qualitative analysis for the word "*effort*" and highlighted each instance of the word by changing its font to uppercase, increasing the font size and changing the font colour to amber. The findings were then re-read to identify areas that were considered effort using synonyms such as "*work*", "*difficult*", and "*struggle*" with alternatives of these words, for example, "*struggled*". Samples from the student reflections are presented in Appendix F. Several factors that influenced effort were observed, including grades, time constraints, reflection, and internal motivation and external motivations. Presentation preparation (pre-learning) with stakeholder involvement (learning) and feedback from the presentation (post-learning) were observed to be important. Clear

differentiation was observed in the reflections for pre-presentation preparation and post-presentation feedback.

The following sections describe the observed student reflections related to effort indicated by the students.

6.3 Drivers of Effort

A link was observed between applied effort and Dewey’s reflective action, which considers thought and action a nexus (Miettinen, 2000). An entanglement was also observed between effort and the other learning influencers with undertaking tasks, applying effort, increasing understanding and pursuing quality embodied in effort. The embodied learning influencers were separated into four drivers of effort according to each influencer and reified to differentiate between the influencers of learning and the drivers of effort. Purposeful effort (undertaking tasks) is a form of habitual action in the lived environment, applied effort (applying effort) is disrupted habit, and the formation of working hypotheses, thoughtful effort (increasing understanding) is reasoning relative to context. Reflexive effort (pursuing quality) is action that leads to changes in the lived environment.

Table 6.1. Drivers of effort relative to the learning influencers.

Driver of Effort	Four Levels of Learning (Helsing et al., 2004)	Depth of Knowledge (Webb, 2002)	Learning Influencers	Reflective Activities (Dewey, 1933)
Purposeful Effort	Absolutist	Recall	Undertaking Tasks	Habitual action in the lived environment
Applied Effort	Transitionist	Skill/Concept	Applying Effort	Disrupted habitual action – definition of the problem and formation of a working hypothesis
Thoughtful Effort	Relativist	Strategic Thinking	Increasing Understanding	Reasoning – relative to the context
Reflexive Effort	Contextist	Extended Thinking	Pursuing Quality	Reflective action – testing of hypothesis in action in a context

The drivers of effort are shown in Table 6.1 in relation to the initial influencers of learning and Dewey’s reflective action. Each form of effort was associated with different ways that students perceived the world around them (Helsing et al., 2004).

Figure 6.1 graphically depicts the themes and categories of the drivers of effort from the effort mechanism derived from the student reflections across the courses. The drivers of effort show the *what* of applying effort. It is the abstract of Cronjé (2011).

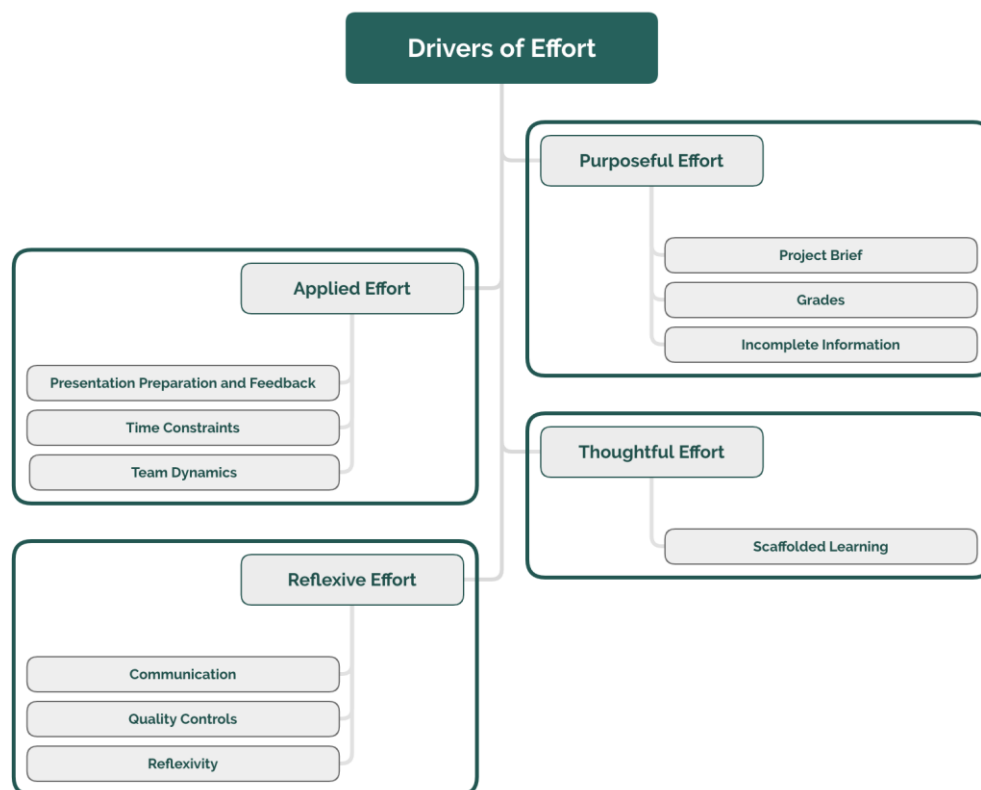


Figure 6.1. Themes and categories for the drivers of effort.

1. Purposeful Effort (Task-Oriented Effort)

Purposeful effort is the absolutist task-oriented effort (Helsing et al., 2004) with an outcome that is certain, which purposely follows set tasks. It can be likened to habit and non-reflection. Assessment at this level is based on recall (Webb, 2002).

Intentionally and purposefully following tasks were observed to encourage effort by adhering to the project brief and the outcomes from grades such as the presentation grade. Purposeful effort was also observed to be motivated by limited or incomplete information.

- **Project Brief**

Effort was seen to derive from the project brief for the assigned task. The project brief was linked to the perceived lack of information, forcing students to do additional *“reading and learning”* and collaboration. This led to task-oriented knowledge *“engraved in our memory”* and linked to emotion with *“pleasant group working experiences”*.

“A really good effort was put into process improvement, the team made sure to read the section on process improvement in the course reader ... We think that the process improvement knowledge was really engraved in our memory, this was one of the more pleasant group working.” (ARC1 P10).

- **Grades**

Grades for the presentations led to additional effort.

“The reporting section can be seen as the most important section as it is worth the most marks ... we believe we gave a good effort ...” (ARC4 P52).

One team received positive feedback from their presentation and consequently were not motivated to apply additional effort. However, lower than expected presentation grade motivated them to put more effort into their project's final phase.

“One of our earlier assessments was the presentation. I believe that my team worked well in preparation for this... However, upon receiving the marks, we did not do as well as we had hoped. I felt quite disappointed after the effort we had put in and hoped for more feedback. Nonetheless, I used this disappointment as motivation to work harder and do better.” (ARC4 P39).

To achieve a grade bonus, one team reflected on effort, which was made more difficult by the division of labour.

“We stayed up all night making sure all four reports touched all bases of the process and left no stone unturned ... to get it in for the 5% bonus ...” (ARC4 P44).

Grades did not consistently motivate effort for presentations. For example, one team took a satisficing view of a threshold grade.

“Our first presentation went well, 62% is satisfactory ...” (ARC4 P47).

Several teams recognised the need for effort but remained task-oriented.

“After that, we went back and re-analysed where we had fallen short and where we needed more information before going back to the stakeholders as well as our lecturer for his feedback.” (ARC4 P48).

- **Incomplete Information**

Effort was observed as an extension of assigned tasks and appeared to derive from a lack of necessary information.

“We put in a decent effort here given that we had no system to work with.” (ARC1 P13).

Purposeful Effort Summary

Purposeful effort purposely followed task, which is certain and absolutist. It can be considered habitual action in a purposeful lived environment. Three main drivers of effort were observed: grades, incomplete information and the project brief. The project brief is the task to be performed that required effort, which increased when necessary information required for the task was not provided and required some effort to obtain. Although grades were motivators for effort, some students took a satisficing approach.

2. Applied Effort (Effort-Oriented Effort)

Applied effort related to transitionist effort-oriented effort (Helsing et al., 2004) as the application of effort and provided the input to produce the required outcomes. The outcome of applied effort was a working hypothesis of the action required to complete the task. It can be likened to disrupted habits. Assessment at this level is based on skills and concepts (Webb, 2002).

Applied effort is the essence of effort. It equates to Dewey’s intellectualisation and studying the conditions of the situation (Dewey, 1933). According to Dewey, it should result in a working hypothesis that leads to action. The primary motivators for applied effort were presentation preparation and feedback, and time constraints.

- **Presentation Preparation and Feedback**

Presentations showed a dual effect on effort. Effort was needed to prepare for the presentation, and feedback from the presentation drove effort.

“One of the greatest lessons from the project came from the scheduled presentation. We were allowed the opportunity to present our perspective of the project as we saw it. This interaction allowed us to see gaps in our understanding of the process and provided us the benefit of correction from the panel that was present. Perhaps the greatest lesson gained from the presentation was the fact that it is always better to seek feedback...” (ARC3-P11).

Unknowingly, the team showed an appreciation for the Feynman technique to recognise gaps in their understanding after simplifying and presenting their project (Gleick, 1993).

Feedback from stakeholders was observed to be a motivator.

“... a major effort was put into the scoping diagram. We received some good feedback on it after the presentation, and we got some good advice from [the client] ...” (ARC1 P10).

“...the interaction with actual stakeholders made producing the presentation and report much more interesting and in some cases, more difficult.” (ARC1 P12).

However, feedback from the presentations did not always translate into effort. Some teams showed they would only put in effort if required to do so.

“...the team made sure each member ... was contributing to the assignment ... A project plan will be drawn up and will be looked at regularly to make sure the team is on track or if more effort needs to be put in.” (ARC4 P52).

“We are going to reflect on issues and decide to put a concerted effort into rectifying them.” (ARC3-P16).

In some cases, negative feedback from the presentations was observed to motivate effort.

“The stakeholder analysis initially received poor feedback for being too high level ... [in the final report a] large amount of effort was put into the scoping diagram ...” (ARC3 P30).

- **Time Constraints**

Time constraints motivated teams to apply effort. One team identified that the source of their poor presentation feedback was a lack of timely stakeholder contact. Addressing the issue led to improved understanding by the team.

“... we struggled to get the information we required on time ... after the presentation was made efforts were made thereafter to meet with and discuss the process with the various stakeholders, and we felt afterwards that our understanding of the process was at a much higher level than before ...” (ARC3 P27).

Time constraints due to environmental factors and not starting early enough reduced the perceived quality of the outcome. Interestingly, students linked quality and time to effort, arguing that they required more time to apply more effort. A positive outcome and pleasant environment were conducive to encouraging effort.

“We would’ve wanted more time so we could put more effort into it because we enjoyed our process and working with [the client].” (ARC1 P10).

One team changed projects during the project, which required additional effort due to a shortened deadline. This provided learning related to coping strategies and remedying time constraints rather than enhancing learning.

“We had to change projects otherwise, we would have been doomed to failure ... Unfortunately, we had to cover [sic] up for lost time, however, hard work and perseverance from the team got us to the point that we needed to be at.” (ARC1 P14).

- **Team Dynamics**

Several teams attempted to circumvent time constraints by delegating tasks to team members who could work independently, thereby saving time.

“The main lessons that we learnt in terms of project management is communication and delegation of duties. Tasks were divided and given to the group member who was best at the task.” (ARC1 P01).

The delegation of tasks resulted in poor feedback of presentations for some teams and caused them to apply effort to work as a group.

“... where members start striving to work in a collaborative manner. This could have been achieved sooner had we come together as a group to make sure we were on the same page. The decentralised approach we took to the deliverables prevented us from producing a cohesive report and presentation.” (ARC3 P25).

Applied Effort Summary

Applied effort was linked to presentation preparation, presentation feedback and time constraints. Feedback from internal lecturers and external assessors provided motivation. Time constraints were closely tied to preparation and an espoused potential for additional effort to improve outcomes. Resonant of Dewey (1933), applied effort produced a working hypothesis that may not be enacted.

3. Thoughtful Effort (Understanding-Oriented Effort)

Thoughtful effort was related to relativist understanding-oriented effort (Helsing et al., 2004), which used reasoning to transition the applied effort working hypothesis into a potential action relative to the purposeful effort task. It can be likened to reasoning and reflection relative to the situation or context. Thoughtful effort was linked to learning and reflection by the students. Assessment at this level is based on strategic thinking (Webb, 2002).

“Major effort was put into self-analysis of the team. We were very honest with our experiences in this project, and have learnt a great deal of skills and knowledge.” (ARC1 P7).

“This project took me out of my comfort zone by exposing me to situations I had not yet been properly exposed to. In my regular discipline (B.Sc.) it is uncommon to work in a larger team, give presentations and meet real clients.” (ARC4 P39).

- **Scaffolded learning**

Scaffolding and knowledge-sharing showed that effort could provide constructivist learning. Effort which led to learning was necessary as the project differed from scaffolded case studies.

“A really good effort was made here ... we had to apply small changes because the context of the business case was slightly different to the ones we did last semester.” (ARC1 P10).

Thoughtful Effort Summary

Thoughtful effort was relativist and linked to learning and reflection relative to the situation or context. Learning occurs through reasoning to transition the applied effort working hypothesis into a potential action relative to the purposeful effort task. Assessment at this level is based on extended thinking (Webb, 2002).

4. Reflexive Effort (Quality-Oriented Effort)

Reflexive effort was related to contextist quality-oriented effort (Helsing et al., 2004). It followed Dewey’s reflective action and combines thought and action in multiple contexts (Miettinen, 2000) and may be perceived as critical reflection. Whereas purposeful effort was associated with project briefs, applied effort was associated with work and thoughtful effort with learning, reflexive effort was a complex combination of thought and action in contextual settings. Assessment at this level is based on extended thinking (Webb, 2002).

Reflexive effort was observed to motivate effort through communication, quality control, and reflexivity.

- **Communication**

Students reflected that understanding the business process required significant effort. After multiple meetings, one team required even more meetings. They revealed that they did not discuss their meetings internally as much as they should have. Both external and internal communications led to effort.

“... meetings were highly beneficial, especially at times when there was confusion as to how certain tasks were carried out by the school. Meetings with [a stakeholder] happened quite a few times ... These meetings helped us and we are glad that we were able to have them ... As a group we could have had more group meetings, especially before meeting our sponsor or facilitator.” (ARC3 P28).

One team provided insight into the shortcomings of the division of labour and working individually. Effort in communication was required to overcome what the team considered time-saving through the delegation of duties.

"... where members start striving to work in a collaborative manner. This could have been achieved sooner had we come together as a group to make sure we were on the same page. The decentralised approach we took to the deliverables prevented us from producing a cohesive report and presentation." (ARC3 P25).

- **Quality Controls**

Effort was motivated internally from a quality perspective enhanced by reflective practices.

"Lots of effort, stands out as superior. Good use of tables and figures, perfect headings and titles. One document with high clarity graphics. Crisp, consistent, aesthetically pleasing." (ARC1 P7).

One team noted that grades were not under their control, and consequently, they should put more effort into those areas that they could control, such as the amount of effort expended in the project and the quality of the outcome.

"While being goal-oriented is important, we learned that it's better to focus on aspects of the project we can control (how much effort we put in, the quality of our work) than aspects we have no influence over (our result mark)." (ARC4 P50).

- **Reflexivity**

During reflection-on-action, teams observed the need for effort. However, this motivation came too late to implement. By implication, reflection must be actioned earlier (or throughout the project) rather than only undertaken at the end.

"We could have arranged for better timing to consolidate with every team member's section to allow for a more comfortable early submission. ... keeping in constant contact with the stakeholder, especially regarding the suggested solution is what we should have been doing ..." (ARC4 P44).

Reflexivity was observed as a driver of effort. Although one team had encountered communication problems, they improved their learning outcome by combining their reflections and feelings in a “collective effort”.

“Finally, putting this reflection together was a collective effort ... Once we had discussed and looked at what each person had written we took points and ideas from each person and put this section together.” (ARC3 P28).

Reflexive Effort Summary

Reflexive effort is contextual in experimenting with reasoned action (in other words, thoughtful effort). It follows Dewey’s reflective action and combines thought and action in multiple contexts. From a reflective practice perspective, it may be considered critical reflection. Whereas applied effort was associated with work effort and thoughtful effort with learning, reflexive effort was a complex combination of thought and action in contextual settings. Reflexive effort was observed to motivate effort through external and internal communication, quality control and the process of critical reflection.

6.4 Retrospective-Prospective

Several students remarked that, in hindsight, they should have put in more effort. Part of their motivation was for a better grade.

“I should have put more time and effort into the project. Knowing that this is the last project of the year and that it counts 18% of our year mark, I should have been motivated to do work to the best of my ability.” (ARC4 P48).

At the same time, students consider how they would motivate their teams to put in more effort in the future.

“If I am to work on a different project ... I will try and motivate team members if I feel that we are losing focus of the goal and always follow up when we are falling behind schedule.” (ARC4 P48).

Reminiscent of customer-dominant logic (Heinonen et al., 2010), one group mentioned reflection from three distinct viewpoints – pre-presentation (group dynamics), presentation

(during), post-presentation (report). These appeared to relate to three distinct periods and forms of effort.

“The three major reflections we would break this project up into are: initial group dynamics before meeting with the stakeholders, doing the first presentation with the group and then working on and handing in the final report with the group.” (ARC4 P45).

Students retrospectively recognised the importance of effort. While several remarked that they would do things differently in the future, the study's nature did not allow for testing these intentions.

One of the most commented upon areas of effort and doing things differently was the presentations, which showed a disruptive effect on student learning. This disruptive effect is explored in the following subsection.

6.5 Learning Influence Disruptors

The student reflections showed multiple disruptive activities associated with the drivers of effort. The disruptors brought about an awareness that caused the students to pause and reflect, leading to a change in behaviour. This behavioural change ranged from doing nothing to changes in their approach to the project and showed the potential of change in future. One student referred to several disruptions which moved them out of their “comfort zone”.

“This project took me out of my comfort zone by exposing me to situations I had not yet been properly exposed to ... to work in a larger team, give presentations and meet real clients.” (ARC4 P39).

Multiple student groups reflected on exposure to other contexts, teamwork and working with actual clients. In some cases, a link between disruptions was observed. For example, one team reflected that they learnt to *“think on a broader scale to come up with solutions ... to work as a team ... to carry out presentations in front of professional business analysts ...”* (ARC1 P11).

Throughout the study, several disruptive actions leading to learning were observed in the findings. These disruptions included assigned tasks, grades, project presentations, time constraints, team dynamics, scaffolded learning, communication, quality controls, and reflection. The disruptors leading to effort show the *how* of applying effort. It is the subjective of Cronjé (2011).

- **Assigned Task – Project Brief**

The initial disruption was the task of completing the business process management project and was fundamental to obtaining a good grade.

“... the team made sure to read the section on process improvement in the course reader ...” (ARC1 P10).

- **Incomplete Information**

The project brief disruptor was closely related to the perception of incomplete information. The disruptive effect was clearly shown by one team who remarked:

“It was demanding trying to work out how to apply what we have learnt in class ... we had to sit together and try [to] work out what was required [of] us ...” (ARC1 P5).

- **Grades**

A lower than expected presentation grade motivated teams to apply effort for their final report.

“... upon receiving the marks, we did not do as well as we had hoped. I felt quite disappointed ... I used this disappointment as motivation to work harder and do better.” (ARC4 P39).

- **Project Presentations**

The teams' project presentations were frequently observed to inspire effort leading to learning and understanding.

“... we had a clear view of the process, but we were shown to be wrong after the presentation was made. Efforts were made thereafter to meet with and discuss the

process with the various stakeholders, and we felt afterwards that our understanding of the process was at a much higher level than before.” (ARC3 P27).

Some students acknowledged that their presentations were disruptive, but this was not sufficient to inspire additional effort.

“The presentation was taken well by the markers; however, in some ways, we had missed the point of the presentation ... Otherwise, I felt all in all this has been an extremely effective report, project, and most of all, team ...” (ARC4 P44).

One team reflected on three distinct phases of disruption - pre-presentation, presentation, and post-presentation - which the team related to different forms of effort.

“The three major reflections we would break this project up into are: initial group dynamics before meeting with the stakeholders, doing the first presentation with the group and then working on and handing in the final report with the group.” (ARC4 P45).

Recurrently, the presentations showed a dual effect on effort. Effort was needed to prepare for the presentation, and feedback from the presentation drove effort.

“One of the greatest lessons from the project came from the scheduled presentation. We were allowed the opportunity to present our perspective of the project as we saw it. This interaction allowed us to see gaps in our understanding of the process and provided us the benefit of correction from the panel that was present.” (ARC3 P11).

Feedback from the presentations was consistently observed to be a motivator.

“... a major effort was put into the scoping diagram. We received some good feedback on it after the presentation, and we got some good advice from [the client] ...” (ARC1 P10).

“After our team presentation, the panels gave feedback on the stakeholder diagram and the scoping diagram ... We improved on these comments.” (ARC4 P52).

However, feedback did not necessarily translate directly into applied effort, with teams stating that they would only put in effort if required.

“...the team made sure each member ... was contributing to the assignment ... A project plan will be drawn up and will be looked at regularly to make sure the team is on track or if more effort needs to be put in.” (ARC4 P52).

In some cases, negative feedback from the presentations motivated effort.

“The stakeholder analysis initially received poor feedback for being too high level ... [in the final report a] large amount of effort was put into the scoping diagram ...” (ARC3 P30).

- **Time Constraints**

Time constraints motivated teams to apply more effort. Although aware of the time constraints, the presentation brought about a disruption in emphasising the approaching project deadline and encouraged action and improved understanding.

“... we struggled to get the information we required on time ... after the presentation was made efforts were made thereafter to meet with and discuss the process with the various stakeholders, and we felt afterwards that our understanding of the process was at a much higher level than before ...” (ARC3 P27).

- **Team Dynamics**

Assumed time-saving by delegating duties was a paradox that caused some teams to apply more effort than anticipated.

“... teamwork needs constant communication and collaboration. A project is not successful if all team members work individually and only look out for themselves ...” (ARC1 P13).

“... where members start striving to work in a collaborative manner. This could have been achieved sooner had we come together as a group to make sure we were on the same page. The decentralised approach we took to the deliverables prevented us from producing a cohesive report and presentation.” (ARC3 P25).

- **Scaffolded Learning**

Scaffolding provided temporary facilitated support for learners to go beyond their current abilities with a gradual reduction of support as they become proficient in their knowledge.

The course reader was a common source of reference outside of the lecture room. Although this provided a scaffolded resource, it required effort and was hence a disruptor.

“A really good effort was put into process improvement, the team made sure to read the section on process improvement in the course reader ...” (ARC1 P10).

Effort which led to learning was necessary as the project differed from the scaffolded cases in the course reader and lectures. The combination of scaffolding and knowledge-sharing showed that effort could provide constructivist learning.

“... we had to apply small changes because the context of the business case was slightly different to the ones we did last semester.” (ARC1 P10).

- **Communication**

Knowledge sharing required communication which was a common thread in the student reflections and showed clear links to applying effort. Communication required effort for external stakeholders and internally between team members.

“The communication with stakeholders has improved our professional communication skills. Being aware that our emails with the stakeholders were being assessed, made us put a lot more effort into making sure they were as professional as possible ...” (ARC1 P6).

“Team communication was a big problem in this time and continued to be as there was not a single form of communication that was ideal for the full group ... a single form of communication should be decided on for team discussions ...” (ARC1 P3).

Communication disruptions resulted in espoused effort without evidence of effort being enacted. In the study setting, this was due to students only reflecting at the end of the project, which reduced the opportunity to put the learnings into practice within their project timeframe.

“We could have communicated more efficiently, had more meetings and also distributed tasks earlier on ...” (ARC1 P6).

- **Quality Controls**

Several teams reflected on the quality of their project as a motivator of effort leading to understanding. Thus, quality was considered a disruptive activity.

“Lots of effort, stands out as superior. Good use of tables and figures, perfect headings and titles. One document with high clarity graphics. Crisp, consistent, aesthetically pleasing.” (ARC1 P7).

“... we put in weeks and weeks of hard work in order to map everything out perfectly. Hence, we feel that this aspect of the project was done close to 100%. If we had not perfected this, then the project as a whole would be greatly misunderstood and would have led to failure ...” (ARC1 P14).

Whereas grades are considered a disruptor, one team noted that as grades were not under their control, they should apply effort to those areas they could control, including the quality of the outcome.

“While being goal-oriented is important, we learned that it's better to focus on aspects of the project we can control (how much effort we put in, the quality of our work) than aspects we have no influence over (our result mark).” (ARC4 P50).

- **Reflection**

During reflection, teams observed the need for effort, which acted as a disruptor. The team had improved their learning outcome by combining their reflections and feelings through collective effort.

“Finally, putting this reflection together was a collective effort ... Once we had discussed and looked at what each person had written we took points and ideas from each person and put this section together.” (ARC3 P28).

Meta-cognitive reflection was seen to be a disruptor when students showed the benefits of reflecting and the importance of applying effort.

“We feel reflecting back on the good times and bad times of doing this project came up the most when we were drawing up the learnings. We are going to miss this project, it was an intense year, coupled with the unrest of campus. This project and the year was truly a challenge and preparing these learnings made us realize we managed to come up from it.” (ARC1 P14).

Although reflection acted as a disruptor, it did not necessarily result in applied effort.

“We are going to reflect on issues and decide to put a concerted effort into rectifying them.” (ARC3-P16).

The findings in this section reveal that disruptions in habitual action can take multiple forms and are directly associated with the effort drivers. The most common disruption derived from the project presentation preparation and feedback. Other disruptions emanated from the assigned tasks, grades, project presentations, time constraints, team dynamics, scaffolded learning, communication, quality controls, and reflection.

6.6 Summary

This chapter explored what motivates students to apply effort in an experiential business process project and how to assess their learning. This was in response to the fourth research question [RQ4], which sought mechanisms that activate the effort learning influencer. At the same time, the fifth research question [RQ5] was addressed in identifying how learning outcomes can be assessed. The findings from Chapter 5 were reanalysed to answer the questions and identify where students indicated they had put in special effort, which led to improved learning.

The reanalysis was linked to the depth of knowledge model of Webb (2002) to determine potential assessment methods. Effort was reified into an effort-based learning generative mechanism structure where all four learning influencer constructs were perceptible. The constructs were termed purposeful effort, applied effort, thoughtful effort and reflexive effort. Presentations were a common disruptor leading to applying effort, extending from preparation through presenting the project presentations to post-presentation feedback.

Applying effort was the most significant generative learning mechanism with the potential to improve learning in business process management experiential learning courses. In the context of business process management experiential learning projects, applying effort accommodated the four levels of learning as espoused by Helsing et al. (2004), which may be assessed through the depth of knowledge model of Webb (2002).

7 Discussion

This study found that student reflections can translate into improved learning outcomes in experiential learning business process management projects. Based on experiential learning theory (Kolb, 2015) and reflective thought and action (Dewey, 1938), reflection is fundamental to experiential learning. However, reflection is imprecise, and consequently, the concept of reflective practice (Schön, 1983) was introduced to formalise the understanding of reflection. During the study, reflecting-on-action and reflecting-in-action were found to be restrictive after the action had already occurred. Reflection-for-practice (Killion & Todnem, 1991; Van Manen, 1992) was included in the research to broaden the reflective process. This yielded no significant difference from the other forms of reflection.

The study was guided by what students who undertake a business process management experiential project reflect on that may improve their learning outcomes. The need to investigate reflective practices is derived from disconnects between the research situation and experiential learning theory in practice. Whereas experiential learning is recommended in information systems education (Bélanger & Van Slyke, 2012), there is a paucity of understanding of reflection, which is pivotal for experiential learning but has multiple definitions and unclear outcomes. Kolb has been shown to be deficient and applicable to stages rather than a learning cycle (Miettinen, 2000). Dewey follows a cyclical experience-reflection-learning cycle, but the benefits of reflection remain challenging to identify, especially when Dewey speaks of reflective action (Miettinen, 2000). Simultaneously, educators encounter difficulties setting learning objectives for formulating, teaching and assessing learning outcomes that transcend primary retention and lead to learning transfer in new situations (Anderson & Krathwohl, 2001).

This study investigated a series of experiential learning business process management capstone projects for enterprise systems courses at a higher education institution in South Africa to better understand the impact of reflection. The courses were at the highest immersion level of integrated practicum (Guthrie & Guthrie, 2000) and the only one of its type in South Africa at the time of the study. The study's findings revealed four generative learning mechanisms that could improve learning outcomes - undertaking tasks, applying effort, increasing understanding, and pursuing quality. The most significant mechanism was

applying effort, which was considered to hold the potential to improve learning in business process management experiential learning courses. The four generative mechanisms are interrelated and are depicted as a learning influencer onion, as shown in Figure 7.1. Undertaking tasks are embedded in the other influencers, each broader in scope than undertaking tasks. Likewise, applying effort is included partly in undertaking tasks and entirely in increasing understanding and pursuing quality.



Figure 7.1. Learning influencer onion.

The embeddedness of applying effort shown in the onion provides a view of effort from the proposed learning influence model's four ontological perspectives. The four embedded perspectives provided four philosophical views applicable to learning effort and were named drivers of effort. The drivers of effort were reified as purposeful effort (undertaking tasks-oriented effort), applied effort (applying effort-oriented effort), thoughtful effort (increasing understanding-oriented effort) and reflexive effort (pursuing quality-oriented effort) to separate them from the influencers of learning.

Consequently, applying effort accommodated the four levels of learnings as espoused by Helsing et al. (2004) and may be assessed through the depth of knowledge model of Webb (2002).

7.1 Influencers of Learning Generative Mechanisms

The first research question sought to identify mechanisms that students consider beneficial to learning in a business process experiential learning project. Students were observed to justify project marks based on four criteria – absolutist task, transitionist effort, relativist

understanding and contextist quality – which emerged as potential learning influencers during the four action research cycles. The learning influencers permeated the set of general themes identified from the student reflections and resonated with Helsing et al. (2004), who provide a comprehensive theoretical basis of constructive-developmental learning drawn from multiple adult learning theories.

Undertaking Tasks - Level 1 Absolutist

Undertaking Tasks reflected the inherent objective of the projects. It was the guideline for undertaking the work and was fundamental to obtaining a good grade. When a project or job task is not undertaken according to provided guidelines, it may not produce the intended outcome. The need for absolute answers was evident in the students' task-oriented reflections, where the students sought unambiguous outcomes for their project. Absolutist thinking following task was common in the reflections, with students revealing a need for precision in the outcome of what they were asked to do. Teams described at length the extent to which they had followed the instructions. Task-oriented teams focused on marks and responded directly to feedback. The precise affirmations showed their desire for certainty and fixed reality. Students showed surprise when their tasks were not up to standard, and even after they fixed the issues, they often fell short of moving to the higher level of transitionist effort. Nevertheless, some students observed a need for more information to move beyond the absolutist view. The view that effort and quality had a higher value than task was epitomized by one team.

- **Recognising Level 1 Absolutist students**

Absolutist learners' stance on knowledge is based on a dualist philosophy whereby knowledge is directly observable and either true or false. Educators are expected to be sources of clearly communicated accurate knowledge delivered with clear instructions and rules on obtaining the correct answers. In acknowledging the absolutist stance, Helsing et al. (2004) provide a method of identifying learners at each level.

Applying Effort - Level 2 Transitionist

Applying effort was an extension of undertaking tasks where students revealed how much effort they put into their projects. However, they seldom reflected on what activities they performed or how they performed the activities. Applying effort went beyond what was asked

of the students (undertaking tasks). However, when students used the word “*effort*”, it was often considered a form of activity compared to focused work. The need for additional effort was often portrayed in negative terms, with students retaining an absolutist stance. Teams reflected on the benefits of reflection when they retrospectively considered the additional effort required for their projects.

Effort was observed as transcending tasks and was not finite, with reflections showing the potential for more effort, which some considered learning for their future. Effort was required to satisfy their lack of knowledge. Team members encouraged each other to put more effort into their projects and recognised the benefits brought about by the effort of peer support.

The appreciation for effort was frequently related to tasks. At least one team suggested that feedback encouraged extra effort, leading to understanding and, hence, learning. Whereas applying effort was posited as the transition between undertaking tasks and increasing understanding, teams revealed they applied effort to clarify aspects rather than to understand. This reinforced the assessment that students have stronger links to the absolutist view than the relativist view. Nevertheless, there were signs of transitioning from task to understanding through effort. Effort required by project complexity was also linked to quality output by the students. Thus, applying effort was transitionist, as espoused by Helsing et al. (2004).

- **Recognising Level 2 Transitionist students**

According to Helsing et al. (2004), transitionist knowing disrupts the dualist absolutist view and provides learners with an awareness that their knowledge is incomplete. Learners progress beyond pure knowledge acquisition to seeking opportunities to apply their new knowledge, which leads to understanding. Transitionist learners tend to interact emotionally towards educators, seeking acknowledgement and encouragement for their learning and rapport.

Increasing Understanding - Level 3 Relativist

Increasing understanding was observed as a reflective comprehension that proceeded from applying effort when undertaking the task. Students adapted from an absolutist stance to perceiving multiple versions of knowledge. Whereas undertaking tasks appeared emotion-

free, emotions surfaced in applying effort and were noticeable in increasing understanding, revealing future orientation.

Increasing understanding transitioned through applying effort to relate classroom activities to the task at hand. Additional knowledge was necessary to deal with situations that deviated from the norm and thus extended the requirement for more absolutist information as in the transitionist view. For many students, the absolutist view persisted, and they stopped short of the understanding required to improve their situation and move from current to future.

Deviation from the absolutist task-based lecture room to real-life complexities was considered "*misunderstanding*", in which students hinted at multiple versions of reality. Misunderstanding originated from segmentation through delegation of duties without a central leadership and thus acknowledged the potential of multiple understandings. Understanding was perceived to be situational and incremental and, therefore, constructivist and enhanced by experience. The potential for multiple solutions revealed an awareness that not all solutions were feasible. Understanding the coursework was outwardly focused, with students reflecting on the benefits to others in contrast to self-reflectivity. Students used the concept of understanding to reinforce the task-oriented view and appeared to miss the potential of multiple versions of reality. One team put in significant effort to reach a consensual understanding to the extent of taking a democratic view and voting on significant issues without conceding the potential of multiple contexts.

- **Recognising Level 3 Relativist students**

In recognizing relativist students, Helsing et al. (2004) observed that learners begin to recognise that truth may be relative and was not merely a lack of knowledge. Learners began to observe that multiple non-finite versions of truth exist. The relativist level is characterised by openness to new ideas and provides the basis for critical thinking. Learners are at the early stage of reflective practices and must learn methods for evaluating multiple versions of the truth. However, they start to determine their own perspectives and seek opportunities to share these with peers. In turn, they identify peers as knowledge sources, but they do not trust peer interpretations for acquired knowledge. Relativist learners seek affirmation from educators who must support learners and encourage independent thinking.

Quality - Level 4 Contextist

Pursuing quality, in terms of doing excellent work, was highlighted by several teams. The students appeared to be justifying a higher grade based on aesthetics often linked to the other influencers. Student teams showed a progression from undertaking tasks through applying effort to increasing understanding and pursuing quality. Quality was subjective and difficult to define. In one context, an item may be regarded for its aesthetic quality but not in another context. This was seen in the multiple facets of the students' reflections on learning and ongoing lives, which acknowledged a contextist nature in a future-oriented view.

Quality was contextual and hence subjective. Students recognized the contextual nature of quality which transcended understanding. Context and quality were evident in longer-term views. One team considered that the quality of their output could be applied in several contexts but did not recognise the project's real-life context. They viewed the project as a case study and remarked on doing "*something proper*". Another team reflected on links between quality and time when they achieved a higher quality output by delaying their project. Contextually, this spoke to performance levels that can improve over time.

Hints of critical reflection were exposed. Reflections extended beyond the appreciation of context whereby alternate realities could lead to different solutions that hold the potential to change students' lives. Where critical reflection was observed, it was espoused rather than enacted.

- **Recognising Level 4 Contextist students**

Helsing et al. (2004) explain the contextist stance (pursuing quality) as expanding the relativist view (level 3) to take cognisance of the context of knowledge creation. Learners evaluate the background of the information and the processes by which it is acquired. While they acknowledge authoritative sources, they do not take them as determinants of absolute truth. Students begin to take responsibility for their learning and have developed methods for self-evaluation of their own complex ideas. However, contextist learners require educators to facilitate learning by using multiple teaching strategies and encouraging corroborative argumentation.

Learning Influencers Summary

In this section, generative mechanisms that may lead to improved learning outcomes were identified from the student reflections during experiential learning projects in answer to research question one [RQ1]. Four learning influencer mechanisms were proposed – undertaking tasks, applying effort, increasing understanding, and pursuing quality. These were associated with the absolutist, transitionist, relativist and contextist ontologies proposed by Helsing et al. (2004). The four learning influencers resonate with triple-loop learning (Holmgren, 2014; Tosey et al., 2012) depicted in Figure 3.3. Results resemble undertaking tasks; actions resemble applying effort, assumptions resemble increasing understanding, and context resembles pursuing quality. In the reviewed higher education courses, absolutist tasks were the starting point for learning based on classroom instructions provided by lecturers and tutors. In the experiential learning projects, this form of learning needed to be expanded to complete the projects. This required applying effort by the students, who noticed that absolutist answers were not always achievable. Real-life situations required students to apply additional effort and consider multiple situations. Not all students could progress beyond finite answers, and many persisted in seeking absolute answers. Although some students became aware of alternate contexts and even actively pursued these contexts, time limitations constrained them to remain within a transitionist perspective. Consequently, applying effort became paramount and was observed to be both qualitatively and quantitatively significant. This finding answered research question two [RQ2] regarding how learning influencers can improve learning outcomes. The finding that effort significantly correlated to learning outcomes addressed research question three [RQ3], which explored the effect of the learning influencers on learning outcomes. Single-loop learning was prevalent, although there were observations of transitioning to double-loop learning. At the highest context level of triple-loop learning, scaffolded reflection (Perusso et al., 2020) assisted in shifting double-loop learning to doing things right. However, triple-loop learning is associated with studies of learning organisations that may not be comparable to educational institution learning (Field, 2019). Hence, the focus for education should be on double-loop learning using action to challenge assumptions and move beyond task-based, facilitated, and restrictive assessments.

7.2 Using Learning Influencer Mechanisms for Improved Learning

The previous section identified potential learning generative mechanisms that might improve students' learning during experiential learning projects and how each mechanism could be recognised. Of the four influencers of learning, applying effort was identified as the most significant. In this section, practical applications of the applying effort mechanism are described from the research data. This section answers the research questions of how disruptions can activate generative mechanisms [RQ4] and how learning outcomes from the learning influencers can be assessed in experiential learning [RQ5].

A more in-depth analysis and active reflection about what the students had identified in their reflections generated a set of drivers of effort. Drivers of effort followed a similar four-level structure as the overall findings, with all four learning influencers discernible within effort. The four influencers were reified and named as purposeful effort (task-oriented effort), applied effort (effort-oriented effort), thoughtful effort (understanding-oriented effort) and reflexive effort (quality-oriented effort) to avoid confusion with the learning influencers.

Improved learning requires an assessment system to provide methods of evaluating if learning is taking place (Anderson & Krathwohl, 2001). Webb's depth of knowledge framework (2002) was incorporated into this study to address this need and answer research question five. The four levels of the depth of knowledge assessment model ontologically link to the observed drivers of effort.

Purposeful Effort

Applying effort in undertaking tasks was reified as purposeful effort and comprised the project requirements (project brief), grade, and incomplete information. Project briefs and grades are typical project learning drivers, and providing incomplete information is perceivably part of examinations. Exams test absolutist knowledge by providing selected information that needs to be completed by the students. Exams are typically time-constrained, which links to time constraints in applied effort discussed next. Incomplete information required students to put in effort to obtain the missing information. However, in undergraduate courses and project settings such as those used in this study, educators must ensure that the incomplete information is available for the students to find with effort.

Purposeful effort purposely followed task, which is absolute. It can be considered habitual action in a purposeful lived environment. This form of effort was not directly linked to learning and often surfaced to apply task-oriented activities. Assessment at this level is based on recall (Webb, 2002).

Three themes were observed for purposeful effort: the project brief, grades, and incomplete information.

- ***Project Brief***

Effort was seen to derive from task. Students had insufficient information to proceed but had to do additional “*reading and learning*” and collaboration.

- ***Grades***

Grades for the presentations led to additional effort. Grades were not observed to be a significant motivating factor for effort. Nevertheless, the promise of a bonus grade motivated some teams. Satisficing was observed when a team was not motivated to further effort on receiving positive feedback. However, a presentation grade that was lower than expected motivated them to apply effort for the final phase of their project. To achieve a grade bonus, some students reflected on effort, which was made more difficult by the division of labour. Overall, teams acknowledged the need for effort but remained task-oriented.

- ***Incomplete Information***

Applying effort as an extension of undertaking tasks was observed to derive from a lack of sufficient information. Students had to perform additional reading, learning and collaboration.

Applied Effort

Gaps in knowledge were perceived to require effort to fill them. This led to applying effort being reified as applied effort. The most significant drivers of applied effort were the presentations and time constraints. Presentations afforded students mechanisms to learn from preparation and feedback from their presentations.

Applied effort enacted purposeful effort, both of which directly related to the task. Whereas purposeful effort was motivated by external factors such as the project brief, grades and

incomplete information, applied effort was oriented to the students' actions. Students could control the preparation for their presentation and how they reacted to the feedback. Likewise, time constraints had to be managed by the students. Assessment at this level is based on skills and concepts (Webb, 2002).

- ***Presentation Preparation and Feedback***

Presentations showed a dual effect on effort. Effort was required to prepare for the presentation, and feedback from the presentation drove effort. Whereas positive feedback was not seen to motivate students directly, negative feedback from the presentations motivated effort for final reports. However, feedback from the presentation did not necessarily translate directly into effort. Some teams showed they would only put in effort when required to do so. Unfortunately, they provided no measurement criteria to show if additional effort was applied.

- ***Time Constraints***

Time constraints motivated teams to put in extra effort. One team identified the source of their presentation feedback as a lack of timely stakeholder contact, the resolution of which led to improved understanding by the team. Due to environmental factors and not starting early enough, time constraints reduced the students' perceived outcome quality. Students also linked quality and time to effort, arguing that they needed more time to put more effort into producing quality output.

A team that changed projects during the allocated project time required additional effort due to a shortened deadline. This provided learning related to soft skills in coping strategies and alleviating time constraints rather than enhancing task-related learning.

Thoughtful Effort

The increasing understanding component of applying effort was reified as thoughtful effort and considered learning originating from applied effort. Thoughtful effort was relativist but fell short of self-reflection observed in reflexive effort. Thoughtful effort was linked to learning through reflection, which occurs through reasoning and transitions the applied effort hypothesis into a potential action relative to the purposeful effort task. Assessment at this level is based on strategic thinking (Webb, 2002).

The key theme observed for thoughtful effort was learning through rudimentary reflection. Reflection was at the third level described by Kember et al. (2008), where information is related to personal experience and may include personal insights. The effort required for experiential in-situ learning, although similar to case studies, held more significant benefits. Combined with scaffolding and knowledge-sharing, effort can provide constructivist learning by building on scaffolded cases from the classroom.

Reflexive effort

Reflexive effort is the reified view of pursuing quality as part of the applying effort learning influencer and was contextual and messy. Reflexive effort was transitionist in ontology (through applying effort) but contextist in epistemology (through pursuing quality). Reflexive effort was contextual in experimenting with reasoned action (that is, thoughtful effort). From the reflective practice perspective, it revealed aspects of critical reflection. Reflexive effort followed reflective action from Dewey (1933) to combined thought and action in multiple contexts. Whereas purposeful effort was associated with the task, applied effort with work, and thoughtful effort with learning, reflexive effort was a complex combination of thought and action in contextual settings. Reflexive effort was observed to motivate effort through external and internal communication and through the process of reflecting. Assessment at this level is based on extended thinking (Webb, 2002).

Reflexive effort was observed to apply to communication, subjective quality controls, and critical self-reflection.

- ***Communication***

Students reflected that communication differed between external stakeholder meetings and internal project meetings, and both required effort. One team epitomized the contextual nature of effort in suggesting that they required more stakeholder meetings, even though they had not adequately discussed the earlier meetings internally. Effort in communication was required to overcome what the team considered to be time-saving through delegation of duties. In contrast, another team provided insight into effort required to offset setbacks brought about by poor communication due to the delegation of duties and working individually.

- **Quality Control**

Effort was motivated internally from a quality perspective and enhanced by reflective practices. One team noted that task grades (purposeful effort) were not under their control and required effort (applied effort) for those areas that they could control, such as the quantity of effort expended (thoughtful effort) and the quality of the outcome (critical self-reflexive effort).

- **Critical Self-Reflection**

Reflection was observed as a driver of effort, and multiple contexts were observed. For example, one team had encountered communication problems and used reflection to learn by combining their reflections and feelings in a “*collective effort*”. According to Kember et al. (2008), critical reflection has transformative properties and is most common in the early stages of understanding before assumptions become entrenched.

The effects of critical reflection were tempered by reflection after action (reflection-on-action). Although teams observed the need to apply effort, this motivation came too late to implement. Thus, reflection must be performed early in the project (or throughout the project) rather than only at the end.

Learning Mechanisms Summary

Effort was observed to be the most significant potential mechanism for improved learning outcomes. Nevertheless, effort alone was insufficient to provide improvements. Effort relies on following the task and is enhanced by understanding the underlying work and ensuring the quality of the work. This structure is evident in the effort mechanism, which follows the undertaking tasks, applying effort, increasing understanding, pursuing quality structure reified as purposeful-effort, applied-effort, thoughtful-effort and reflective-effort.

The concept of drivers of effort resembles critical realism. Potential mechanisms and structures, which are layered and interconnected, exist in the real domain and bring about events in the actual domain, which may or may not be observable. The events in the actual domain cause observable experiences in the empirical domain (Heeks et al., 2019). In this study, the students' reflections (observable experiences in the empirical domain) were used to project potential mechanisms (the real domain) that could bring about the events in the actual domain, as shown in the Learning Disruptor Sankey diagram in Figure 7.2.

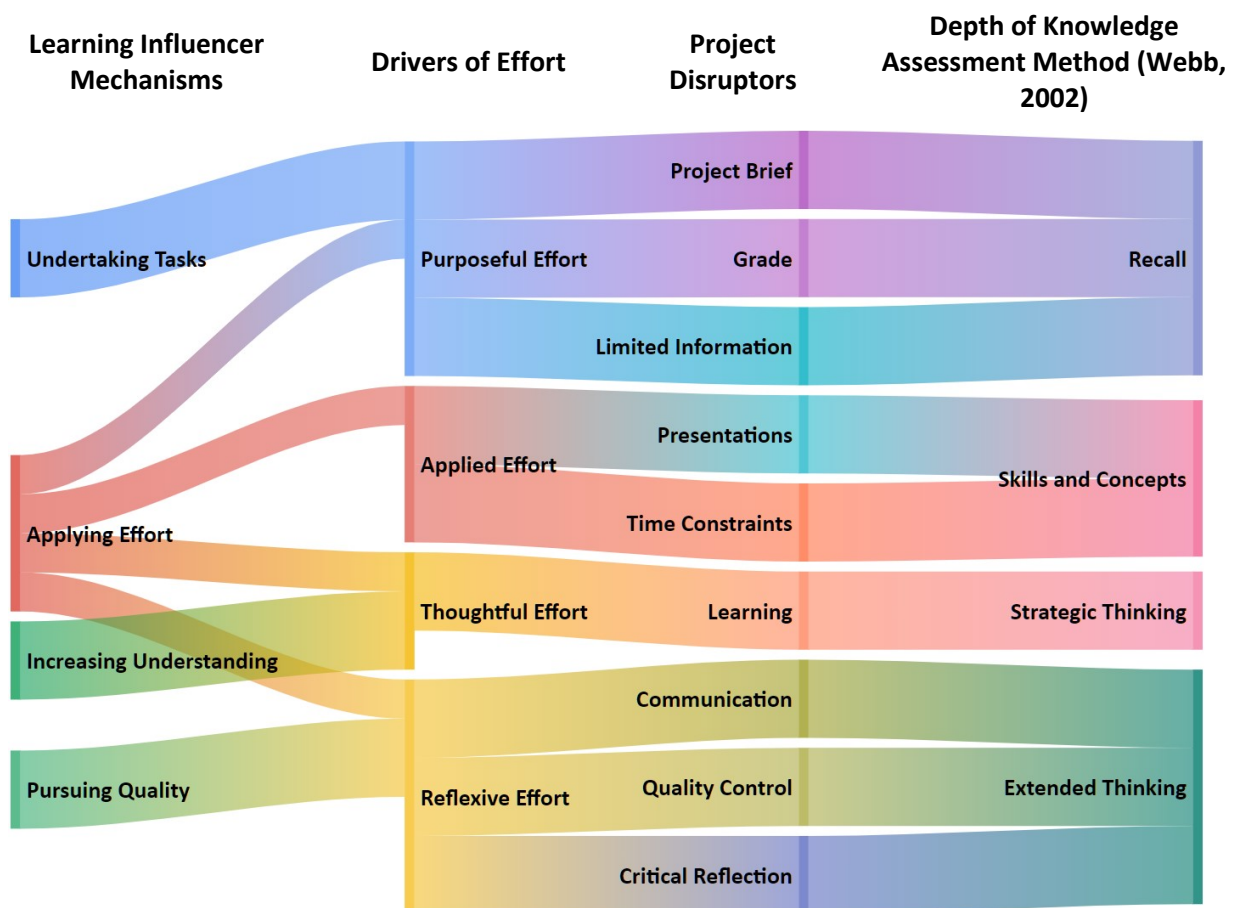


Figure 7.2. Links between the proposed learning influencer generative mechanisms, drivers of effort, project disruptors, and assessment methods for improved learning outcomes.

7.3 Reflection and the Implications of Reflection

Reflection was observed to improve learning outcomes. The quantitative findings revealed significant but weak correlations between student reflections and learning outcomes represented by the final examinations. A stronger correlation was observed between the mid-term and final exams than between the experiential learning and final exams. While this appears to contradict Kolb (2015), it aligns with Dewey (1933), who considered reflection to include action. This view of Dewey is supported in the observation that reflection on the projects correlated significantly with effort.

Reflection is hypothesised to be a basis for learning (Boud et al., 1985; Dewey, 1938; Kolb, 2015; Moon, 2009) which can improve learning outcomes. The aggregated data across the four cycles in this study showed no significant improvement in learning outcomes from the experiential learning projects where the final exam was the unit of analysis for the course learning outcome. For reflection to be a moderator between experience and learning

outcomes, there must be a significant correlation between project and reflection and reflection and exam. Although a significant correlation was observed between reflection and the final exam, there was no significant correlation between project and exam. Hence, moderation was not observed for reflection in the study. This may be due to the time constraints that did not encourage abstract conceptualisation and active experimentation required by Kolb's experiential learning cycle. To follow the experiential learning cycle thoroughly would require students to undertake multiple iterations of the projects, which was not practical in the settings. Hence, this study subscribed to the view of Schatzki (2016) in considering reflection as *"just one form that people's responses to changes in the world can take"* (p.17).

Reflection-in-action through maintaining reflective research journals held the most potential for reconceptualising and experimenting. The increased effort made this reflection method unpopular with the students and highlighted the need for scaffolding (Perusso et al., 2020). As multiple iterations of the business process management course projects were not practical and reflective journals challenging, an alternate learning outcome improvement method was required. A student-dominant logic approach was undertaken to identify (i) what potential mechanisms students reflect on in their projects which may improve learning outcomes and (ii) how the identified factors could improve learning outcomes.

Multiple levels of reflection were observed during the data analysis, which resonated with other research (Kember et al., 2008; Kemmis, 2005; Mezirow, 1990). Kember et al. (2008) posited four levels of reflection - non-reflection (or habit), understanding, reflection and critical reflection – which resembled this study's observations. The reviewed literature on reflection often used the term *"levels"*; however, these may better be considered layers than levels. Levels indicate depth, making sense for learning (Webb, 2002), but reflection is not as restrictive. A preferred description derives from the concept of rhizomatic layers, which are flat but intertwined (Deleuze & Guattari, 1987). Schatzki (2016) describes flat as level but not smooth – thus a layered flatness rather than multiple levels. Rhizome plants are complex comprising leaves, flowers and rhizomatic tubers with roots below the surface in layers. Roots are tenuous and without the structure and strength of arboreal roots that bury deep into the ground. Rhizomes resonate with multi-layered learning, sprouting up in foliage and flowers and drilling down into the soil albeit shallowly. The rhizome is not fixed and remains

malleable. It resembles the changing of practice until the actions form habits and are entrenched in practice. Once entrenched in practice, it is regarded as learning and can be likened to Deleuze and Guattari's (1987) arborescence until a disruption occurs (Schatzki, 2016).

Whereas the experiential-based reflective learning of Dewey (1933;1938) is fluid and Kolb's lacks hierarchy (Rainey, 2019), Schatzki (2016) indicates a cycle that flows until it encounters a disruption which causes a temporary pause. Disruption disturbs the smooth flow and may cause a person to pause and consider (think and reflect), leading to new insights. A crisis event that disrupts habit is likely, at least initially, to force a sensual reaction – touch, taste, smell, hear, see, or feeling – resulting in attention to otherwise taken for granted practices. Schatzki (2016) draws on Heidegger in this regard and uses Heidegger's example to describe how a hammer is used habitually with little thought for the hammer beyond a tool. Once a crisis disrupts the habit of hammering, the hammer draws attention to itself and its components. Should the hammerhead come off, the wood and metal materials that make up the hammer are examined. If the hammer strikes the thumb of the person wielding the hammer, then the thumb draws attention. Neither of these reactions initially causes reflection, although it may later be the case, confirming Schatzki's non-fluid, disruptive view of an action or experience. Nevertheless, events that disrupt habits are more likely to cause behavioural changes that lead to changes in practice and can become habits over time. Putting a hand on a hot surface is unlikely to force a person to reflect on their action and cause them not to do it again. While learning may occur with the person being more careful in future, the immediate attention will be to the sense of pain. Thinking may follow, but initially, the activity will change due to the disruption. Future actions will depend on the strength of the disruption. A severe burn could hamper the activity or defer it until a later time. Thus, a disrupted practice may result in an undesirable change or unintended consequences.

Nevertheless, learning is closely associated with experience and hence effort. Learning through experience may be acknowledged and ignored, or it can lead to understanding enhanced by reflection and ultimately result in a change of habit. Reflection-on-action, reflection-in-action, and reflection-for-action hold benefits in causing people to consider what they have done and how they can improve their experiences, leading to learning,

behavioural change, and reified habits. Nevertheless, reflection remains an enhancer of learning and not a determiner.

7.4 Implications for education

Experiential learning dictates that learning occurs due to reflection on experience (Dewey, 1938; Kolb, 2015). Several implications for education were observed in this study in respect of business process management education, reflection and learning.

Business Process Management Education

This study confirmed extant literature regarding business process management education and provided guidelines for addressing education requirements through a reflective-action approach. Reflection in action provides a holistic combination of capabilities and skills (Bandara et al., 2012) that enables triple-loop learning (Tosey, 2006; Tosey et al., 2012). Triple-loop learning extends double-loop learning to change underlying structures to overcome single-loop learning satisficing when assimilating information and communications technology into organisations (Baird et al., 2017).

Reflection is a critical component of experiential learning and is a vital component of business process management education (Bergener et al., 2012; Boyle & Strong, 2006; Rosemann & vom Brocke, 2010; Searle & Cantara, 2016). Reflection in experiential learning is shown in this study to build capabilities which supports the views of Thennakoon et al. (2018) and van der Aalst (2013). It agrees with the middle ground between the tacit knowledge and mastery view of Raelin (2007b). Simultaneously, reflection and critical reflection provide a holistic process view (Malinova & Mendling, 2018; Rosemann & vom Brocke, 2010) to link skills with competencies (Dörge, 2010). Ultimately, in combining business process education theory with experiential practice, reflection in action overcomes the separation of formal education from the world of work (Roth et al., 2014).

Reflection

Although reflection has been regarded as necessary for experiential learning, it is complex and challenging to implement (Boud et al., 1985; Moon, 2000; Perusso et al., 2020). Where time limits restrict the ability to cycle through the reflection process, reflective learning may not be as influential as promoted by experiential learning theories. Students were observed

to struggle with reflective practices, some embracing reflection, some tolerating it and others detesting it.

In this study, reflection took three forms, reflection-on-action, reflection-in-action and reflection-for-action. As reflection-for-action is dependent on prior experience – physical or mental - it may be considered a form of delayed reflection-on-action. Hence, it is not a form of reflective practice provided by Schön (1983). Reflection-in-action was preferred as it was closer to experiences in time. However, it can become entrapped in the minutiae of daily activities and was not perceived holistically, leading to frustration and a sense of being overwhelmed. On the other hand, reflection-on-action takes a holistic view but may lose nuances and suffer from the influence of euphoria or discouragement on completing an activity. While reflection-in-action is closer to the activity, it remains dependent on one or more prior experiences. Consequently, reflection-in-action may be perceived as a form of reflection-on-action. The conclusion is that reflection is a form of temporally differentiated reflection-on-action for reflecting before an experience, during an experience and after the experience.

Methods of reflection used in this study took the form of written reports and reflective journals. Students were encouraged to use centred thinking for reflection and even mindfulness. Written reflections differed significantly between the three forms of reflection. Reflection-on-action provided a broader base of shortcomings and motivations for learning which acknowledged non-learning in class and the need for more effort. Reflection-in-action incorporated reflective journals, which provided the most in-depth insights into self-reflection. There were several drawbacks to the keeping of reflective journals. The journals were not popular amongst the students, and some students used them as diaries rather than a reflection device. Emotions were observed in the journals, and more personal notes were encountered. On the other hand, in-depth insights into the projects' progress were observed, and students reflected on the benefits they obtained from the journals. In the reflection-for-action reflective reports, students appeared to presume that learning had occurred in the classroom lectures and that the project revolved around the application of classroom learning. The three reflection forms had similar outcomes in respect of the four identified learning influencers.

Learning

Central to experiential learning is the creation of knowledge from lived experiences (Kolb et al., 2011) through changes in habit (Dewey, 1933) initiated by disruption (Schatzki, 2016) in the individual-environment system. Miettinen (2000, p. 66) described this as *“a disturbance in the human, material activity or in the man-environment system”*.

The current study observed the potential for changes of habit to be brought about by forcing a disruption to create an awareness in the students. This linked reflection to absolutist undertaking tasks (project brief) for relativist increasing understanding (reflective learning) through the transitionist applying effort learning mechanism. For some students, this led to cognitive reflection but was not consciously done by most students when reflection was not a part of the project brief. In some cases, this could lead to contextist pursued quality (critical reflection), but this is not prevalent in the study. Changes through learning from practice were most likely to occur by forcing a disruption that caused the students to apply effort toward providing a suitable answer to preset tasks. Like the rhizome, applying effort may cause multiplicity and expansion, but whether this becomes a habit is up to the student and requires further research over an extended period.

The findings from this study revealed that effort applied to task-related activities correlated significantly to improved learning outcomes. Analysis of the drivers of effort showed a rhizomatic entanglement between effort and the disruptive influencers that could motivate students to apply effort and positively influence learning.

7.5 Implications of the Learning Influencers

This study supported the levels of learning proposed by Helsing et al. (2004) and has retained the term *“level”* although layers were the preferred terminology. Students were observed to be generally absolutist (task-oriented) and required certainty in their learnings. When the answers were uncertain, students had to move to a transitionist view (effort-oriented) which required effort to fill in the gaps. Not all students could move beyond an absolutist stance. The minority showed progression to the relativist (understanding) and contextist views (quality). The analysis of student reflections confirmed that applying effort was the most

significant influencer of learning. Undertaking tasks, increasing understanding and pursuing quality were entwined with transitionist effort. Applied effort followed the predetermined task to transition from low order absolutist tasks to higher learning orders of understanding and quality for improved learning outcomes.

Intrinsically, undertaking tasks may result in habitual action changes but will not directly lead to applying understanding to a broader range of activities without effort. From the literature on reflection, undertaking tasks can be considered non-reflection and habit (Kember et al., 2008). Applying effort requires action beyond immediate tasks and rote learning (non-reflection) to reflective practice. However, applying effort precedes relative and contextual applications. The shift from absolutist task through transitionist effort to relativist understanding was not typical. This limitation should be considered in the context of undergraduate and early post-graduate education, where there is little opportunity to provide long-term projects that could lead to recognising multiple contexts.

7.5.1 Applying Effort as a Learning Influencer

Applying effort to a preset task that leads to understanding and quality represents a transition from an absolutist mindset to applying learning in multiple contexts. The progression from non-learning to contextual mastering of a skill resonates with the five-stage model of the mental activities involved in directed skill acquisition in keeping with Dreyfus and Dreyfus (1980). The five stages proceed from novice through competence, proficiency to expertise and mastery. Dreyfus and Dreyfus (1980) took a contrary view to the Piagetian understanding of skills that improve from concrete to abstract, as found in behaviourism. They believe that abstract formal rules combined with experience lead to higher skill levels, which is the idealistic experiential learning approach observed in this study. Beginners are considered unknowledgeable in the field, where novices are characteristic learners, and masters are people who have substantial experience with the ability to craft solutions that vary between contexts, but they do not automatically understand why. Between novice and master are degrees of abilities ranging from competence in applying abstract rules to the concrete task, proficiency to recognise multiple situations, expertise in responding intuitively to multiple situations, and mastery in moving from intuitive contextual abilities to absorbed performance. Dreyfus and Dreyfus (1980) consider the master level an intense and limited state that transcends expertise infrequently but only for short periods. Thus, the master level

fits the highest form of ephemeral pursuing quality but may regress to a habitual novice action state requiring new information to complete the cycle.

The learning influence model presented in Figure 7.3 was developed from this study's observations and the supporting literature. The model is based on Burrell and Morgan (1979) and adapted by Cronjé (2020).

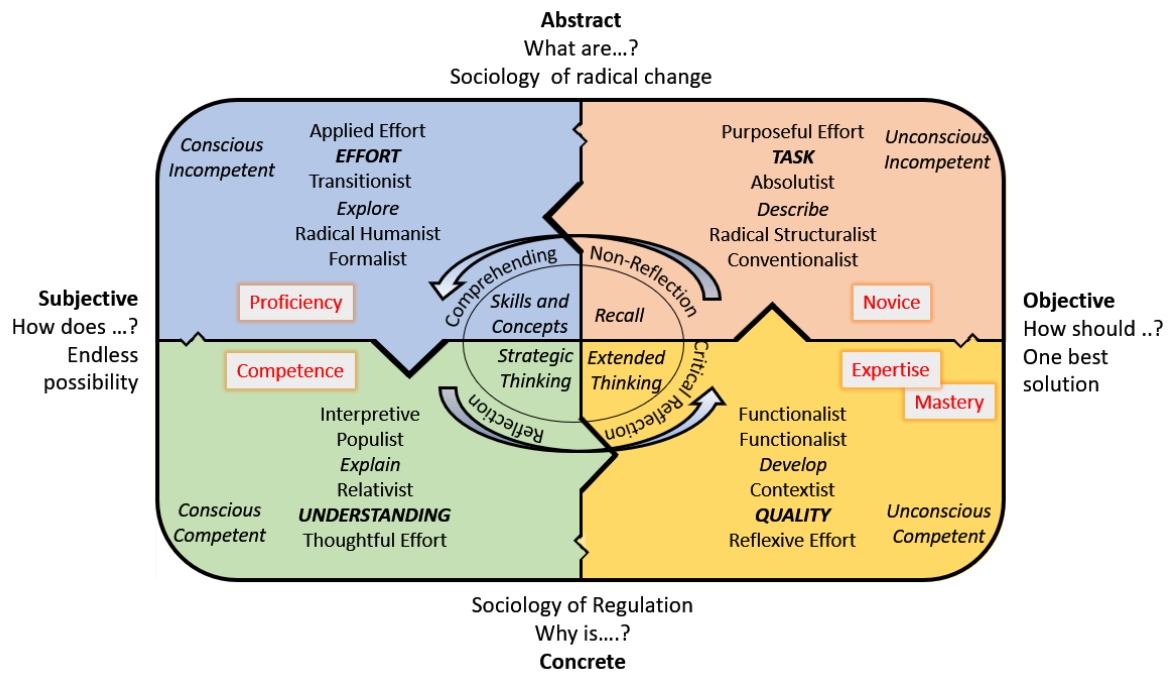


Figure 7.3. Learning influencer model.

The model comprises two perpendicular axes, subjective-objective and abstract-concrete. The subjective-objective continuum in a situation ranges from one best answer (objective) to endless possibilities (subjective). The objective edge asks, in this circumstance and context, how should ...? The subjective edge asks, amongst all the possibilities, how does ...? The abstract-concrete continuum represents a range of outcomes from a concrete artefact to an abstract concept. Abstract looks for patterns and solutions to unanswered questions where beginners do not yet know the formal rules. Concrete represents enacted activity in the form of experience regulated by rules. Abstract asks, what are the potential options ...? Concrete asks, why does this option work...?

At the model's edges, each continuum is an unattainable absolute, reminiscent of the critical realist real domain. The edges signify absolute concreteness, absolute subjectivity, absolute abstraction and absolute objectivity, and the continua depict variations in each construct. As

the continua are not fixed perpendicularly, the quadrants dynamically adjust according to the levels of concreteness and objectivity.

The influencers of learning identified in the findings can be assigned to the relevant quadrants based on the ontologies of the four levels of learning (Helsing et al., 2004). Undertaking tasks is absolutist used to describe a situation (objective) and what possible solutions (abstract) apply in that situation. The tasks are objective based on a concrete object or concept that the student may not understand. Thus, for the student, undertaking the task is abstract. Applying effort is transitionist and explores how (subjective) the potential solutions (abstract) in the situation are applicable. Increasing understanding is relativist asking why (concrete) the potential solution (subjective) is applicable. Pursuing quality is contextist examining why the solution (concrete) works in a situation (objective).

Embedded in the model is the beginner-to-master five-stage skill acquisition model of Dreyfus and Dreyfus (1980). The skill levels follow the cycle from novices using purposeful effort to proficiency in applied effort, basic competence through thoughtful effort and expertise through reflexive effort. The beginner is objective in their requirement of one best solution, but their lack of experience makes it abstract. Mastery is objective as it cannot be externally influenced and is under the control of the master who provides the best concrete solution in a particular situation. The novice is unconsciously incompetent, seeking the best solution, while the master is unconsciously competent to produce contextual outcomes recognized as quality but difficult to explain.

The counter-clockwise operation of the model is represented by the semi-circular arrows and larger V-shapes embedded in the continua. The inner larger V-shapes indicate how the model flows from absolutist task through transitionist effort and relativist understanding to contextist quality. The smaller double V-shapes represent movement between quadrants. As both skills and tasks are malleable and multi-faceted, there are continuous interactions between the levels. This is depicted as the outer double V-shapes indentations on the subjective-objective continuum between task and quality. Whereas a task-expert will habitually perform the required task (non-reflection), a novice will emulate the task-expert or may transition to effort to perform the task. This effort may take several forms, including repetitively attempting the task, doing further research, or undertaking additional training.

For the expert-master, a significant disruption may reduce them to a novice status in one or more aspects of their daily lives. Kruger and Dunning (1999) depict this as the expert's confidence level, never reaching 100%. For a specific task, an expert in one area may need to put in effort to gain an understanding of a quality solution in other contexts. Similarly, cyclical effects are observable between the other quadrants in the model.

The oscillation between task and quality can be understood through differentiating between full-expert and task-expert. The full-expert and task-expert are similar in situations where the necessary expertise is objective and not contextual. The task-expert has a limited sphere of expertise compared to the full expert who can apply expertise in multiple contexts. Differences between the two become apparent in situations that are similar but not contextually the same. The absolutist task-expert will either apply their prior situational experience to the current situation or apply effort to obtain competence. On the other hand, the full expert can draw on several previous experiences. However, the full expert may need to apply effort to obtain competence in new complex situations. When putting in effort, other differences are noted between full expert and task expert. The task expert will look for a finite solution within the same or similar situations, in contrast to the full expert who will draw from previous experiences that may be trans-disciplinary. Crossing boundaries requires relativist understanding which is enhanced through the experience of applying contextist concepts. In the face of a lack of knowledge, experts in one field may cross disciplines and interact in the lower expertise quadrants (as beginners and novices in the other fields), leading to improved multidisciplinary knowledge.

Underpinning the influence model is the notion of reflective practice. Although reflection is challenging to explain and measure, it is influenced by the four quadrants and influences each quadrant, as observed in this study. Following the four levels of reflection of Kember et al. (2008), the task quadrant shows novices and absolutist task-experts who perform habitually with minimal reflection (non-reflection). In the effort quadrant, novices still seek an absolute answer but realise that they need additional knowledge, which necessitates a cognitive approach to comprehend. In the understanding quadrant, the novices start to become proficient and need to reflect on the relative circumstances. In the quality quadrant, experts will critically reflect on how their competencies change them and their view of reality.

However, reflection is not assured without significant disruption, and people may act out of awareness or habit.

The four stages of competence (Broadwell, 1969) are depicted close to the model's edges. This indicates the improbability of absolute stages of competence. Purposeful effort (undertaking tasks) can be linked to unconscious incompetence, applied effort (applying effort) to conscious incompetence, thoughtful effort (increasing understanding) to conscious competence and reflexive effort (pursuing quality) to unconscious competence. The learning influence model extends Broadwell's view to include a more in-depth understanding of the fourth level (pursuing quality) as attainable through effort and not only as an inherent or natural phenomenon. Although Broadwell (1969) considers masters as having inherent natural abilities, this does not mean that masters are not reflective. Schatzki (2016) pointed out that reflection might be just one method of learning. Boud (2010) describes experience-based learning as holistic, incorporating classic philosophy and modern thinking and includes reflection in learning through experiences. However, reflection may be tacit in experts (unconscious competent) and hence instinctive and unconscious. Expert tacit reflection may not be objectively observable and resemble novice non-reflection. Boud (2010) contemplates three factors that impact experiential learning and, by extension, reflection, structured design, facilitation and assessment. The level of reflection decreases with the increasing strength of each factor. Assessment is key to the design and facilitation and must be aligned to the learning outcomes to be effective (Webb, 1997, 2002). This is depicted in the centre of the model based on the depth of knowledge model (Webb, 2002). Undertaking tasks should be assessed through recall, applying effort assessed through skills and concepts, increasing understanding assessed through strategic thinking and pursuing quality through extended thinking.

The learning influencers were mapped to the 4MAT model along the lines of abstract-concrete and subjective-objective to validate the model, as shown in Table 7.1. Table 7.1 supports the observations that undertaking tasks are abstract and objective, applying effort is abstract and subjective, increasing understanding is concrete and subjective and pursuing quality is concrete and objective.

Table 7.1. Mapping the learning influencers model to the 4MAT model.

Subjective	Influencer	4MAT	4MAT	Influencer	Objective
Abstract	Applying Effort (E)	Quadrant 2	Quadrant 3	Undertaking Tasks (T)	Abstract
Concrete	Increasing Understanding (U)	Quadrant 1	Quadrant 4	Pursuing Quality (Q)	Concrete
Anti-clockwise	T, E, U, Q	3, 2, 1, 4	1, 2, 3, 4	U, E, T, Q	Clockwise

Comparing the two models, a difference in the application becomes apparent. The 4MAT argues that students perceive a concrete situation and process it reflectively (subjective-concrete) (Quadrant 1). The students abstract the information and process it subjectively (subjective-abstract reflective) (Quadrant 2). In Quadrant 3, the students actively (objective-abstract) process the abstracted concept and follow this with active (objective-concrete) processing of the concrete subject or artefact in Quadrant 4. Consequently, 4MAT moves clockwise from concrete-subjective (understanding) through abstract-subjective (effort), abstract-concrete (task) to concrete-objective (quality), or UETQ. The learning influencer model flows counter-clockwise from undertaking tasks (abstract-objective) through applying effort (abstract-subjective), increasing understanding (concrete-subjective) to pursuing quality (concrete-objective), or TEUQ.

The clockwise operation of the 4MAT supports the situation in which there is a desire (or need) to understand, abstract and experiment (cf. Kolb). Where a project is in progress, the outcome is determined and evaluated by the specifications or task. Applying the 4MAT model makes little sense as it would begin with task and move from quality to understanding and finally effort. Clearly, effort needs to precede quality irrespective of when understanding occurs. By starting at task and proceeding counter-clockwise, the 4MAT model resembles the learning influence model flowing from undertaking tasks (quadrant 3) through applying effort (quadrant 4), increasing understanding (quadrant 1) and pursuing quality (quadrant 2).

The basis of the proposed learning influence model is that applying effort leads to improved learning outcomes. However, effort requires an initiator to disrupt habitual action.

7.5.2 Disrupted Learning

The observation of effort leading to improved learning endorses the view of knowledge as knowing-in-action (Raelin, 2007b). Raelin (2007b) characterised an epistemology of action comprising three building blocks - tacit knowledge, critical reflection and mastery - which shows similarities to the skills stages of Dreyfus and Dreyfus (1980). The current study set out to determine mechanisms that have the potential for improving tacit knowledge through reflection. However, reflection was observed to be challenging, and critical reflection was seldom attained. Consequently, moving from explicit knowledge to tacit knowledge with changes in habitual practice was shown to be impracticable in a single semester course. This is supported in literature with reports of mastery taking years of small changes to habit (Clear, 2018). For Raelin (2007b), critical reflection is required to move toward knowing-in-action. This is the same message from Dewey (1938), Kolb (2015) and Schön (1983), who recognize the need to move beyond theory to practice. Raelin (2007b) reveals this to be demanding but desirable and doable.

Tacit knowledge creation is active as tacit knowledge is experiential and action-oriented (Polanyi, 1969). However, this may result in espoused knowledge-for-action and not enacted knowledge-in-action, which was observed in several student reflections in this study. Knowledge-in-practice requires that tacit knowledge be practiced, and while this holds the potential to become a master habit, it requires effort. Effort is underpinned by disruption, which Miettinen (2000) argues leads to reflection and is closely linked to action.

“When the normal course of activity is disturbed, a state of uncertainty and indetermination emerges. The starting point of the experience is not experience understood as an internal representation or recollection of an individual but as a disturbance in the human, material activity or in the man-environment system. Some kind of obstacle or resistance in the situation makes the normal flow of action difficult ... Reflective thought starts with studying the conditions, resources, aids, difficulties and obstacles of action” (Miettinen, 2000, p. 66).

Several disturbances were observed within the learning environment in this study and address the fourth research question. While it can be argued that lectures were disruptive influences on students' everyday lives, the discussion is restricted to disruption in the process

of learning. Assuming that classroom lectures are the norm and are the habitual practice of students, the discussion commences from a behaviourist position. The student reflections revealed several disturbances that motivated effort. Purposeful effort-oriented disturbances were the assigned task, grades and incomplete information. Applied effort disturbances were the project presentation with feedback and time constraints. Thoughtful effort disturbances were derived from reducing scaffolded learning, while reflexive effort was motivated by communication, quality control and critical reflection. Overall, the project presentations were the most disruptive and produced the most effort.

Entwined influencers of learning and reflection were observed throughout the study. For everyday survival and flourishing in the environment where individuals find themselves, there are sets of cultural rules - or doxa (Bourdieu, 2000; Koch, 2020) - which guide individuals' activities. Activities that individuals undertake frequently become habitual actions either as reflexes or reflexively (Cunliffe, 2004, 2016). Reflex is a mechanical action responding to a stimulus, while reflexive activities are based on self-reflection with action that results in transformation. The link between reflex and reflection - a required step for reflexive action - disrupts the individual's action. Koestler (1969) describes a disruption leading to change as a "*bisociation*" (p.35) which is a situation or idea that lies at the intersection of "*two self-consistent but habitually incompatible frames of reference*" (ibid.). Koestler (1969) depicts bisociation as the centre of two oblique planes, which forces a change of direction from habitual actions to a new creation on another path. Koestler (1969) suggests that disruptions to habit will be addressed by rules defined by experience or lead to transformation influenced by past experiences. Rules, like doxa, are environmentally determined and linked to a consistent environment. Compared to single-minded behaviourist action, bisociation is double-minded, unstable and transitory. Bisociation is a disturbance of the balance between emotion and thought (Koestler, 1969) and bears similarities with the secondness of Peirce (Plowright, 2016). Consequently, bisociation resonates with the transitionist applying effort learning mechanism observed in this study. Applying effort transitions from absolute to contextual and from action to thought. Furthermore, it sees similarities in the involvement of emotion. The heart of the act of creation encompasses a "*triptych*" of humour, discovery and art (i.e. the jester, the sage and the artist) (Koestler, 1969). This resembles the higher levels that extend the absolutist task-driven view with effort showing emotion, understanding the

discovery of knowledge applicable in multiple settings through reflection and quality viewed as aesthetic.

The habitual behaviourist person performs actions in social environments without thinking about their actions. These habitual actions range from simple activities performed routinely to high levels of expertise and mastery. However, habitual action may suffer disruptions, which range from a minor interruption to a crisis. Bourdieu (2000, p. 162) refers to crises or sudden change as “*blips*” in habitual action or habitus that lead to reflection. A disruption brought on by a crisis, sudden change or a blip forces an awareness that may go beyond sensory input and become cognitive. The disruptive action can move from awareness to productively influencing ongoing life for the individual through improved knowledge-in-practice through cognition. Koestler (1969) refers to reflective backtracking, where a problem is reflectively solved in reverse order from the problem back to each step leading up to the solution. This resembles the process of abduction, whereby a result depends on hypothesised rules proven from a case (Plowright, 2016). Every disruption in the process of reversing from the current situation affords an opportunity for learning in action.

When a disruption interrupts a habit, a range of potential reactions is triggered. The first effect is awareness, leading to continuity as if nothing occurred or acknowledging the event or reflective action. Even awareness may result in a change in the actions of the individual. In the learning influence cycle, awareness leads from undertaking tasks to applying effort, increasing understanding, and pursuing quality to end with learning in action. However, the cycle may not complete and could exit at any point resulting in a myriad of potential learning outcomes and possible changes in habit, including no change in habit. Each individual’s reaction to disruption can be reinforced or negated at any stage, with the capability of the disrupted action to return to normality at any time. Returning from a disruptive reaction is hypothesised to follow one of two broad primary routes. First, the disruption could cause the habitual practice to continue without a long-term change from the espoused action to action in-use. Alternatively, the disruption could change a habit, expanding learning in action into habitual action. Changes in habitual action will impact the individual’s practice and ultimately lead to transformations in social practices, although this may take a generation or more (Bourdieu, 1986; Koch, 2020).

7.5.3 Disrupted Learning Process

The disrupted learning process begins with daily life in a social world made bearable by habitual action, which, according to Peirce, provides rules for behaviour (Plowright, 2016). When habitual action is disrupted, a reaction is required from the individual. The initial reaction is awareness perceived cognitively, which leads to a range of reactions from doing nothing to changing behaviour. Behavioural change is central to learning and flows through the disrupted learning influence model proposed in Table 7.2. A range of adjusted actions can occur when a disruption in habitual action occurs, starting with undertaking tasks and progressing through applying effort, increasing understanding and pursuing quality.

Undertaking tasks is absolutist with fixed answers. At this level, learners may take a satisficing approach and return to habitual activity once they have done enough to negate the disturbance. At this level, educators are recognized as subject-matter authorities. Students are novices with limited learning beyond the experience of the task, with minimal emotion. The typical teaching mode (Scott, 1994) uses workbooks, manuals, demonstrations, hands-on activities, and field trips. Tasks are just tasks - a job that has to be completed. Emotion may derive from the task but is not part of it. In the study, task-driven novices exhibiting frustration were observed not to be prepared to put in the effort to improve learning. Thus, the emotion was associated with unfulfilled effort, which resulted in the regression to the task.

Applying effort was the most reliable indicator of learning in the experiential learning courses. Effort is essentially absolutist but stimulates transition to a relativist ontology. Learning leads to competence for which educators are regarded as experts from whom students seek acknowledgement. The teaching mode (Scott, 1994) uses extensive reading assignments, lectures, audio tapes and "*think*" sessions. Effort was associated with emotion, resulting in regression to the task or a progression to understanding.

Increasing understanding was relativist and recognised the applicability of knowledge in similar but non-identical situations. Students are open to complexities and start to formulate their own realities but look to teachers for scaffolding and support. However, this takes time which may not be available in short-term courses. The teaching mode (Scott, 1994) uses games, group discussions, movies, short lectures with discussions, audio, and visual

experiences. Understanding affords proficiency for diverse scenarios and provides the learning that underpins contextual expertise.

Table 7.2. Disrupted learning model construct recognition and ramifications.

Learning Influencer		Undertaking Tasks		
Ontology		Absolutist		
Associated Driver of Effort		Purposeful Effort		
Process		Satisficing		
Assessment		Recall		
Disruptors	Teaching Mode	Student Traits	Outcome	Ramifications
Project Brief, Grade, Limited Information	Workbooks, manuals, demonstrations, hands-on activities, and field trips	Educator acknowledged as the authority	Tasks are central and completed with little learning. Novice	Non-learning with little emotion. The task is the task and nothing more
Learning Influencer		Applying Effort		
Ontology		Transitionist		
Associated Driver of Effort		Applied Effort		
Process		Embedded in the Learning Influence Model - Purposeful Effort, Applied Effort, Thoughtful Effort, Reflexive Effort		
Assessment		Skills and Concepts		
Disruptors	Teaching Mode	Student Traits	Outcome	Ramifications
Presentations, Time Constraints	Extensive reading assignments, lectures, audio tapes, and "think" sessions	Educator as the expert. Students expose emotion and seek acknowledgement for learning	Absolutist learning leads to competence through applied and determined effort	Emotion could lead to frustration and regression to the task
Learning Influencer		Increasing Understanding		
Ontology		Relativist		
Associated Driver of Effort		Thoughtful Effort		
Process		Recognition of multiple realities		
Assessment		Strategic Thinking		
Disruptors	Teaching Mode	Student Traits	Outcome	Ramifications
Learning	Group discussions, movies, short lectures with discussions, and audio and visual experiences	Educators scaffold and support learning. Students require affirmation	Applied effort leads to proficiency with the potential for broader application of experiential knowledge	Limited potential of scaffolded case studies and experiential learning in-situ projects. Requires time
Learning Influencer		Pursuing Quality		
Ontology		Contextist		
Associated Driver of Effort		Reflexive Effort		
Process		Reality is contextual		
Assessment		Extended Thinking		
Disruptors	Teaching Mode	Student Traits	Outcome	Ramifications
Communication, Quality Control, Critical Reflection	Games, simulation, independent study, problem solving, contract-activity assignments, and special readings	Educators facilitate learning through multiple modes. Students take responsibility for learning	Increased understanding in multiple scenarios lead to quality outcomes based on context. Competence oscillates between expertise and mastery	Ephemeral and challenging to define. Requires extensive experience and requires longer time-frames

Pursuing quality is contextual, difficult to quantify and open to multiple definitions. Students may attain expertise interspersed with bouts of mastery exhibiting proficiencies in multiple contexts; however, expertise and mastery can take several years to perfect. The teaching mode (Scott, 1994) uses games, simulations, independent study, problem-solving, contract-activity assignments, and special readings.

Disruptive learning does not impose a hierarchical structure as the awareness of disruption may occur at any of the four levels and exit at any level. Nevertheless, if the disrupted learning activity does not begin with undertaking the task, the outcome may not align with the task at hand.

The disruptive learning model suggests that action at the levels above undertaking the task - applying effort, increasing understanding, and pursuing quality - are most likely to produce changes in habit and practices. This finding is similar to Koestler's (1969) triptych, which sees acts of creation in emotion, discovery, and art. However, actions must be aligned to the task for ultimate success. Non-alignment to the task does not negate potential learning, but it is unlikely to produce the desired learning outcomes.

The findings from student reflections led to several proposed recommendations for action. Effort was most noticeable for improved learning outcomes driven by disruptors of habit, with the primary motivator being the student project presentations. The disruptors were observed in the business process management information systems courses but are supported in literature from other fields. Consequently, the disrupted learning model may apply to a broader audience.

7.6 Recommendations for Practice

The most important recommendation from the study is to create an environment for students that provides a scaffolded field of study with abstract formal rules and the opportunity to experience concrete cases to improve skill levels (Dreyfus & Dreyfus, 1980). A disrupting influence must be applied in the learning environment to produce high performance levels (Bourdieu, 2000; Miettinen, 2000; Schatzki, 2016). Simultaneously, students must be encouraged to reflect with limited opportunities of regressing to habitual action. This requires that students be taught reflective practice to combine reflection and action (Perusso et al.,

2020). As Kolb sees reflection and action as separate activities (Kolb, 2015; Miettinen, 2000), an experiential course based on Kolb must include training in reflective practices following Dewey (1933) and authors such as Boud et al. (1985), Ghaye (2011), Mezirow (1990), Miettinen (2000), Schatzki (2016) and Schön (1995) who combine reflective thought and action.

Several disruptive practices were observed, which pushed students beyond satisficing and encouraged a beneficial level of effort. The disruptions included assigned tasks, grades, incomplete information, project presentations, time constraints, scaffolded learning, communication, quality controls, and reflexivity. Although these disruptors showed the potential to produce improved learning, they were neither definitive nor prescriptive. Nevertheless, they are supported in the broader body of knowledge. The most common disruptor for learning was the presentations which often linked to the other disruptors. Although the courses included a single presentation, there was evidence that multiple presentations may be effective. Presentations motivated students from three perspectives: preparation, feedback, and grades. Preparation inspired students to engage with their projects and put them under time constraints. Both factors motivated effort. Feedback provided guidance and formative assessment for the students. Presentation grades had two foci. One, presentation grades motivated preparation and two, grades mediated feedback. On receiving low grades, students who perceived the feedback as positive were observed to put in additional effort.

The disruptors were observed to align to the learning influencers, which showed an entanglement between applying effort as an influencer and the influence of applied effort.

Purposeful Effort

Purposeful effort is central to the curriculum or learning unit. It provides intrinsic motivation at a fundamental level.

- **Assigned task**

Assigned tasks are the fundamental requirement for learning. In this study, the assigned tasks combined the project brief with incomplete information which the student had to source. There must be a balance between providing sufficient information and too much while providing scaffolding for a range of students. Too little information may lead to frustration,

and too much information will lose effectiveness by overindulging students. Scaffolding must include concrete cases for higher-level learning.

- **Grades**

Although they must be carefully planned to produce desired outcomes, grades are a common motivator, as they may become demotivators when incorrectly targeted. Grades may benefit from being set in conjunction with assessments tools such as the depth of knowledge model (Webb, 2002).

- **Incomplete Information**

The need for additional effort was seen as an extension of undertaking tasks to provide the missing information. Students needed to perform additional reading, learning and collaboration.

Applied Effort

Applied effort is the most effective motivation for short-term learning. It is disruptive and can be implemented in a social setting but is transient, which suits classroom learning.

- **Presentations**

The presentations were the main driver of effort and produced motivation and guidance across the projects. For example, examples and feedback from the presentations offered an opportunity to include concrete experiences in scaffolded coursework. Further work must be done to understand how presentations can be further utilised to scaffold learning and provide formative assessment.

- **Time Constraints**

Time constraints were observed to be motivators of effort. This resonated with students experience irrespective of whether the students were early or late starters.

- **Team Dynamics**

Using delegation of duties to obviate time constraints resulted in team dynamics issues that required effort to resolve.

Thoughtful Effort

Thoughtful effort is primarily individual but can include groups. It takes a relativist stance that may be difficult to implement with diverse students and skill levels.

- **Scaffolded Learning**

Scaffolding learning should be closely linked to the assigned task, the course content, and the student's level, so as to provide the maximum benefit for increased understanding. However, this requires multiple scenarios in diverse class settings.

Reflexive effort

Reflexive effort is the highest level of motivation but is internal and predominantly individualistic. High levels of reflection that may produce a change in the individual are challenging to implement. Part of the challenge is in the ephemeral nature of reflection. Reflexive effort requires purposeful implementation of applied effort and thoughtful effort to be effective.

- **Communication**

Communication provided alternate versions of reality for learners as it is contextual. Learners required adequate competence in the field before they could be effective communicators of the task.

- **Quality Control**

Quality is ephemeral and subjective and required clear guidelines to maintain focus on the assigned task. Quality and quality controls were observed to link back to the assigned tasks.

- **Reflexivity**

Reflective practice is disruptive, with ensuing action leading to higher levels of effort and learning. However, reflection was observed to require guidelines as students found reflection challenging to undertake, and it did not always lead to action. Providing guidelines connects reflexive effort back to purposeful effort and assigned tasks.

7.7 Summary

In this chapter, the findings from the four action research cycles were discussed with support from literature. Student reflections during business process experiential learning projects were analysed alongside the course results to identify potential mechanisms that may lead to improved learning during experiential learning projects. Five research questions were posed. The first sought to identify the potential mechanisms beneficial to improving learning outcomes, followed by how the mechanisms could influence learning outcomes. The third question sought to identify relationships between reflection and the identified learning

influencer mechanisms. The fourth question sought to understand how the learning influencer mechanisms were activated, and the fifth question sought to identify how the learning influencer mechanisms may be assessed.

The findings showed that reflection is a complex topic and needs to be performed in conjunction with action to improve learning effectiveness. Reflections from students were observed to positively influence learning outcomes when students expended effort on assigned tasks. Four learning influencers were observed, of which applying effort was the most statistically significant influencer of learning outcomes. However, effort required one or more disruptors to be stimulated. While education over a single semester provided novice students with the opportunity to acquire competence through experiential learning, proficiency leading to expertise takes several years of experience, which is seldom available in undergraduate or early postgraduate courses.

Based on these observations, two models were proposed. The first, a learning influence model, was embedded in the second, a disruptive learning model. The models sought to answer the research questions posed in the study. Learning outcomes can be improved through reflective practice by recognising that although students learn at different levels, they are predominantly absolutist. With each learning influencer having a preferred assessment method, assessing learning outcomes becomes complicated. Exacerbating this was the observations of students requiring disruptors to stimulate effort for completing tasks and overcoming satisficing. In the research setting, project presentations provided a significant disruptor that engendered effort. Other disruptors - the project brief, grades, limited but readily available information, scaffolding, time constraints, internal quality control and reflection - encouraged effort.

The drivers of effort show the *what* of applying effort and is the abstract of Cronjé (2011). The disruptors leading to effort show the *how* of applying effort and is the subjective of Cronjé (2011). Thus, effort is placed in the explore space of the proposed learning influence model. Applying effort embodies the sociology of radical change with endless possibilities.

8 Conclusion

This study originated from observation of lower than anticipated grade outputs in experiential learning business process management courses at a higher education institution in South Africa. The issue was highlighted in a research paper using a similar experiential learning course with a cohort of novice business process management students that identified knowledge transfer as a shortcoming (Garbutt & Seymour, 2015).

The study investigated potential mechanisms that may assist students in improving experiential learning grades in a business process management capstone project. Student reflections were explored to identify what influenced student learning and how these influencers may be encouraged. A pragmatist-critical realist study guided four action research cycles which adjusted and gathered student reflections in each cycle. Three modes of applying reflection - reflection-on-action, reflection-in-action and reflection-for-action - were proposed and analysed over the cycles. Five research questions were posed for the study: 1) What potential generative mechanisms do students reflectively consider as drivers of learning outcomes in business process management experiential learning projects? 2) How can the identified learning mechanisms improve learning outcomes? 3) What relationship exists between reflection and learning influencer mechanisms? 4) How are learning influencer generative mechanisms activated? 5) How can learning influencer generative mechanisms be assessed?

Multiple analysis methods were used to answer the research questions. Reflexive thematic analysis was used to identify potential learning mechanisms qualitatively, and partial least squares structural equation modelling to validate the findings quantitatively. None of the reflection modes were observed to influence learning outcomes directly. Although this is contra Kolb's experiential learning theory (Kolb, 2015), it resonates with Dewey's view of reflective action as a combination of reflection and action (Dewey, 1938; Miettinen, 2000). Whereas Kolb separates reflection from actions, as does Schön (reflection-on-action and reflection-in-action)(Schön, 1983), Dewey combines the two.

The findings from the four action research cycles identified four influencers of learning mechanisms that hold potential for improving learning outcomes. The most significant

influencer of learning outcomes was applying effort, which was re-analysed to identify what motivated students to apply effort to their projects. From the findings, two conceptual models were proposed to understand what influences students' learning, how the influencers are stimulated in education, and how they should be assessed.

8.1 Overview of the Study

The research was presented in Chapter 2 through Chapter 7 and summarised in the following sections.

- **Chapter 2 - Previous Research**

In Chapter 2, prior research was explored through a literature review. The literature review method and setting were summarised in the first section, followed by an overview of knowledge and learning spaces in the second. The third section provided background to the business process management experiential learning education context. The fourth subsection presented literature on student reflections for improved learning outcomes in preparation for the fifth section in respect of potential mechanisms that, if they exist, may improve learning outcomes. This was followed by a review of reflective practices in the context of experiential learning projects, and in the seventh subsection, the knowledge gap was described. The reviewed literature was combined in the eighth subsection into a theoretical lens model that holds the potential to explain improved learning outcomes. The ninth subsection took a reflective stance with a review of the literature and the knowledge gap supporting the problem statement, research aim, and research questions.

- **Chapter 3 - Research Paradigm**

Chapter 3 presented pragmatist-critical realism as the underpinning philosophy for the study and the research setting. Although this concept is not new, the combination of pragmatism and critical realism is rarely used. Pragmatist-critical realism supports a solid ontological and epistemological basis with practical application. The philosophical underpinning followed Heeks et al. (2019) for rigour, although the proposed grounded theory analytic method was rejected in favour of reflexive thematic analysis (Braun & Clarke, 2019). Thematic analysis is theoretically flexible and supports a critical realist approach (Braun & Clarke, 2006). In the second part of Chapter 3, the research setting of business project management courses in an information systems department of a South African higher education institution was

described. This included the ethics clearance process from the University of Cape Town ethics committee.

- **Chapter 4 - Research Design**

Chapter 4 describes a four-cycle action research study undertaken to answer the research questions emanating from the literature. Action research is the preferred research method for pragmatist-critical realist studies (Heeks et al., 2019). Over four action research cycles, the research observed, adjusted and analysed student reflections from business process projects as part of enterprise systems and business process management higher education courses. The role of theory was described from two perspectives - focal theory and instrumental theory (Davison et al., 2012). A mixed-methods approach was followed as is customary in research, following both pragmatism and critical realism philosophies (Zachariadis et al., 2013). This study used thematic analysis (Braun & Clarke, 2019) for qualitative analysis and partial least squares based structural equation modelling (Chin, 2010; Hair et al., 2017) for the quantitative analysis method.

- **Chapter 5 – Findings: Influencers of Learning**

Chapter 5 described the findings from the student reflections across the four action research cycles of experiential learning business process management projects. The findings showed similar outcomes for each action research intervention. The first intervention - reflection-on-action - identified four influencers for learning which were confirmed in the subsequent cycles. In cycle two, students were required to reflect-in-action by maintaining reflective journals. This cycle had the lowest response rate but the richest reflections. Cycle three - reflection-for-action - had similar outcomes to the first two cycles. The data from cycle three was not as rich as for cycle two. Cycle four encouraged the use of all three forms of reflection. Even though the lecturing staff had changed for cycle four, the findings were similar to the first three cycles.

The analysis of the student reflections showed that applying effort was the most common influencer of learning. The quantitative analysis confirmed this finding and displayed the support of the other learning influencers for effort. Applying effort transcended absolutist answers and epistemologically supported an absolute outcome that was not initially known

to the student and required effort to obtain. To ensure that effort is applied, students need to operate in an environment where information is available but not directly supplied.

- **Chapter 6 – Findings: Drivers of Effort**

Chapter 6 addressed the question of what motivates students to apply effort in an experiential business process project. The question was addressed by referring to the research findings in Chapter 5 to identify where students indicated that they had put in notable effort. Whereas Chapter 5 identified potential critical realist mechanisms, Chapter 6 sought a pragmatic application of the significant learning mechanism, applying effort. Applying effort showed a similar ontology to the task-effort-understanding-quality leaning influencer generative mechanism structure. Consequently, applying effort was separated into four concepts: purposeful effort, applied effort, thoughtful effort and reflexive effort. For the research context, presentations were observed to be the most common source of applied effort. Presentations were seen to require effort for their preparation during the presentation and post-presentation. This confirmed the potential for a student-centric logic approach similar to the customer-dominant logic approach of Heinonen et al. (2010). The outcome of the drivers of effort review was linked to the depth of knowledge model of Webb (2002) to determine potential assessment links. The two-fold aim was to identify the breadth and depth of the significant generative mechanism, applying effort, in line with Webb (2002) and Coker et al. (2017).

- **Chapter 7 - Discussion and Proposed Conceptual Models**

Chapter 7 discussed the findings and proposed two conceptual models. The findings from the four action research cycles were reviewed in conjunction with the literature. This review showed that reflection is a complex topic that must be combined with action to be effective as a learning tool. Reflections from students were observed to positively influence learning outcomes when students expended effort on assigned tasks. Although four learning influencers were observed, applying effort was statistically the most significant and only absolutely important learning influencer. The other learning influencers, undertaking tasks, increasing understanding, and pursuing quality, were relatively important. The significance of applying effort was posited to be due to the nature of education and the length of the courses. Higher education over one or two semesters provides novice students with the opportunity to acquire competence to approach know-how through experiential learning. However,

proficiency leading to expertise may take several years of experience, which is seldom available in undergraduate or early postgraduate courses.

Based on these observations, two models were proposed. The first, a learning influence model, is embedded in the second, a disruptive learning model. The models sought to answer the research questions posed in the study. Learning outcomes of experiential learning business process management projects can be improved through reflective practice by recognising that students learn at different levels but remain predominantly absolutist. Students need to be challenged to apply effort in completing tasks to overcome satisficing. In the research setting, project presentations provided a significant disruptor to engender effort. Other disruptors - the project brief, grades, incomplete information, scaffolding, time constraints, team dynamics, internal quality control, and reflection - encouraged effort to a lesser extent.

8.2 Reflections on the Study

In this section, three forms of reflection on the study - methodological, substantive and academic - were undertaken to consider the lessons learnt during the research.

- **Methodological Reflection**

The study began with an inductive pragmatic approach, but potential learning mechanisms more aligned to a critical realist approach were observed during the first cycle. When these mechanisms were observed in the second cycle, a review of the pragmatic approach was required. The study was neither intended to be nor initiated from a critical realist approach. Although pragmatism was necessary for the research, it was not sufficient. The solution came by applying a pragmatist-critical realism approach (Proctor, 1998), following the guidelines of Heeks and Wall (2018) and Heeks et al. (2019). Pragmatism provided a practical positioning and supported the action research method, while critical realism provided the ontological and epistemological support for the proposed mechanisms observed in the student reflections. Reflexive thematic analysis (Braun & Clarke, 2006, 2019) supported the research approach as it supports pragmatist and critical realist studies.

While every effort was taken not to influence the research unduly, a purely objective stance was impossible, especially for a pragmatic and qualitative study such as this one. Cross-

validation of the findings was performed by validating the findings between cycles and with the literature to ensure the reliability of the findings. Further reliability validation was done through a quantitative analysis of the findings using partial least squares structural equation modelling.

Limitations were imposed through the restriction to reflective practices. Although this was by design, it may have influenced the findings where the student reflections were not accurate reflections of their work. For example, because reflection is challenging and students may withhold information that places them negatively, students may not have been entirely honest in their reflections. Anecdotal evidence from the tutors, which was investigated but not included in the study, revealed that teams sometimes withheld information from their reflections, such as the extent of conflict between team members in the projects.

- **Substantive Reflection**

Experiential learning is frequently used in information systems education. However, the literature shows experiential learning to be paradigmatically problematic. This was true when following Kolb and lesser so for Dewey, particularly regarding reflection on experiences. While much has been written about reflection, it continues to be challenging. This is in part due to terminology and the conflation of reflection, reflexivity and reflective practice. Reflexivity is understood as reflection applied in the reflectors' everyday life that leads to modified habitual actions. Reflective practice is reflection entrenched in daily activities as reflection-on-action and reflection-in-action. In the study, low concentrations of reflexivity and reflective practice were observed. Reflection after action was beneficial for student-centred learning and provided insight into potential mechanisms that may improve learning outcomes. Students frequently commented on the benefits of reflection to their learning which was confirmed in a weak but significant correlation between reflection on the projects and the final exam grades. The study findings of four influencers for the project reflections resonate with studies in areas beyond business process management and information systems. While literature reveals how to recognise the forms of learning in students, there was a paucity of understanding which form is the most significant and how those forms can be enacted.

The findings revealed that student reflections led to an appreciation of applying effort as an influencer of learning, extending for transitioning to relativist situations and multiple

contexts. However, applying effort required a disruptor to disturb habitual practices, which did not automatically translate into action. Furthermore, the findings indicated that a holistic systems approach might be more effective than setting specific goals for learning. Specific goals are only beneficial at the primary level of absolutist tasks. As a process, effort-based learning is more encompassing and may provide a smoother transition into life-long learning skills.

- **Academic Reflection**

This study contributes to the academic body of knowledge in presenting two models of learning. The proposed disruptive learning model contributes to an awareness of reflection to promote a better life through more holistic and improved learning outcomes. At the same time, it raises awareness of people's potential to satisfice and stagnate in habitual activity. Taking action from a cognitive position led to improved learning outcomes that may become habitual until a further disruption occurs.

Central to the proposed disruptive learning model is a learning influence model that emphasises the influence of effort on sustainable learning outcomes. The model indicates the potential for four forms of effort to help a beginner grow from novice to expert, with spurts of mastery, through applied effort. Habitually following reflection and action leads to a life of reflective practice posited to hold the potential for expertise and mastery.

8.3 Contribution of the Study

The study contributes to the existing knowledge base by presenting the two learning models and guidelines for practice. The first model is the learning influencer model, which identifies four learning influencers that may improve learning outcomes. The model incorporates guidelines on how to assess each learning influencer. Guidelines are presented on how to recognise the learning influencer stage and assess each stage. The second model, the disruptive learning model, describes the disruptive influences that may activate the learning influencer mechanisms.

A methodological contribution was provided through using the pragmatist-critical realism approach (Proctor, 1998), following the guidelines of Heeks and Wall (2018) and Heeks et al. (2019). While pragmatism provided a practical positioning and supported the action research

method, critical realism provided the ontological and epistemological support for the proposed mechanisms observed in the student reflections.

8.4 Recommendations for Practice

The most important recommendation from the study is to create an environment for students that will provide a scaffolded field of study with abstract formal rules and the opportunity to experience concrete cases aimed at improving skill levels (Dreyfus & Dreyfus, 1980). A disrupting influence must be applied in the learning environment (Bourdieu, 1986; Miettinen, 2000; Schatzki, 2016) to produce high levels of performance. Simultaneously, students must be encouraged to think critically and not have the opportunity to regress to habitual action. Students must be taught reflective practice (Perusso et al., 2020; Schön, 1983), whereby reflection is combined with action (Boud et al., 1985) with focused assessment (Boud, 2010; Boud et al., 2016). As Kolb views reflection and action as separate activities (Kolb, 2015; Miettinen, 2000), experiential courses must include training in reflective practices following Dewey (1933) and authors such as Boud et al. (1985), Ghaye (2011), Mezirow (1990), Miettinen (2000), Schatzki (2016) and Schön (1995) who combine reflective thought and action.

The primary disruptor for learning identified in the projects was observed to be the project presentations. Presentations motivated students from three approaches: preparation, feedback, and grades. Preparation inspired students to engage with their projects and put the students under time constraints. Feedback provided guidance and formative assessment for the students. Presentation grades had two foci: first, the grades motivated preparation and second, mediated feedback. On receiving low grades, students who considered the feedback positive were observed to put in additional effort.

Disruptors that resulted in effort reflected the underlying ontologies of the task-effort-understanding-quality influencers, which showed a rhizomatic entanglement between applying effort as a learning influencer mechanism and the influence of effort on learning. The four ontologies of effort were reified as purposeful effort, applied effort, thoughtful effort and reflexive effort.

Purposeful Effort

Purposeful effort is the assigned task that provides intrinsic motivation at the most basic level.

- *Assigned Task (Project Brief)*

The assigned task is the fundamental requirement for learning in the educational setting. It must create a balance between sufficient information and too much information tempered by the provision of scaffolding across a range of students. Insufficient information may lead to frustration, and too much information reduces the students' need for effort.

- *Grades*

Although grades are a universal motivator, assessments must be carefully planned to produce desired outcomes. Grades may become demotivators when incorrectly targeted.

- *Incomplete Information*

Incomplete but readily available information was seen as an extension of undertaking tasks to provide missing information that introduced the need for applying effort.

Applied Effort

Applied effort is the most effective motivation for short-term learning. It is disruptive and can be implemented in a social setting but is transient, which suits classroom learning.

- *Presentation Preparation and Feedback*

The presentation was the main driver of effort and produced motivation and guidance across the projects. Further research is required to understand how presentations can be used to scaffold learning and provide formative assessments.

- *Time constraints*

Time constraints were observed to motivate effort irrespective of whether the students were early or late starters.

- *Team Dynamics*

Using delegation of duties to obviate time constraints resulted in team dynamic issues which required effort to resolve.

Thoughtful Effort

Thoughtful effort is predominantly individualistic and takes a relativist stance that may be challenging to implement with diverse students and skill levels.

- *Scaffolded Learning*

Scaffolding for the subject and reflection should be closely linked to the assigned task and aligned to both the course content and the level of the student. It must present multiple scenarios that may have to be adjusted per class.

Reflexive effort

Reflexive effort is the highest level of the effort learning influencer and is contextual. Critical reflection can produce changes in individual behaviour, and it is difficult for educators to control. Part of the difficulty is in the ephemeral nature of reflection. Reflexive effort requires thoughtful effort to be applied purposefully to be effective.

- *Communication*

Communication is contextual, which provides alternate versions of reality for learners. Learners need to have sufficient competence in the substantive field before being effective communicators of the task.

- *Quality Control*

Like reflection, quality is ephemeral and requires scaffolding guidelines to retain student focus on the assigned task.

- *Reflexivity*

Reflective practice can lead to higher levels of effort and learning. However, it requires guidelines, as students find reflecting challenging and low levels of reflection do not lead to action.

8.5 Limitations of the Research

Several limitations were encountered in the research. The research setting was a single university in South Africa using course content fundamentally the same across the action research cycles. Findings may differ with different course content.

The action research cycle reflections were analysed using multiple methods, but the reflections were not followed up by interviews to clarify nuances. This was partly due to the analysis being completed only after the students had left the university or moved on to other courses. Richer data may have been garnered through follow-up sessions, although this would require additional time allocations.

Furthermore, action research as a methodology has some drawbacks. Avison et al. (2018) list four barriers to action research relevant to PhD theses. First, action research requires a lot of time and resources, second, it is inappropriate for PhD students and third, it is considered to be less scientific than other methods. Finally, action research can be difficult to publish in leading information systems journals. Avison et al. (2018) provide a set of guidelines aimed at overcoming each of the barriers, however, these also take a lot of time and need to be put in place prior to the PhD study to be fully effective. As their publication was only after the start of this study, their useful guidelines were too late to inform the current work. Nevertheless, these guidelines should be part of any action research proposal in the future. In this study, several of these methodological limitations were encountered. On the one hand, the amount of time to do the research was greater than anticipated, while on the other hand, the repercussions of each cycle were not directly observed in the cycle following. Where tutors had gone through the reflection training, they were often unsure of how to guide the current students in their reflections. This showed a need for a longer-term adjustment to the process of reflection and, hence, the need for time as recorded by Avison et al. (2018). Time here was needed for the changes to be embedded and to work through the system. This confirms the need of people to change, which, while a tenet of reflection, can overcome the tendency of researchers to focus on external factors alone (Stark, 2014). Kock (2004) has similar concerns with regard to uncontrollability of the intervention and calls for a carefully chosen unit of analysis. Two further threats are contingency and subjectivity (Kock, 2004). Contingency is the level of generalisability to other contexts while subjectivity describes the threat of researcher-bias. In this study, these concerns were addressed by multiple iterations, inductive thematic analysis, and backgrounding the findings in literature. There remains the potential of bias in applying limited changes and bias in analysis. One of the issues encountered in the research was the limit to the number and size of the changes that could be made in each cycle. The limitation was regulated by the need to balance what was required of the students for their projects with the additional effort of the enhanced reflection process.

A final limitation was in deriving the disruptive learning model based on this study and literature reviews. This imposed limitations on the disruptive model, which was not empirically tested. However, the disruptive learning model is a situating model to apply effort as an influencer of learning that stemmed from the study.

8.6 Further Research

The proposed models were produced from the research setting and literature and require further research to overcome the limitations imposed by a single research setting. The learning influence model was derived from business process management experiential learning projects and needs to be tested in other settings and subjects. Further research is required to investigate the proposed relationship between the learning influence model and the disruptive learning model. The disruptive learning model offers multiple opportunities for further research as it has been produced from the study and supported conceptually from the literature and, consequently, is largely untested. Likewise, the disruptive factors were identified from a re-analysis of the student project reflections and require further research. Firstly, the disruptive factors should be confirmed for validity in business process management projects and, secondly, within other topics and subjects.

Finally, there is a need for longitudinal studies on reflection. As shown in the limitations of the research, time is needed to allow the reflections taught in each cycle to permeate the lives of students and bring about meaningful change. The learning influencers strongly suggest that learning can be influenced by undertaking tasks, applying effort, increasing understanding, and pursuing quality. In each of these mechanisms is an element of reflection, however, these need to be validated over time.

8.7 Final Thoughts

The study revealed that learning outcomes of a business process management experiential learning project could be improved through reflective practice, for which students need to be trained in reflective practices. Reflective practices based on Schön, Dewey and Schatzki supported by Miettinen are posited as being more effective than Kolb.

Students need to be made aware that applying effort leads to higher learning outcomes through disruptive learning methods. The leading disruptor observed in the business process management project was the presentations of students' concrete experiences. The study revealed that reflection must be performed in conjunction with action to be effective. Students were observed to learn by imitating others and undertaking tasks (absolutist) in pre-set situations. Improved learning correlated with the most significant level in the study applying effort (transitionist) when undertaking tasks (absolutist). However, mastery and

wisdom are learned at higher levels by combining novice imitation with experience and reflection (relativist). The application of understanding in multiple contexts equates with aesthetics at the highest level (contextist), which may be considered practical wisdom or wisdom-in-action.

This study showed that applying effort is the quintessential embodiment of the sociology of radical change with endless possibilities.

“By three methods we may learn wisdom:

first, by *reflection*, which is noblest;

second, by *imitation*, which is easiest;

and third by *experience*, which is the bitterest”

Confucius (551 BC - 479 BC).

References

- Agrawal, A. K. (2001). University-to-industry knowledge transfer: Literature review and unanswered questions. *International Journal of Management Reviews*, 3(4), 285–302.
- Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Alderfer, C. P. (1969). An Empirical Test of a New Theory of Human Needs. *Organizational Behavior and Human Performance*, 4(1), 142–175.
- Allen, S., Cunliffe, A. L., & Easterby-Smith, M. (2017). Understanding Sustainability Through the Lens of Ecocentric Radical-Reflexivity: Implications for Management Education. *Journal of Business Ethics*, 154(3). <https://doi.org/10.1007/s10551-016-3420-3>
- Al-Mashari, M., Al-Mudimigh, A., & Zairi, M. (2003). Enterprise Resource Planning: A Taxonomy of Critical Factors. *European Journal of Operational Research*, 146(2), 352–364.
- Alter, S. (2013). Work system theory: Overview of core concepts, extensions, and challenges for the future. *Journal of the Association for Information Systems*, 14(2), 72.
- Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives* (Complete ed). Longman.
- Andresen, L., Boud, D., & Cohen, R. (2000). Experience-Based Learning. In G. Foley (Ed.), *Understanding Adult Education and Training* (2nd., pp. 226–240). Allen & Unwin.
- Archer, M. S. (2007). The trajectory of the morphogenetic approach: An account in the first-person. *Sociologia*, 1(54), 35–47.
- Archer, M. S. (2010). Routine, Reflexivity, and Realism. *Sociological Theory*, 28(3), 272–303.

- Armarego, J. (2008). Aligning Learning with Industry Requirements. In G. R. Lowry & R. L. Turner (Eds.), *Information systems and technology education: From the university to the workplace* (pp. 159–194). IGI Global.
- Avgerou, C. (2008). Information Systems in Developing Countries: A Critical Research Review. *Journal of Information Technology*, 23(3), 133–146.
- Avison, D. E., Davison, R. M., & Malaurent, J. (2018). Information systems action research: Debunking myths and overcoming barriers. *Information & Management*, 55(2), 177–187. <https://doi.org/10.1016/j.im.2017.05.004>
- Baird, A., Davidson, E., & Mathiassen, L. (2017). Reflective Technology Assimilation: Facilitating Electronic Health Record Assimilation in Small Physician Practices. *Journal of Management Information Systems*, 34(3), 664–694. <https://doi.org/10.1080/07421222.2017.1373003>
- Bandara, W., Harmon, P., & Rosemann, M. (2011). Professionalizing Business Process Management: Towards a Body of Knowledge for BPM. *Business Process Management Workshops*, 759–774.
- Bandara, W., Indulska, M., Chong, S., & Sadiq, S. (2007). Major issues in business process management: An expert perspective. *Proceedings ECIS 2007 - The 15th European Conference on Information Systems*, 1240–1251. <http://eprints.qut.edu.au/14345/>
- Bandara, W., Rosemann, M., Davies, I. G., & Tan, C. (2007). A Structured Approach to Determining Appropriate Content for Emerging Information Systems Subjects: An Example for BPM Curricula Design. *Proceedings 18th Australasian Conference on Information Systems*, 1132–1114.
- Bandara, W., Syed, R., Kapurubandra, M., & Rupasinghe, L. (2012). Building Essential BPM Capabilities to Assist Successful ICT Deployment in the Developing Context:

- Observations and Recommendations from Sri Lanka. *Proceedings of SIG GlobDev Fifth Annual Workshop*, 1–22.
- Barad, K. (2003). Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter. *Signs: Journal of Women in Culture and Society*, 28(3), 801–831.
- Baskerville, R., & Pries-Heje, J. (1999). Knowledge capability and maturity in software management. *ACM SIGMIS Database*, 30(2), 26–43.
- Bass, J., Fenwick, J., & Sidebotham, M. (2017). Development of a Model of Holistic Reflection to Facilitate Transformative Learning in Student Midwives. *Women and Birth*, 30(3), 227–235. <https://doi.org/10.1016/j.wombi.2017.02.010>
- Bélanger, F., & Van Slyke, C. (2012). *Information Systems for Business: An Experiential Approach*. John Wiley & Sons.
- Bélanger, P. (2011). Three Main Learning Theories. In *Theories in Adult Learning and Education* (pp. 17–34). Verlag Barbara Budrich.
- Berente, N., Vandenbosch, B., & Aubert, B. (2009). Information flows and business process integration. *Business Process Management Journal*, 15(1), 119–141.
- Bergener, K., vom Brocke, J., Hofmann, S., Stein, A., & vom Brocke, C. (2012). On the Importance of Agile Communication Skills in BPM Education: Design Principles for International Seminars. *Knowledge Management & E-Learning: An International Journal*, 4(4), 415–434.
- Bhaskar, R. (2008). *A Realist Theory of Science*. Routledge.
- Bhaskar, R. (2009). *Scientific Realism and Human Emancipation*. Routledge.
- <https://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=260655>

- Biesta, G. (2014). Pragmatising the Curriculum: Bringing Knowledge Back into the Curriculum Conversation, but via Pragmatism. *The Curriculum Journal*, 25(1), 29–49.
<https://doi.org/10.1080/09585176.2013.874954>
- Biesta, G., & Burbules, N. C. (2003). *Pragmatism and educational research*. Rowman & Littlefield.
- Biggs, J. (1996). Enhancing Teaching Through Constructive Alignment. *Higher Education*, 32(3), 347–364.
- Blom, B., & Morén, S. (2011). Analysis of Generative Mechanisms. *Journal of Critical Realism*, 10(1), 60–79. <https://doi.org/10.1558/jcr.v10i1.60>
- Boell, S. K., & Cecez-Kecmanovic, D. (2015). Debating systematic literature reviews (SLR) and their ramifications for IS: a rejoinder to Mike Chiasson, Briony Oates, Ulrike Schultze, and Richard Watson. *Journal Of Information Technology*, 30(2), 188–193.
- Bolton, G. (1999). Stories at work: Reflective writing for practitioners. *Lancet*, 354(9174), 243–245. [https://doi.org/10.1016/S0140-6736\(98\)06443-5](https://doi.org/10.1016/S0140-6736(98)06443-5)
- Boud, D. (2010). Locating Immersive Experience in Experiential Learning. In N. Jackson (Ed.), *Learning to be Professional through a Higher Education e-book* (pp. 1–12). University of Surrey, Centre for Excellence in Professional Training and Education.
<http://learningtobeprofessional.pbworks.com/f/DAVID+BAUD.pdf>
- Boud, D., Dawson, P., Bearman, M., Bennett, S., Joughin, G., & Molloy, E. (2016). Reframing assessment research: Through a practice perspective. *Studies in Higher Education*, 1–12. <https://doi.org/10.1080/03075079.2016.1202913>
- Boud, D. J. (2010). Assessment for developing practice. *Education for Future Practice*.
<https://opus.lib.uts.edu.au/handle/10453/14326>

- Boud, D., Keogh, R., & Walker, D. (Eds.). (1985). *Reflection: Turning Experience into Learning*. Routledge.
- Boud, D., Keogh, R., & Walker, D. (2005). What is Reflection in Learning? In D. Boud, R. Keogh, & D. Walker (Eds.), *Reflection: Turning Experience into Learning* (pp. 7–17). Routledge Falmer.
- Bourdieu, P. (1986). The Forms of Capital. In J. G. Richardson (Ed.), *Handbook of Theory of Research for the Sociology of Education* (pp. 241–258). Greenwood Press.
- Bourdieu, P. (2000). *Pascalian Meditations*. Stanford University Press.
- Bourdieu, P., & Wacquant, L. J. D. (1992). *An Invitation to Reflexive Sociology*. Polity Press.
- Boyatzis, R. E. (2008). Competencies in the 21st Century. *Journal of Management Development*, 27(1), 5–12. <https://doi.org/10.1108/02621710810840730>
- Boyatzis, R. E., & Saatcioglu, A. (2008). A 20-Year View of Trying to Develop Emotional, Social and Cognitive Intelligence Competencies in Graduate Management Education. *Journal of Management Development*, 27(1), 92–108. <https://doi.org/10.1108/02621710810840785>
- Boyle, T. A., & Strong, S. E. (2006). Skill Requirements of ERP Graduates. *Journal of Information Systems Education*, 17(4), 401–412.
- Braun, V., & Clarke, V. (2006). Using Thematic Analysis in Psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Braun, V., & Clarke, V. (2012). Thematic Analysis. In H. Cooper, P. M. Camic, D. L. Long, A. T. Panter, D. Rindskopf, & K. J. Sher (Eds.), *APA Handbook of Research Methods in Psychology: Vol. Vol. 2. Research Designs: Quantitative, Qualitative, Neuropsychological, and Biological* (First, pp. 57–71). American Psychological Association.

- Braun, V., & Clarke, V. (2019). Reflecting on Reflexive Thematic Analysis. *Qualitative Research in Sport, Exercise and Health*, 11(4), 589–597.
<https://doi.org/10.1080/2159676X.2019.1628806>
- Brent, J. (1993). *Charles Sanders Peirce: A Life*. Indiana University Press.
- Broadwell, M. M. (1969). Teaching For Learning (XVI.). *The Gospel Guardian*, 41, 1–3.
- Burkitt, I. (2012). Emotional reflexivity: Feeling, emotion and imagination in reflexive dialogues. *Sociology*, 46(3), 458–472.
- Burrell, G., & Morgan, G. (1979). *Sociological paradigms and organisational analysis: Elements of the sociology of corporate life*. Heinemann Educational Books Ltd.
- Bygstad, B., Munkvold, B. E., & Volkoff, O. (2016). Identifying generative mechanisms through affordances: A framework for critical realist data analysis. *Journal of Information Technology*, 31(1), 83–96.
- Cannon, H., Feinstein, A., & Friesen, D. (2010). Managing Complexity: Applying the Conscious-Competence Model to Experiential Learning. *Developments in Business Simulations and Experiential Learning*, 37, 172–182.
- Cannon, H. M., Friesen, D. P., Lawrence, S. J., & Feinstein, A. H. (2009). The Simplicity Paradox: Another Look at Complexity in Design of Simulations and Experiential Exercises. *Developments in Business Simulation and Experiential Learning*, 36, 243–250.
- Carr, D. (2003). Philosophy and the Meaning of 'Education'. *Theory and Research in Education*, 1(2), 195–212. <https://doi.org/10.1177/1477878503001002003>
- Charmaz, K. (2016). Shifting the Grounds: Constructivist Grounded Theory Methods. In J.M. Morse et al. (Eds.). In *Developing Grounded Theory: The Second Generation* (pp. 127–193). Routledge, Taylor & Francis Group.

- Chavan, M. (2011). Higher Education Students' Attitudes Towards Experiential Learning in International Business. *Journal of Teaching in International Business*, 22(2), 126–143. <https://doi.org/10.1080/08975930.2011.615677>
- Cherryholmes, C. H. (1992). Notes on Pragmatism and Scientific Realism. *Educational Researcher*, 21(6), 13. <https://doi.org/10.2307/1176502>
- Chin, W. W. (2010). How to Write Up and Report PLS Analyses. In V. Esposito Vinzi, W. W. Chin, J. Henseler, & H. Wang (Eds.), *Handbook of Partial Least Squares: Concepts, Methods and Applications* (pp. 655–690). Springer Berlin Heidelberg. <https://doi.org/10.1007/978-3-540-32827-8>
- Chomsky, N. (2006). *Language and Mind, Third Edition* (3rd ed.). Cambridge University Press.
- Clarke, V., & Braun, V. (2013). Teaching Thematic Analysis: Overcoming Challenges and Developing Strategies for Effective Learning. *The Psychologist*, 26(2), 120–123.
- Clear, J. (2018). *Atomic Habits: An Easy and Proven Way to Build Good Habits and Break Bad Ones : Tiny Changes, Remarkable Results*. <https://library.dctabudhabi.ae/sirsi/detail/1266613>
- Coker, J. S., Heiser, E., Taylor, L., & Book, C. (2017). Impacts of Experiential Learning Depth and Breadth on Student Outcomes. *Journal of Experiential Education*, 40(1), 5–23. <https://doi.org/10.1177/1053825916678265>
- Corson, D. (1991). Bhaskar's Critical Realism and Educational Knowledge. *British Journal of Sociology of Education*, 12(2), 223–241. <https://doi.org/10.1080/0142569910120206>
- Cronjé, J. C. (2006). Paradigms Regained: Toward Integrating Objectivism and Constructivism in Instructional Design and the Learning Sciences. *Educational Technology Research and Development*, 54(4), 387–416.

- Cronjé, J. C. (2011). *The ABC Instant Research Question Generator*. 1–11.
http://www.learndev.org/dl/BtSM2011/Cronj%E9-The_ABC_Instant_research_question_generator.pdf
- Cronjé, J. C. (2013). What is this Thing called “Design” in design Research and Instructional Design. *Educational Media International*, 50(1), 1–11.
<https://doi.org/10.1080/09523987.2013.777180>
- Cronjé, J. C. (2016). Towards an Integration of Paradigmatic and Pragmatic Research in Information Systems. *The Electronic Journal of Information Systems in Developing Countries*, 77(1), 1–14.
- Cronjé, J. C. (2020). Designing Questions for Research Design and Design Research in eLearning. *The Electronic Journal of E-Learning*, 18(1 Jan 2020).
<https://doi.org/10.34190/EJEL.20.18.1.002>
- Crotty, M. (1998). *The Foundations of Social Research: Meaning and Perspective in the Research Process*. Sage Publications.
- Cunliffe, A. L. (2004). On Becoming a Critically Reflexive Practitioner. *Journal of Management Education*, 28(4), 407–426.
<https://doi.org/10.1177/1052562904264440>
- Cunliffe, A. L. (2016). “On Becoming a Critically Reflexive Practitioner” Redux: What Does it Mean to Be Reflexive? *Journal of Management Education*, 40(6), 740–746.
<https://doi.org/10.1177/1052562916668919>
- d’Agnese, V. (2017). Behind and Beyond Self-Mastery: Risk, Vulnerability, and Becoming Through Dewey and Heidegger. *Interchange*, 48(1), 97–115.
<https://doi.org/10.1007/s10780-016-9291-9>

- Daudelin, M. W. (1996). Learning from Experience Through Reflection. *Organizational Dynamics*, 24(3), 36–48.
- Davenport, T. H. (1998). Putting the enterprise into the enterprise system. *Harvard Business Review*, 76(1), 121–131.
- Davenport, T., & Short, J. (1990). The New Industrial Engineering: Information Technology and Business Process Redesign. *MIT Sloan Management Review*, 31(1), 11–27.
- Davison, R. M., Martinsons, M. G., & Ou, C. X. J. (2012). The Roles of Theory in Canonical Action Research. *MIS Quarterly*, 36(3), 763–786.
- Davison, R. M., Ou, C. X. J., & Martinsons, M. G. (2012). Information technology to support informal knowledge sharing. *Information Systems Journal*, no-no.
<https://doi.org/10.1111/j.1365-2575.2012.00400.x>
- Davison, R., Martinsons, M. G., & Kock, N. (2004). Principles of Canonical Action Research. *Information Systems Journal*, 14(1), 65–86. <https://doi.org/10.1111/j.1365-2575.2004.00162.x>
- DeForge, R., & Shaw, J. (2012). Back- and fore-grounding ontology: Exploring the linkages between critical realism, pragmatism, and methodologies in health & rehabilitation sciences: Back- and fore-grounding ontology. *Nursing Inquiry*, 19(1), 83–95.
<https://doi.org/10.1111/j.1440-1800.2011.00550.x>
- Deleuze, G., & Guattari, F. (1987). *A thousand plateaus: Capitalism and schizophrenia*. University of Minnesota Press.
- DeSanctis, G., & Poole, M. S. (1994). Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory. *Organization Science*, 5(2), 121–147.
- Devitt, M. (1991). Aberrations of the Realism Debate. *Philosophical Studies*, 63, 43–63.

- Dewey, J. (1905). The Realism of Pragmatism. *The Journal of Philosophy, Psychology and Scientific Methods*, 2(12), 324. <https://doi.org/10.2307/2010861>
- Dewey, J. (1925). The Development Of American Pragmatism. In *Hickman, L.A. and Alexander, T.M. (eds), The essential Dewey* (1998th ed., Vol. 1, pp. 3–13). Indiana University Press.
- Dewey, J. (1933). *How We Think: A Restatement of the Relation of Reflective Thinking to the Educative Process*. D.C. Heath and Company.
- Dewey, J. (1938). Experience and Education. In *Experience and Education* (pp. 17–23, 89–91). Kappa Delta Pi.
- Díaz-Méndez, M., Paredes, M. R., & Saren, M. (2019). Improving Society by Improving Education Through Service-Dominant Logic: Reframing the Role of Students in Higher Education. *Sustainability*, 11(19), 5292. <https://doi.org/10.3390/su11195292>
- Dick, B. (2003). AR and Grounded Theory. *Research Symposium*, 1–12.
- Dick, B., Stringer, E., & Huxham, C. (2009). Theory in Action Research. *Action Research*, 7(1), 5–12. <https://doi.org/10.1177/1476750308099594>
- Dörge, C. (2010). Competencies and Skills: Filling Old Skins with New Wine. In *Key Competencies in the Knowledge Society* (pp. 78–89). Springer.
http://link.springer.com/chapter/10.1007/978-3-642-15378-5_8
- Dreyfus, S. E., & Dreyfus, H. L. (1980). *A Five-Stage Model of the Mental Activities Involved in Directed Skill Acquisition*: Defense Technical Information Center.
<https://doi.org/10.21236/ADA084551>
- Dugger, W. M. (1983). Two Twists in Economic Methodology: Positivism and Subjectivism. *American Journal of Economics and Sociology*, 42(1), 75–91.
<https://doi.org/10.1111/j.1536-7150.1983.tb01691.x>

- Dziewanowska, K. (2017). Value Types in Higher Education – Students’ Perspective. *Journal of Higher Education Policy and Management*, 39(3), 235–246.
<https://doi.org/10.1080/1360080X.2017.1299981>
- Easton, G. (2010). Critical Realism in Case Study Research. *Industrial Marketing Management*, 39(1), 118–128. <https://doi.org/10.1016/j.indmarman.2008.06.004>
- Edwards, P. K., O’Mahoney, J., & Vincent, S. (Eds.). (2014). *Studying organizations using critical realism: A practical guide* (First edition). Oxford University Press.
- Elder-Vass, D. (2007). Reconciling Archer and Bourdieu in an Emergentist Theory of Action*. *Sociological Theory*, 25(4), 325–346.
- Elkjaer, B., & Simpson, B. (2011). Pragmatism: A lived and living philosophy. What can it offer to contemporary organization theory? In H. Tsoukas & R. Chia (Eds.), *Research in the Sociology of Organizations* (Vol. 32, pp. 55–84). Emerald Group Publishing Limited. [https://doi.org/10.1108/S0733-558X\(2011\)0000032005](https://doi.org/10.1108/S0733-558X(2011)0000032005)
- English, A. R. (2013). *Discontinuity in Learning: Dewey, Herbart, and Education as Transformation*. Cambridge University Press.
- Ertmer, P. A., & Newby, T. J. (2013). Behaviorism, Cognitivism, Constructivism: Comparing Critical Features From an Instructional Design Perspective. *Performance Improvement Quarterly*, 26(2), 43–71. <https://doi.org/10.1002/piq.21143>
- Field, L. (2019). Schools as Learning Organizations: Hollow Rhetoric or Attainable Reality? *International Journal of Educational Management*, 33(5), 1106–1115.
<https://doi.org/10.1108/IJEM-05-2018-0165>
- Finlay, L. (2008). Reflecting on “Reflective Practice.” *PBPL Paper 52*, 1–27.

- Finney, T. G., & Finney, R. Z. (2010). Are Students their Universities Customers? An Exploratory Study. *Education + Training, 52*(4), 276–291.
<https://doi.org/10.1108/00400911011050954>
- Fleming, N. D. (1995). I'm Different; Not Dumb: Modes of Presentation (V.A.R.K.) in the Tertiary Classroom. In A. Zelmer (Ed.), *Research and Development in Higher Education, Proceedings of the 1995 Annual Conference of the Higher Education and Research Development Society of Australasia (HERDSA)* (Vol. 18, pp. 308–313). Higher Education Research and Development Society of Australasia.
- Fleming, N. D., & Mills, C. (1992). Not Another Inventory, Rather a Catalyst for Reflection. *To Improve the Academy, 11*, 137–155.
- Fletcher, A. J. (2017). Applying Critical Realism in Qualitative Research: Methodology meets Method. *International Journal of Social Research Methodology, 20*(2), 181–194.
<https://doi.org/10.1080/13645579.2016.1144401>
- Foley, G. (Ed.). (2000). *Understanding Adult Education and Training* (2nd ed). Allen & Unwin.
- Frenk, J., Hunter, D. J., & Lapp, I. (2015). A Renewed Vision for Higher Education in Public Health. *American Journal of Public Health, 105*(S1), S109–S113.
<https://doi.org/10.2105/AJPH.2014.302468>
- Galbin, A. (2014). *An Introduction to Social Constructivism. 26*, 13.
- Garbutt, M., & Seymour, L. F. (2015). Enterprise Systems Competencies-Supplying the Skills–The Novice Practitioner Perspective. *Beyond Development. Time for a New ICT4D Paradigm? Proceedings of the 9th IDIA Conference, Paul Cunningham and Miriam Cunningham (Eds)*, 378–397.

- Garrison, J. (1995). Deweyan Pragmatism and the Epistemology of Contemporary Social Constructivism. *American Educational Research Journal*, 32(4), 716–740.
<https://doi.org/10.3102/00028312032004716>
- Garrison, J. (2005). A Pragmatist Conception of Creative Listening to Emotional Expressions in Dialogues Across Differences. *PHILOSOPHY OF EDUCATION*, 112–120.
- Garson, G. D. (2016). *Partial Least Squares*. 262.
- Gersick, C. J. G. (1991). Revolutionary Change Theories: A Multilevel Exploration of the Punctuated Equilibrium Paradigm. *The Academy of Management Review*, 16(1), 10–36. <https://doi.org/10.2307/258605>
- Ghaye, T. (2011). *Teaching and Learning through Reflective Practice: A Practical Guide for Positive Action* (2nd ed.). Routledge. <https://doi.org/10.4324/9780203833322>
- Gibson, W. J., & Brown, A. (Eds.). (2009). *Working with Qualitative Data* (1st ed). Sage.
- Gleick, J. (1993). *Genius: The Life and Science of Richard Feynman* (1st Vintage Books ed). Vintage Books.
- Goldkuhl, G. (2008). What Kind of Pragmatism in Information Systems Research. *AIS SIG Pragmatics Inaugral Meeting*, 6.
- Goldkuhl, G. (2012). From Action Research to Practice Research. *Australasian Journal of Information Systems*, 17(2). <https://doi.org/10.3127/ajis.v17i2.688>
- Grandzol, J. R., & Ochs, J. (2010). Bridging the Gap Between Business and Information Systems ERP-Based Curricula to Achieve Improved Business Process Learning Outcomes. *Proceedings of DYNAA*, 1(1), 17–24.
- Greenwood, D. J. (2007). Pragmatic Action Research. *International Journal of Action Research*, 3(1+2), 131–148.

- Grönroos, C. (2011). Value Co-Creation in Service Logic: A Critical Analysis. *Marketing Theory*, 11(3), 279–301. <https://doi.org/10.1177/1470593111408177>
- Guilbault, M. (2018). Students as customers in higher education: The (controversial) debate needs to end. *Journal of Retailing and Consumer Services*, 40, 295–298. <https://doi.org/10.1016/j.jretconser.2017.03.006>
- Guthrie, R. W., & Guthrie, R. A. (2000). Integration of enterprise system software in the undergraduate curriculum. *Proceedings of IESCON 2000*, 17, 1–7.
- Gyimah-Brempong, K., & Ondiege, P. (2011). Reforming higher education: Access, equity, and financing in Botswana, Ethiopia, Kenya, South Africa, and Tunisia. In *The Africa Competitiveness Report 2011* (pp. 39–66). World Economic Forum, the World Bank and the African Development Bank.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (Second edition). Sage.
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to Use and How to Report the Results of PLS-SEM. *European Business Review*, 31(1), 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>
- Hall, J. N. (2013). Pragmatism, Evidence, and Mixed Methods Evaluation. *New Directions for Evaluation*, 2013(138), 15–26. <https://doi.org/10.1002/ev.20054>
- Hammer, M. (2015). What is business process management? In Vom Brocke, J., Roseman, M. *Handbook on Business Process Management 1: Introduction, Methods, and Information Systems*. (2nd Edition, pp. 3–16). Springer.
- Hammer, M., & Champy, J. (2002). *Reengineering the corporation: A manifesto for business revolution*. PerfectBound.

<http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=81568>

Harmon, P. (2019). *Business Process Change: A Business Process Management Guide for Managers and Process Professionals* (4th edition). Elsevier.

Hean, S., Craddock, D., & O'Halloran, C. (2009). Learning Theories and Interprofessional Education: A User's Guide. *Learning in Health and Social Care*, 8(4), 250–262.

<https://doi.org/10.1111/j.1473-6861.2009.00227.x>

Heeks, R., Ospina, A. V., & Wall, P. J. (2019). Combining Pragmatism and Critical Realism in ICT4D Research: An e-Resilience Case Example. In P. Nielsen & H. C. Kimaro (Eds.). In *Information and Communication Technologies for Development. Strengthening Southern-Driven Cooperation as a Catalyst for ICT4D: Vol. II* (pp. 14–25). Springer International Publishing. https://doi.org/10.1007/978-3-030-19115-3_2

Heeks, R., & Wall, P. J. (2018). Critical realism and ICT4D research. *The Electronic Journal of Information Systems in Developing Countries*, 84(6), e12051.

<https://doi.org/10.1002/isd2.12051>

Heine, S. (2014). *Like Cats and Dogs: Contesting the Mu Koan in Zen Buddhism*. Oxford University Press.

Heinonen, K., & Strandvik, T. (2015). Customer-Dominant Logic: Foundations and Implications. *Journal of Services Marketing*, 29(6/7), 472–484.

<https://doi.org/10.1108/JSM-02-2015-0096>

Heinonen, K., Strandvik, T., Mickelsson, K., Edvardsson, B., Sundström, E., & Andersson, P. (2010). A Customer-Dominant Logic of Service. *Journal of Service Management*, 21(4), 531–548. <https://doi.org/10.1108/09564231011066088>

- Helsing, D., Drago-Severson, E., & Kegan, R. (2004). Applying Constructive-Developmental Theories of Adult Development to ABE and ESOL Practices. *Review of Adult Learning and Literacy, 4*, 157–197.
- Hibbert, P. (2013). Approaching Reflexivity Through Reflection: Issues for Critical Management Education. *Journal of Management Education, 37*(6), 803–827.
<https://doi.org/10.1177/1052562912467757>
- Hibbert, P., Coupland, C., & MacIntosh, R. (2010). Reflexivity: Recursion and Relationality in Organizational Research Processes. *Qualitative Research in Organizations and Management: An International Journal, 5*(1), 47–62.
<https://doi.org/10.1108/17465641011042026>
- Hodes, R. (2017). Questioning “Fees Must Fall.” *African Affairs, 116*(462), 140–150.
<https://doi.org/10.1093/afraf/adw072>
- Holmgren, M. (2014, May 16). Becoming a Learning Organization – Part One [Blog]. *Anticipate!* <https://markholmgren.com/2014/05/16/becoming-a-learning-organization-part-one/>
- Hustad, E., & Olsen, D. H. akon. (2011). Teaching Enterprise Systems in Higher Education: The Learning Context Triangle. *Proceedings of the 8th International Conference on Enterprise Systems, Accounting and Logistics (8th ICESAL 2011)*.
- livari, J., & Venable, J. (2009). Action research and design science research—Seemingly similar but decisively dissimilar. *European Conference on Information Systems, 17*(1), 1–13.
- Jabeen, S. S., & Rafiuddin, A. (2015). *Factors Influencing the Education Decision Making Process. 5*, 203–215.

- Jackson. (2014). The Democratic Individual: Dewey's Back to Plato Movement. *The Pluralist*, 9(1), 14–38. <https://doi.org/10.5406/pluralist.9.1.0014>
- Jesuit Institute. (2014). *Ignatian Pedagogy—An abridged version of the document on teaching and learning in a Jesuit school*. Jesuit Institute London.
[http://jesuitinstitute.org/Resources/Ignatian%20Pedagogy%20Abridged%20%20\(Jan%2014\)%2010x210%20MASTER.pdf](http://jesuitinstitute.org/Resources/Ignatian%20Pedagogy%20Abridged%20%20(Jan%2014)%2010x210%20MASTER.pdf)
- Johnson, P., & Duberley, J. (2000). *Understanding management research: An introduction to epistemology*. SAGE Publications.
- Johnson, P., & Duberley, J. (2003). Reflexivity in Management Research. *Journal of Management Studies*, 40(5), 1279–1303. <https://doi.org/10.1111/1467-6486.00380>
- Justice, S. B., Bang, A., Lundgren, H., Marsick, V. J., Poell, R. F., & Yorks, L. (2020). Operationalizing Reflection In Experience-Based Workplace Learning: A Hybrid Approach. *Human Resource Development International*, 23(1), 66–87.
<https://doi.org/10.1080/13678868.2019.1621250>
- Kalema, B. M., Olugbara, O. O., & Kekwaletswe, R. M. (2014). *Identifying Critical Success Factors: The Case of ERP Systems in Higher Education*.
- Kegan, R. (2009). What “Form” Transforms? - A Constructive-Developmental Approach to Transformative Learning. In K. Illeris (Ed.), *Contemporary theories of learning: Learning theorists in their own words*. (pp. 35–54). Routledge.
- Kember, D., McKay, J., Sinclair, K., & Wong, F. K. Y. (2008). A Four-Category Scheme for Coding and Assessing the Level of Reflection in Written Work. *Assessment & Evaluation in Higher Education*, 33(4), 369–379.
<https://doi.org/10.1080/02602930701293355>

- Kemmis, S. (2005). Action Research and the Politics of Reflection. In D. Boud, R. Keogh, & D. Walker (Eds.), *Reflection: Turning Experience into Learning* (pp. 139–163). Routledge Falmer.
- Killion, J. P., & Todnem, G. R. (1991). A process for personal theory building. *Educational Leadership, 48*(6), 9–12.
- Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching. *Educational Psychologist, 41*(2), 75–86.
- Kitchenham, A. (2008). The Evolution of John Mezirow's Transformative Learning Theory. *Journal of Transformative Education, 6*(2), 104–123.
<https://doi.org/10.1177/1541344608322678>
- Kitchenham, B., Pearl Brereton, O., Budgen, D., Turner, M., Bailey, J., & Linkman, S. (2009). Systematic literature reviews in software engineering – A systematic literature review. *Information and Software Technology, 51*(1), 7–15.
<https://doi.org/10.1016/j.infsof.2008.09.009>
- Klun, M., & Trkman, P. (2018). Business Process Management – at the Crossroads. *Business Process Management Journal, 24*(3), 786–813. <https://doi.org/10.1108/BPMJ-11-2016-0226>
- Ko, R. K. (2009). A computer scientist's introductory guide to business process management (BPM). *Crossroads, 15*(4), 11–18.
- Koch, M. (2020). Structure, Action and Change: A Bourdieusian Perspective on The Preconditions For a Degrowth Transit. *Sustainability: Science, Practice and Policy, 16*(1), 4–14. <https://doi.org/10.1080/15487733.2020.1754693>

- Kock, N. (2004). The three threats of action research: A discussion of methodological antidotes in the context of an information systems study. *Decision Support Systems*, 37(2), 265–286. [https://doi.org/10.1016/S0167-9236\(03\)00022-8](https://doi.org/10.1016/S0167-9236(03)00022-8)
- Koestler, A. (1969). *The Act Of Creation*.
http://books.google.co.za/books/about/The_act_of_creation.html?id=C6AoAAAAYA
AJ&redir_esc=y
- Köhler, W. (1959). Gestalt Psychology Today. *American Psychologist*, 14(12), 727–734.
- Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education*, 4(2), 193–212.
- Kolb, D. A. (2015). *Experiential Learning: Experience as the Source of Learning and Development* (Second edition). Pearson Education, Inc.
- Kolb, D. A., Boyatzis, R. E., & Mainemelis, C. (2011). Experiential Learning Theory: Previous Research and New Directions. In R. J. Sternberg & L. F. Zhang (Eds.), *Perspectives on Cognitive, Learning and Thinking Styles* (pp. 227–247). Routledge.
- Kurgun, H., & İşildar, P. (2016). *Investigation of the Learning Styles of Tourism and Hospitality Students Using Kolb and VARK Learning Style Models*. 4(2), 130–141.
- Lanzi, D. (2007). Capabilities, human capital and education. *The Journal of Socio-Economics*, 36(3), 424–435. <https://doi.org/10.1016/j.socec.2006.12.005>
- Leonardi, P. M. (2013). Theoretical Foundations for the Study of Sociomateriality. *Information and Organization*, 23(2), 59–76.
<https://doi.org/10.1016/j.infoandorg.2013.02.002>

- Levin, M., & Martin, A. W. (2007). The praxis of educating action researchers: The possibilities and obstacles in higher education. *Action Research*, 5(3), 219–229. <https://doi.org/10.1177/1476750307081014>
- Lowry, P. B., & Gaskin, J. (2014). Partial Least Squares (PLS) Structural Equation Modeling (SEM) for Building and Testing Behavioral Causal Theory: When to Choose It and How to Use It. *IEEE Transactions on Professional Communication*, 57(2), 123–146. <https://doi.org/10.1109/TPC.2014.2312452>
- Lozano, J. F., Boni, A., Peris, J., & Hueso, A. (2012). Competencies in Higher Education: A Critical Analysis From the Capabilities Approach. *Journal of Philosophy of Education*, 46(1), 132–147.
- Lusch, R., & Wu, C. (2012). A Service Science Perspective on Higher Education: Linking Service Productivity Theory and Higher Education Reform. *Center for American Progress*, 1–12.
- Madkour, M. (2015). The Role of Harvard University In Affecting Global Educational Reforms That Can Be Implemented in Egypt. *Second 21st Century Academic Forum Conference at Harvard*, 5, 273–292.
- Malinova, M., & Mendling, J. (2018). Identifying Do's and Don'ts Using the Integrated Business Process Management Framework. *Business Process Management Journal*, 24(4), 882–899. <https://doi.org/10.1108/BPMJ-10-2016-0214>
- Manuell, P., & Graham, W. (2017). *Grounded Theory: An Action Research Perspective with Models to Help Early Career Researchers*. 8(1), 74–90.
- Maxwell, J. A. (2010). Using Numbers in Qualitative Research. *Qualitative Inquiry*, 16(6), 475–482. <https://doi.org/10.1177/1077800410364740>

- McIntosh, P. (2010). *Action Research and Reflective Practice: Creative and Visual Methods to Facilitate Reflection and Learning*. Routledge.
- Mezirow, J. (1990). How Critical Reflection Triggers Transformative Learning. In *Fostering critical reflection in adulthood* (pp. 1–20). Jossey-Bass Inc.
<http://184.182.233.150/rid=1LW06D9V6-26428MK-1Z64/Mezirow's%20chapter,%20How%20Critical%20Refletion%20Triggers%20TL.pdf>
- Mezirow, J. (2003). Transformative Learning as Discourse. *Journal of Transformative Education*, 1(1), 58–63. <https://doi.org/10.1177/1541344603252172>
- Miettinen, R. (2000). The Concept of Experiential Learning and John Dewey's Theory of Reflective Thought and Action. *International Journal of Lifelong Education*, 19(1), 54–72. <https://doi.org/10.1080/026013700293458>
- Miller, R., J., & Maellaro, R. (2016). Getting to the Root of the Problem in Experiential Learning: Using Problem Solving to Improve Learning Outcomes. *Journal of Management Education*, 40(2), 170–193.
- Mingers, J. (2001). Combining IS Research Methods: Towards a Pluralist Methodology. *Information Systems Research*, 12(3), 240–259.
<https://doi.org/10.1287/isre.12.3.240.9709>
- Mingers, J. (2004). Real-izing Information Systems: Critical Realism as an Underpinning Philosophy for Information Systems. *Information and Organization*, 14(2), 87–103.
<https://doi.org/10.1016/j.infoandorg.2003.06.001>
- Mingers, J., Mutch, A., & Willcocks, L. (2013). Critical Realism in Information Systems Research. *MIS Quarterly*, 37(3), 795–802.
<https://doi.org/10.25300/MISQ/2013/37:3.3>

- Mirzaei Rafe, M., Noaparast, K. B., Hosseini, A. S., & Sajadieh, N. (2021). An examination of Roy Bhaskar's critical realism as a basis for educational practice. *Journal of Critical Realism, 20*(1), 56–71. <https://doi.org/10.1080/14767430.2020.1807799>
- Mohamed, S., & McLaren, T. S. (2009). Probing the Gaps Between ERP Education and ERP Implementation Success Factors. *AIS Transactions on Enterprise Systems, 1*(1), 8–14.
- Moon, J. (2009). The Use of Graduated Scenarios to Facilitate the Learning of Complex and Difficult-to- Describe Concepts. *Art, Design & Communication in Higher Education, 8*(1), 57–70. https://doi.org/10.1386/adch.8.1.57_1
- Moon, J. A. (2000). *Reflection in Learning and Professional Development: Theory and Practice*. Kogan Page.
- Moore, P., & Fitz, C. (1993). Gestalt Theory and Instructional Design. *Journal of Technical Writing and Communication, 23*(2), 137–157. <https://doi.org/10.2190/G748-BY68-L83T-X02J>
- Neck, H. M., & Greene, P. G. (2011). Entrepreneurship Education: Known Worlds and New Frontiers: JOURNAL OF SMALL BUSINESS MANAGEMENT. *Journal of Small Business Management, 49*(1), 55–70. <https://doi.org/10.1111/j.1540-627X.2010.00314.x>
- Newman, M. (2012). Calling Transformative Learning into Question: Some Mutinous Thoughts. *Adult Education Quarterly, 62*(1), 36–55.
- Nickerson, J. V. (2006). Teaching the Integration of Information Systems Technologies. *IEEE Transactions on Education, 49*(2), 271–277. <https://doi.org/10.1109/TE.2006.873966>
- Nicoll-Senft, J. M., & Seider, S. N. (2009). Assessing the Impact of the 4MAT Teaching Model Across Multiple Disciplines in Higher Education. *College Teaching, 58*(1), 19–27. <https://doi.org/10.1080/87567550903245623>

- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 14–37.
- Nonaka, I., & Konno, N. (1998). The Concept of “Ba”: Building a Foundation for Knowledge Creation. *California Management Review*, 40(3), 40–54.
<https://doi.org/10.2307/41165942>
- Nowacek, R., & Mountin, S. (2012). Reflection in Action: A Signature Ignatian Pedagogy for the 21st Century. In N. Chick, A. Haynie, & R. A. R. Gurung (Eds.), *Exploring More Signature Pedagogies: Approaches to Teaching Disciplinary Habits of Mind*. (pp. 129–142). Stylus Publishing, LLC.
- OECD. (2005). *The Definition and Selection of Key Competencies—Executive Summary*. OECD.Org. <https://www.oecd.org/pisa/35070367.pdf>
- Okoli, C., & Schabram, K. (2010). A Guide to Conducting a Systematic Literature Review of Information Systems Research. *SSRN Electronic Journal*.
<https://doi.org/10.2139/ssrn.1954824>
- Olsen, W., & Morgan, J. (2005). A Critical Epistemology of Analytical Statistics: Addressing the Sceptical Realist. *Journal for the Theory of Social Behaviour*, 35(3), 255–284.
- Ormerod, R. (2006). The History and Ideas of Pragmatism. *The Journal of the Operational Research Society*, 57(8), 892–909.
- O’Sullivan, J. A., Goldensohn, D., & Hinton, R. (2014). Meeting the Skills Gap with a Focus on ERP Education at SUNY; Farmingdale State College and Binghamton University. *Open Journal of Business and Management*, 02(04), 354–359.
- Parmentier, R. J. (1994). *Signs in Society: Studies in Semiotic Anthropology*. Indiana University Press.
- Peirce, C. S. (1905). What pragmatism is. *The Monist*, 15(2), 161–181.

- Pentland, B. T., & Feldman, M. S. (2008). Designing routines: On the folly of designing artifacts, while hoping for patterns of action. *Information and Organization*, 18(4), 235–250. <https://doi.org/10.1016/j.infoandorg.2008.08.001>
- Perusso, A., Blankesteyn, M., & Leal, R. (2020). The Contribution of Reflective Learning to Experiential Learning in Business Education. *Assessment & Evaluation in Higher Education*, 45(7), 1001–1015. <https://doi.org/10.1080/02602938.2019.1705963>
- Pirsig, R. M. (2014). *Zen & the Art of Motorcycle Maintenance: An Inquiry into Values* (40th Anniversary). Vintage Books.
- Pleasants, N. (2003). A Philosophy for the Social Sciences: Realism, Pragmatism, or Neither? *Foundations of Science*, 8, 69–87.
- Plowright, D. (2016). *Charles Sanders Peirce—Pragmatism and education*. Springer.
- Polanyi, M. (1969). On Body and Mind. *The New Scholasticism*, 43(2), 195–204.
- Potter, C. (2015). Leadership Development: An Applied Comparison of Gibbs' Reflective Cycle and Scharmer's Theory U. *Industrial and Commercial Training*, 47(6), 336–342. <https://doi.org/10.1108/ICT-03-2015-0024>
- Pratschke, J. (2003). Realistic Models? Critical Realism and Statistical Models in the Social Sciences. *Philosophica*, 71, 13–38.
- Proctor, J. D. (1998). The Social Construction of Nature: Relativist Accusations, Pragmatist and Critical Realist Responses. *Annals of the Association of American Geographers*, 88(3), 352–376.
- Raelin, J. A. (2007a). The Return of Practice to Higher Education: Resolution of a Paradox. *The Journal of General Education*, 56(1), 57–77. <https://doi.org/10.1353/jge.2007.0014>

- Raelin, J. A. (2007b). Toward an Epistemology of Practice. *Academy of Management Learning & Education*, 6(4), 495–519.
- Rainey, M. A. (2019). Chapter 5: Four Roles of the Gestalt Intervener: Holistic Presence Using Experiential Learning Theory. 59–74.
- Ravesteyn, P., Batenburg, R., & de Waal, B. (2008). In Search of Competencies Needed in BPM Projects. *Communications of the IIMA*, 8(2), 23–30.
- Rigdon, E. E., Sarstedt, M., & Ringle, C. M. (2017). On Comparing Results from CB-SEM and PLS-SEM: Five Perspectives and Five Recommendations. *Marketing ZFP*, 39(3), 4–16.
<https://doi.org/10.15358/0344-1369-2017-3-4>
- Ringle, C. M., Wende, S., & Becker, J.-M. (2015). *SmartPLS 3*. <http://www.smartpls.com>
- Robey, D., Ross, J. W., & Boudreau, M.-C. (2002). Learning to Implement Enterprise Systems: An Exploratory Study of the Dialectics of Change. *Journal of Management Information Systems*, 19(1), 17–46.
- Roode, J. D. (1993). Implications for teaching of a process-based research framework for information systems. *Proceedings of the Eighth International Academy for Information Management Conference*, 61–76.
- Rorty, R., Putnam, H., Conant, J., & Helfrich, G. (2004). What is Pragmatism? *Think: Philosophy for Everyone*, 8(1), 71–88.
- Rosemann, M., & vom Brocke, J. (2010). The Six Core Elements of Business Process Management. In J. vom Brocke & M. Rosemann (Eds.), *Handbook on Business Process Management 1* (pp. 107–122). Springer Berlin Heidelberg.
http://link.springer.com/10.1007/978-3-642-00416-2_5
- Rosemann, M., & vom Brocke, J. (2015). The Six Core Elements of Business Process Management. In M. Rosemann & J. vom Brocke (Eds.), *Handbook on Business*

- Process Management 1—Introduction, Methods, and Information Systems* (2nd ed., pp. 105–125). Springer.
- Roth, W.-M., Mavin, T., & Dekker, S. (2014). The theory-practice gap: Epistemology, identity, and education. *Education+ Training, 56*(6), 521–536.
- Rowe, F. (2012). Toward a Richer Diversity of Genres in Information Systems Research: New Categorization and Guidelines. *European Journal of Information Systems, 21*(5), 469–478. <https://doi.org/10.1057/ejis.2012.38>
- Rowe, F. (2014). What Literature Review is Not: Diversity, Boundaries and Recommendations. *European Journal of Information Systems, 23*(3), 241–255.
- Ruhi, U. (2016). An experiential learning pedagogical framework for enterprise systems education in business schools. *The International Journal of Management Education, 14*(2), 198–211. <https://doi.org/10.1016/j.ijme.2016.04.006>
- Russell, T. L. (1999). *The no significant difference phenomenon: : As reported in 355 research reports, summaries and papers*. North Carolina State University.
- Samuels, W. J. (2000). Review: Signs, Pragmatism, and Abduction: The Tragedy, Irony, and Promise of Charles Sanders Peirce. *Journal of Economic Issues, 34*(1), 207–217.
- Sandelowski, M., Voils, C. I., & Knafl, G. (2009). On Quantitizing. *Journal of Mixed Methods Research, 3*(3), 208–222. <https://doi.org/10.1177/1558689809334210>
- Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research Methods for Business Students*. Prentice-Hall.
- Schatzki, T. (2016). Crises and Adjustments in Ongoing Life. *Österreichische Zeitschrift Für Soziologie, 41*(S1), 17–33. <https://doi.org/10.1007/s11614-016-0204-z>

- Scholtz, B., Cilliers, C., & Calitz, A. (2012). A Comprehensive, Competency-based Education Framework Using Medium-Sized ERP Systems. *Journal of Information Systems Education, 23*(4), 345–358.
- Schön, D. A. (1983). *The Reflective Practitioner: How Professionals Think in Action*. Basic Books.
- Schön, D. A. (1992). The Theory of Inquiry: Dewey's Legacy to Education. *Curriculum Inquiry, 22*(2), 119–139. <https://doi.org/10.2307/1180029>
- Schön, D. A. (1995). The New Scholarship Requires a New Epistemology. *Change, 27*(6), 26–34.
- Scott, E., Alger, R., Pequeno, S., & Sessions, N. (2002). The Skills Gap as Observed Between IS Graduates and the Systems Development Industry: A South African Experience. *Informing Science, June*(1), 1–9.
- Scott, H. V. (1994). *A Serious Look at the 4MAT Model*. Education Resources Information Center (ERIC). <https://files.eric.ed.gov/fulltext/ED383654.pdf>
- Scott Morton, M. (1995). Emerging Organizational Forms: Work and Organisational Forms in the 21st Century. *European Management Journal, 13*(4), 339–345.
- Searle, S., & Cantara, M. (2016, December 20). *12 Skills Critical to Business Process Management Success*. Gartner. <https://www.gartner.com/doc/3107625/-skills-critical-business-process>
- Seethamraju, R. (2012). Business Process Management: A Missing Link in Business Education. *Business Process Management Journal, 18*(3), 532–547. <https://doi.org/10.1108/14637151211232696>
- Serrat, O. (2017). The Five Whys Technique. In O. Serrat, *Knowledge Solutions* (pp. 307–310). Springer Singapore. https://doi.org/10.1007/978-981-10-0983-9_32

- Seymour, L. F., Sonteya, T., & Seymour, L. (2012). Developing the South African Business Process Analyst: Addressing the Challenges through a new University Programme. *Proceedings of the 2012 Conference of the Southern African Computer Lecturer's Association (SACLA)*, 43–48.
- Seymour, L., Scott, E., Malamoglou, S., Meyerowitz, J., & Morar, A. (2006). Skills Learnt During a Systems Development Course: Graduate perceptions of Skills Transfer and Industry Alignment. *Information Systems Education Journal*, 4(85), 1–13.
- Shusterman, R. (2010). What Pragmatism Means to Me: Ten Principles. *Revue Française d'études Américaines*, 124, 59–65.
- Sims-Schouten, W., Riley, S. C. E., & Willig, C. (2007). Critical Realism in Discourse Analysis: A Presentation of a Systematic Method of Analysis Using Women's Talk of Motherhood, Childcare and Female Employment as an Example. *Theory & Psychology*, 17(1), 101–124. <https://doi.org/10.1177/0959354307073153>
- Stark, J. L. (2014). The Potential of Deweyan-Inspired Action Research. *Education and Culture*, 30(2), 87–101. <https://doi.org/10.1353/eac.2014.0013>
- Stein, M.-K., & Galliers, R. D. (2013). Enterprise Systems Education: How “Not-Learning” Happens. *OLKC 2013*, 1–16.
- Stevens-Fulbrook, P. (2019). 15 Learning Theories in Education (A Complete Summary). *Teacher of Sci*. <https://teacherofsci.com/learning-theories-in-education/>
- Straw, E. M. (2000). Knowledge Management and Polanyi. In *In P. Ståhle, P., & M. Grönroos (Eds.), Dynamic Intellectual Capital, Knowledge Management in Theory and Practice* (pp. 26–39). <http://polanyisociety.org/Nashotah%20House/Papers/Straw-original-pdf-KnowlMgmt%20&Polanyi-5-23-16.pdf>

- Susman, G. I., & Evered, R. D. (1978). An Assessment of the Scientific Merits of Action Research. *Administrative Science Quarterly*, 23(4), 582.
<https://doi.org/10.2307/2392581>
- Taxén, L. (2009). An Inquiry into ERP Systems from an "Activity" Perspective. *Akademin För Svensk Affärssystemforskning: Utveckling Och Användning Av Affärssystem i Privat Och Offentlig Sektor, Linköpings Universitet, 26-27 November, 2009*, 1–17.
<http://www.diva-portal.org/smash/record.jsf?pid=diva2:755598>
- Taylor, E. W. (2008). Transformative learning theory. *New Directions for Adult and Continuing Education*, 2008(119), 5–15. <https://doi.org/10.1002/ace.301>
- Taylor, E. W., & Cranton, P. (2013). A Theory in Progress? Issues in Transformative Learning Theory. *European Journal for Research on the Education and Learning of Adults*, 4(1), 35–47. <https://doi.org/10.3384/rela.2000-7426.rela5000>
- Testa, I. (2017). Dewey's Social Ontology: A Pragmatist Alternative to Searle's Approach to Social Reality. *International Journal of Philosophical Studies*, 25(1), 40–62.
<https://doi.org/10.1080/09672559.2016.1260625>
- Thennakoon, D., Bandara, W., French, E., & Mathiesen, P. (2018). What Do We Know About Business Process Management Training? Current Status of Related Research and a Way Forward. *Business Process Management Journal*, 24(2), 478–500.
<https://doi.org/10.1108/BPMJ-09-2016-0180>
- Tosey, P. (2006). *Bateson's levels of learning: A framework for transformative learning?*
- Tosey, P., Visser, M., & Saunders, M. N. (2012). The Origins and Conceptualizations of 'Triple-Loop' Learning: A Critical Review. *Management Learning*, 43(3), 291–307.
<https://doi.org/10.1177/1350507611426239>

- Trkman, P. (2010). The Critical Success Factors of Business Process Management. *International Journal of Information Management, 30*(2), 125–134.
- Turnbull, N. (2008). Dewey's Philosophy of Questioning: Science, Practical Reason and Democracy. *History of Human Sciences, 21*(1), 49–75.
- UCT. (2020, June 6). *History Introduction*. University of Cape Town.
<http://www.uct.ac.za/main/about/history#gsc.tab=0>
- Urbach, N., & Ahlemann, F. (2010). Structural Equation Modeling in Information Systems Research Using Partial Least Squares. *Journal of Information Technology Theory and Application, 11*(2), 5–40.
- Van de Ven, A. H., & Johnson, P. E. (2006). Knowledge for theory and practice. *Academy of Management Review, 31*(4), 802–821.
- van der Aalst, W. M. P. (2013). Business Process Management: A Comprehensive Survey. *ISRN Software Engineering, 2013*, 1–37. <https://doi.org/10.1155/2013/507984>
- Van Manen, M. (1992). Reflectivity and the Pedagogical Moment: The Practical-ethical Nature of Pedagogical Thinking and Acting. *The Journal of Curriculum Studies, 23*(6), 507–536.
- Van Manen, M. (2008). Pedagogical Sensitivity and Teachers Practical Knowing-in-Action. *Peking University Education Review, 1*(1), 1–23.
- van Zyl, I. (2015). Disciplinary Kingdoms: Navigating the Politics of Research Philosophy in the Information Systems. *The Electronic Journal of Information Systems in Developing Countries, 70*(1), 1–17.
- Vargo, S. L., & Akaka, M. A. (2009). Service-Dominant Logic as a Foundation for Service Science: Clarifications. *Service Science, 1*(1), 32–41.

- Vargo, S. L., & Lusch, R. F. (2016). Institutions and Axioms: An Extension and Update of Service-Dominant Logic. *Journal of the Academy of Marketing Science*, 44(1), 5–23. <https://doi.org/10.1007/s11747-015-0456-3>
- Vargo, S. L., Maglio, P. P., & Akaka, M. A. (2008). On Value and Value Co-creation: A Service Systems and Service Logic Perspective. *European Management Journal*, 26, 145–152. <https://doi.org/10.1016/j.emj.2008.04.003>
- Virani, F. (2015). *A Performance Evaluation Model for School Teachers: An Indian Perspective*. 5, 490–503.
- Vogler, G. (2016). Power Between Habitus and Reflexivity – Introducing Margaret Archer to the Power Debate. *Journal of Political Power*, 9(1), 65–82. <https://doi.org/10.1080/2158379X.2016.1149309>
- Volkoff, O., & Strong, D. M. (2013). Critical realism and affordances: Theorizing IT-associated organizational change processes. *MIS Quarterly*, 37(3), 819–834.
- Von Bertalanffy, L. (1972). The History and Status of General Systems Theory. *The Academy of Management Journal*, 15(4), 407–426.
- Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press.
- Wacquant, L. J. D. (1989). Towards a Reflexive Sociology: A Workshop with Pierre Bourdieu. *Sociological Theory*, 7(1), 26–63.
- Walsh, A. (2009). Modes of Reflection: Is it possible to use both individual and collective reflection to reconcile the ‘three-party knowledge interests’ in workplace learning? *European Journal of Education*, 44(3), 385–398. <https://doi.org/10.1111/j.1465-3435.2009.01389.x>

- Webb, J. L. (2004). Comment on Hugh T. Miller's "Why Old Pragmatism Needs an Upgrade."
Administration & Society, 36(4), 479–495.
<https://doi.org/10.1177/0095399704266741>
- Webb, N. L. (1997). *Criteria for Alignment of Expectations and Assessments in Mathematics and Science Education* (Research Monograph No. 8; pp. 1–46). Council of Chief State School Officers.
- Webb, N. L. (2002). *An Analysis of the Alignment Between Mathematics Standards and Assessments for Three States*. 26.
- Wehrwein, Z. (2019). Where exactly is the 'real' in critical realism? Plus, a Dewey-James alternative. *Journal of Critical Realism*, 18(3), 337–346.
<https://doi.org/10.1080/14767430.2019.1619041>
- Willig, C. (1999). Beyond Appearances—A Critical Realist Approach to Social Constructionist Work. In D. J. Nightingale & J. Cromby (Eds.), *Social Constructionist Psychology: A Critical Analysis of Theory and Practice* (pp. 37–51). Open University Press.
- Zachariadis, M., Scott, S., & Barrett, M. (2013). Methodological Implications of Critical Realism for Mixed-Methods Research. *MIS Quarterly*, 37(3), 855–879.

Appendix A - Ethics approval



Faculty of Commerce

Private Bag X3, Rondebosch, 7701
2.26 Leslie Commerce Building, Upper Campus
Tel: +27 (0) 21 650 4375/ 5748 Fax: +27 (0) 21 650 4369
E-mail: com-faculty@uct.ac.za
Internet: www.uct.ac.za



@Commerce_UCT



UCT Commerce Faculty Office

12 August 2016

Mr Malcolm Garbutt
Information Systems Department
University of Cape Town

Dear Malcolm Garbutt

Project: Towards a Framework for Evaluating Enterprise Systems Courses in Higher Education Institutions

Thank you for submitting your study to the Faculty of Commerce Ethics in Research Committee.

It is a pleasure to inform you that the EIRC has **formally approved** the above-mentioned study.

Approval is granted for the period of 12 months. Should you require an extension or make any substantial changes to the research methodology which could affect the experiences of participants, you must submit a revised protocol to the Committee for approval.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Your sincerely

Ms. Samantha Alexander
Administrative Assistant
University of Cape Town
Commerce Faculty Office
Room 2.24 | Leslie Commerce Building

Office Telephone: +27 (0)21 650 2695
Office Fax: +27 (0)21 650 4369
E-mail: samantha.alexander@uct.ac.za
Website: www.commerce.uct.ac.za<<http://www.commerce.uct.ac.za/>>

"Our Mission is to be an outstanding teaching and research university, educating for life and addressing the challenges facing our society."

Appendix B – Data Collected In the Four Action Research Cycles

Overview of The Collected Data

Action Research Cycle (ARC) Number	1	2	3	4
Denotation	ARC1	ARC2	ARC3	ARC4
Year	2016	2017	2017	2018
Course Type	Undergraduate Full-time	Postgraduate Part-time	Undergraduate Full-time	Undergraduate Full-time
Reflection Type	Reflection-On-Action	Reflection-In-Action	Reflection-For-Action	Reflection-On-Action
Respondent Unit of Measure	Team	Individual	Team	Team
Sample Size	15	16	16	16
Number of Respondents	12	7	14	15
Qualitative Data Source	Reflective Section in Final Project Report	Reflective Journals	Reflective Section in Final Project Report	Reflective Section in Final Project Report
Quantitative Data Source	Summarised Marksheets from Course Supervisor			

Appendix C - Guidelines and Rubrics

ARC1 – 2016 Undergraduate Course

ARC1 Guidelines:

1. What do YOUR team perceive to be the (your) project success criteria.
2. In terms of managing the project, what were the main lessons your team learned?
3. Describe what skills, knowledge and attitudes were improved or changed by this project
4. Describe one example of what went right on this project.
5. Describe one example of what went wrong on this project.
6. What will you do differently on the next project based on your experience working on this project

ARC1 Rubric:

1. [S-A] Complete a group self-assessment using Appendix 3 for your project, considering the strengths of the various sections of your report. [3]
2. [KSA] Describe what skills, knowledge and attitudes were improved or changed by this project. [2]
3. [SH-T] Mention problems you experienced with stakeholder management and team dynamics and how you resolved these. [2]
4. [Reflect] Reflect on what you would do differently if you were asked to do this assignment again. [2]

ARC2 – 2017 Postgraduate Course

ARC2 Guidelines

Journal Writing Example 1:

1. What did I learn?
2. What went well?
3. What could I have done better?
4. Long-term implications?

Journal Writing Example 2:

1. How much time did I spend today?
2. What did I do?

3. What insight did I gain from this?
4. How do I feel about the work?
5. What could I have done better?
6. What could someone have done to help?

Journal Writing Example 3:

Critically Reflexive Approach— What Have You Been Struck By?

1. Identify

Identify personal insights, issues, moments of critical questioning, and revelation/connection with ideas, moments, and comments (by you, other course members, me) that struck you and offered the potential for reflective insight or significant learning.

2. Describe

Describe why these are important to you. What impact did they have, and/or what dilemmas, questions, or possibilities did they raise? Have these resulted in order or chaos for you?

3. Next step

So what are you going to do now? What issues, questions, and dilemmas are you going to explore further? Why and how? How will this influence who you are and how you relate to others? What relational nets can you construct/ connect with to continue this process of reflective and critical learning?

Extended Example of a Journal

1. What did I learn?

Attended first ever seminar

2. What went well?

Discussing ideas made me realise there are many ways of reading a piece of literature. I was surprised by other people's interpretations, but the ones who convinced me were those who linked their interpretations to specific parts of the text. Made some contributions. They were mainly responses to other people's ideas but I was glad I took part and it made me think more deeply about the novel.

3. What could I have done better?

Could have been braver in forming own interpretations. Had a preconception that there was a right or wrong way to read the text.

4. Long-term implications

In future I want to open my mind more. Now realise that there are many ways of reading a text – and if you can find evidence, you can convince people of your perspective. Useful for essays - putting forward a unique viewpoint is possible as long as you have persuasive reasoning.

Journal Writing Methods

1. Handwritten
2. Electronic document
3. Blog

Public

LiveJournal - <http://www.livejournal.com/>

Private

Penzu - <https://classic.penzu.com/>

Reflective Journal Template

Name:	Student Number:
Date:	Number of Hours Spent on the Activity:
Today's goals? / Summary of what I did:	
What went well?	
What aspect caused me the most anxiety?	
What aspect surprised me?	
How could someone have helped me? How can I use this to help someone else?	
Areas for Improvement:	
Goals for next session:	

Which aspects can I include in my assignment? My degree? My work?

Other:

ARC3 – 2017 Undergraduate Course

ARC3 Guidelines

Reflection-For-Action

1. Design – How are we going to approach the assignment?
2. Imagine – What do we need to do?
3. Act – Who takes which action?

Reflection-On-Action:

1. Awareness – What did we do?
2. Appreciation – What went well?
3. Imagine – What could I/we do better?
4. Design – How am I/are we going to do it better? What must I/we do next?
5. Judgement - Is this what I/we should be doing?

ARC4 – 2018 Undergraduate Course

ARC4 Guideline Template

Topic	Meaning
Awareness	What did I /we do? This is to get an overview of where team members are with their understanding of the process they are working with and aware of what stage the team is at regarding completing the assignment.
Appreciation	What went well? This is to get the team members to appreciate what went well within the team regarding the assignment

Imagine	<p>What could I/we do better?</p> <p>This is to allow the team to provide feedback regarding where they individually have to improve and where the whole team can improve to yield better results.</p>
Design	<p>How am I/are we going to do it better? What must I/we do next?</p> <p>This allows members to suggest what needs to be done next. It also allows team members to suggest ways to do the things that the team is struggling with better. It also allows members to suggest what they individually need to do next to improve the performance of the group. This is a good way to get an overview of where everyone is regarding the understanding where they think the team is going.</p>
Judgement	<p>Is this what I/we should be doing?</p> <p>This allows members to confirm if the way the team is going about doing things is the correct way. If any member feels that there are other ways to do things, this section allows them to suggest those ways. Suggestions could vary from team dynamics or assignment related.</p>

Appendix D - Examples of Reflective Journals

(Note: Layouts are as per original documents)

ARC1 – 2016 Undergraduate Course

Example 1.

As a team, the project was a challenging yet rewarding experience. Firstly, we were excited to work with a company that many people interact with on a daily basis and, most importantly, we were looking forward to learning more about [the client]'s business processes to find out why it is so successful in the retail industry.

The most exciting part of this project was that we could finally apply our theory-based knowledge from lectures into a practical environment. We felt as though we were part of the [the client] team and took great interest in this project. Furthermore, the journey has taught us plenty and some of our learning experiences are listed below:

- How to deal with a real-world scenario and being able to observe a process that is being used by a successful company.
- Interaction - meeting new people and communicating professionally with them. We experienced a very formal manner of meeting and interaction between the [the client] stakeholders and project team.
- Being able to see how SAP is used to control inventory in a practical/real-world scenario.
- Problem solving skills - the project made us think on a broader scale to come up with solutions to a problem that [the client] is currently experiencing.
- The ability to work as a team.
- How to carry out presentations in front of professional business analysts as well as improve upon our presentation skills.

Although the project was a great experience, challenges were faced when working with different individuals and [the client]. A few of our challenges that the team faced are listed below:

- Setting meeting dates suitable both for each individual in the team members and [the client] stakeholders.
- Getting to the different meeting locations (transport problems).

- Finding suitable time for the whole team to meet up and work on the deliverables.
- Lastly, challenges faced by the current protest action on UCT campuses.

Reflection

The team greatly appreciates the opportunity they received in working with real life processes including the practical experiences gained. At first the process of the project was very unclear but as the meetings unfolded we formulated a good idea of what needed to be done. Our analytical skills have been improved as a result.

There would not be many things we would do differently regarding the outcome of this project. Perhaps a few changes we could have made are listed below:

- Set meeting dates in advance so that we could meet more regularly.
- Manage our time better.
- Meet up more often as a whole team to work on the project.

Overall, we managed to work well as individuals as well as a team; and in order to overcome our problems faced we agreed that communication would play a vital part in the completion of this project. Everyone in the team was committed and played their part and leveraged each other's strengths and areas of expertise. The commitment paid off towards the completion of the report project and this led to its success.

ARC2 – 2017 Postgraduate Course

Example 2.

Name: -----	Student Number: -----
Date: 15 June 2017	Number of Hours Spent on the Activity: 14 Hrs
<p>Today's goals? / Summary of what I did:</p> <p>I had a change of ideas with regards to the initial business process I intended to analyse. This is partly due to the fact that there is currently one person in charge of the off-campus accommodation process I had intended to analyse, and I struggled to secure an appointment with him for about 2 weeks. I have decided to analyse the Student Application Process. I have met with various role players in this process namely Application, Selection and Admissions business units and they have been able to provide me an overview of the Application process and their different roles they play.</p>	

What went well?

I have been fortunate in that I have a good working relations with the colleagues that are responsible for the Application process and they have been very forthcoming with the information I needed. They have been able to slot me in in their schedules, and because this is not a very busy period with regards to application has worked on my favour.

What aspect caused me the most anxiety?

I encountered an unexpected setback with the sudden passing away of my father, and had to travel to the Eastern Cape to be involved in funeral preparations and attend the funeral. I lost about 2 weeks of preparing for the assignment but I am doing my best to make up for the lost time. Also, there were a lot of activities involved in the entire Application process that I was not aware of. That caused me a lot of anxiety as I had to plan and factor those in, on my entire analysis.

What aspect surprised me?

I was surprised by how well-structured this process is. Almost everyone involved seems to know what role they play and they are very meticulous in carrying out their duties. I have made informal comparison with the other higher education institution that I have been in contact with, and the processes in place for this institution rate far superior than its counterparts and they are highly regarded for their processes.

How could someone have helped me? How can I use this to help someone else?

In the main, I got the assistance I needed for this week, save for the person responsible for off-campus accommodation that I could not manage to secure an appointment with.

Areas for Improvement:

I need to dedicate more time for next week's tasks as the deadline is drawing closer. Also I could have started a lot sooner so that I had more time to gain insight into the process I am analysing.

Goals for next session:

I will be focusing on interviewing the rest of the people involved in the process. Also, I need to source the software that I would be using for modelling and reporting.

Which aspects can I include in my assignment? My degree? My work?

I intend to read 1 or 2 books from the recommended literature that I can incorporate in my work. I also intend to gain more insight into Lean and Six Sigma with the aim of incorporating it into my assignment.

Other:

The class WhatsApp group that we have created, has been very helpful in exchanging ideas and posing whatever issues that you need assistance with. With the long weekend ahead that should afford me even more time to make some much needed progress on my assignment.

ARC3 – 2017 Undergraduate Course

Example 3.

1. **Design** – How are we going to approach the assignment?

We are going to approach this assignment using collaborative efforts as a group and keeping in close contact with the project stakeholder (sponsor) as well as meeting regularly with the facilitator to seek advice and also make sure we are in the right direction.

The approach is going to involve a series of group meetings to discuss and assess the assigned tasks among group members, here the members can address any challenges and successes from working on the project deliverables, the meetings can be used for brainstorming and also for effectively planning the course of the project.

This is also going to involve a scheduling a series of meetings with the stakeholders so as to gather additional information on the project scope and address any other issues that may arise whilst working on the project deliverables and from group meetings.

Meetings will also be scheduled with the facilitator to seek advice on project challenges, assessment of project deliverables and communication in regard to project and scope management. This should guide the team on the project span and allow for effective time and task collaboration between group members.

2. **Imagine** – What do we need to do?

We need to meet more often to assign tasks between group members so that every member is actively involved in all the deliverables of the project, the Gantt chart should be updated and used more frequently as a project management tool in order to keep the team in the loop about what is required from every individual and from the project as a whole.

We need to assess the information gathered from the stakeholder (sponsor) and use it in preparation for the project deliverables and also to learn and understand the extent of the project scope and how the business processes in the industry relate to the BPM information provided in lectures and workshops.

We need to be active and practice a highly participatory approach with the project deliverables, presentations and documentation. In addition, the group must meet with the stakeholder and facilitator often so as to assess the different stages of the project and effectively manage the expectations from the project as a whole.

3. **Act** – Who takes which action?

The group members will practice a highly participatory approach in regard to tasks so that every member can learn from the different deliverables and have a thorough understanding of the project information and business processes.

The actions will be taken as decided by the group members in the subsequent meetings however, at a high level the project leader (D.) is in charge of the project coordination, presiding over group meetings, assessing individuals in regard to allocated tasks and overall project management, the project communicator (T.) is responsible for communicating with the stakeholder since she established the initial communication and the group decided this would be effective so that the stakeholder does not get communication from various team members, she is also responsible for communicating any reminders to the group and will work closely with project member (K.) on the project documentation and updating the drive as required. Project members (R. and S.) will work on project deliverables as assigned and are expected to also actively participate in the assessment and correction of project deliverables and documentation.

E. S. is the project sponsor and she is responsible for any decisions in regard to the project scope and assessment on the project deliverables and presentation. The project facilitator (K.) is responsible for evaluation of the group in terms of the reflection, project planning, team dynamics and stakeholder communication.

ARC4 – 2018 Undergraduate Course

Example 4.

This assignment has given us valuable insight into how the analysis and redesign phases of business processes actually work. It was incredibly beneficial to our understanding of BP trends and gave us an opportunity to implement them in a real-world scenario. The entire team felt fortunate and motivated to formulate a realistic and working solution to the problems faced by the process, as it directly impacts each member of the team in terms of our future at [the university]. We hope these improvements would be considered by the department and potentially incorporated into their application process in the near future.

The initial forming of the team was seamless - despite the fact that we had to combine different areas of expertise (Computer Science and Information Systems). This was made possible due to the fact that we all contributed in outlining the strategy and ultimate goal of the team - to provide redesign improvements that would be recognized as a top three project. To ensure this goal could be met, we made sure to work with each member's strengths (and weaknesses) to provide our best collective solution. This did however add pressure to the assignment and created an environment where we were solely focused on the marks we received rather than the intrinsic value of the assignment. While being goal-oriented is important, we learned that it's better to focus on aspects of the project we can control (how much effort we put in, the quality of our work) than aspects we have no influence over (our result mark). Another important step in the process was to designate different roles in the team, where for the most part we upheld this convention. However, when it came time to deliver the final project, we opted for a collective approach to ensure that our entire proposal is coherent and consistent.

We maintained several communication channels throughout the project life cycle. The team made sure to address the most important aspects of the assignment together in internal team meetings, which proved especially vital for discussion and completion of deliverables. Otherwise, WhatsApp group discussions and informal meetings were reserved for more minor topics. For the presentation preparation, we decided to split up each section of work and present these accordingly. This resulted in some members of the team not fully understanding all the different aspects of the process, until the later stages of the assignment.

Towards the end of the assignment life, we began conducting longer internal meetings and discussed each section of the assignment brief in depth. If we had gone this route for internal meetings from the start of the project, it would've facilitated the understanding and learning of each aspect of the project earlier and would've been far more beneficial, as our approach in the former part of the assignment only delayed thorough understanding of the project.

The meetings with sponsors (and other stakeholders) provided clarity of the processes and outlined various concerns that they had. Initially, we only interviewed the sponsor stakeholders of the Commerce Faculty Office as we were mainly focused on the process itself and the main actors. After presenting our assignment, we learned that our understanding of the process is very biased due to the range of stakeholders we interviewed. We learned that in order to gain a holistic view of the process, we needed to interview all of the stakeholders (or as many as possible). We immediately began scheduling interviews with other stakeholders, which proved extremely helpful to our understanding of the process. When contacting these stakeholders, we tried to provide questions in advance; but seeing that many stakeholders took long to reply or confirm meeting times, this wasn't a concern. We decided that we would gain more value from the interviews by asking inquisitive questions (why/how) rather than questions that would elicit a yes/no response, and the stakeholders seemed genuinely satisfied with our approach.

An important lesson that resonated with our entire team (and the project as a whole) was the value of time. We quickly learned that in the corporate world, there is no guarantee that people will have time or make time for our requests. In some cases, we had to escalate requests with higher management to obtain co-operation with stakeholders. The ultimate lesson in this field is that we should take action - from an early stage - to ensure the project progresses according to the outlined project plan. But, it's important to maintain respect with others, especially those willing to give up their time to help in any way possible.

Appendix E - Partial Least Squares Structural Equation Modelling Data

Respondent	Atlas.ti Code	Test Marks	Project Marks	Reflection Marks	Final Exam Marks	Task	Effort	Understanding	Quality
ARC1-A	-	61.6	60.0	0.0	51.7	.00	0.0	0.0	0.0
ARC1-B	-	73.7	57.5	0.0	56.6	0.0	0.0	0.0	0.0
ARC1-D	ARC1-P03	51.0	50.9	30.0	56.5	1.0	8.0	1.0	12.0
ARC1-E	ARC1-P04	63.9	55.0	50.0	44.6	3.0	15.0	1.0	9.0
ARC1-EX	-	75.6	55.0	0.0	47.7	0.0	0.0	0.0	0.0
ARC1-F	ARC1-P05	78.2	57.5	40.0	50.2	6.0	10.0	1.0	3.0
ARC1-J	ARC1-P06	70.4	57.5	40.0	47.4	0.0	5.0	1.0	3.0
ARC1-K	ARC1-P07	76.4	70.0	90.0	59.7	8.0	18.0	4.0	10.0
ARC1-L	ARC1-P08	83.2	68.5	80.0	65.9	10	21.0	8.0	10.0
ARC1-M	ARC1-P09	61.9	45.5	70.0	40.0	1.0	8.0	2.0	3.0
ARC1-N	ARC1-P10	71.1	59.4	50.0	55.4	4.0	5.0	6.0	6.0
ARC1-O	ARC1-P11	72.7	65.5	70.0	54.8	2.0	14.0	6.0	8.0
ARC1-P	ARC1-P12	78.5	66.0	60.0	56.1	1.0	10.0	6.0	2.0
ARC1-Q	ARC1-P13	58.4	53.2	50.0	45.2	2.0	8.0	2.0	6.0
ARC1-R	ARC1-P14	76.4	73.0	70.0	56.7	4.0	21.0	10.0	13.0
ARC2-A	ARC2-P15	57.0	47.0	94.0	70.0	12.0	45.0	2.0	24.0
ARC2-B	ARC2-P16	63.0	67.0	78.0	67.0	42.0	25.0	8.0	44.0
ARC2-C	-	47.0	50.0	94.0	63.0	0.0	0.0	0.0	0.0
ARC2-D	-	76.0	69.0	0.0	60.0	0.0	0.0	0.0	0.0
ARC2-E	-	57.0	71.0	0.0	53.0	0.0	0.0	0.0	0.0
ARC2-F	-	43.0	71.0	0.0	50.0	0.0	0.0	0.0	0.0
ARC2-G*	ARC2-P17	40.0	-	67.0	48.0	27.0	28.0	12.0	29.0
ARC2-H	-	57.0	75.0	0.0	47.0	0.0	0.0	0.0	0.0
ARC2-I	-	58.0	44.0	0.0	47.0	0.0	0.0	0.0	0.0
ARC2-J	ARC2-P18	52.0	75.0	56.0	45.0	38.0	59.0	28.0	44.0
ARC2-K	ARC2-P19	55.0	74.0	94.0	45.0	6.0	35.0	7.0	29.0
ARC2-L	-	66.0	71.0	0.0	45.0	0.0	0.0	0.0	0.0
ARC2-M	-	39.0	52.0	0.0	42.0	0.0	0.0	0.0	0.0
ARC2-N	ARC2-P20	61.4	69.0	67.0	42.0	12.0	14.0	5.0	10.0
ARC2-O	ARC2-P21	57.0	58.0	83.0	40.0	6.0	34v	4.0	8.0
ARC2-P	-	72.0	67.0	0.0	33.0	0.0	0.0	0.0	0.0
ARC3-B	ARC3-P22	62.3	65.4	63.9	65.0	2.0	5.0	0.0	1.0
ARC3-C	ARC3-P23	64.6	71.3	77.8	79.1	0.0	12.0	0.0	4.0
ARC3-D	ARC3-P24	68.9	74.1	55.6	69.0	10	20.0	2.0	4.0
ARC3-E	ARC3-P25	60.5	54.7	24.5	61.2	1.0	5.0	0.0	1.0
ARC3-F	ARC3-P26	71.0	63.1	55.6	66.9	1.0	4.0	0.0	2.0
ARC3-G	ARC3-P27	63.2	63.0	66.7	57.7	2.0	6.0	2.0	4.0
ARC3-H	ARC3-P28	67.7	70.6	59.3	64.5	1.0	7.0	1.0	1.0
ARC3-I	ARC3-P29	56.1	65.9	35.6	62.4	1.0	2.0	0.0	1.0

ARC3-J	ARC3-P30	70.1	69.0	57.8	66.4	4.0	8.0	0.0	1.0
ARC3-K	ARC3-P31	73.4	69.5	77.8	65.9	1.0	3.0	1.0	1.0
ARC3-L	ARC3-P32	64.6	68.5	59.3	58.7	0.0	5.0	5.0	1.0
ARC3-M	ARC3-P33	62.4	69.3	51.2	66.2	0.0	6.0	0.0	2.0
ARC3-N	ARC3-P34	52.3	54.5	16.7	61.6	1.0	3.0	0.0	1.0
ARC3-P	ARC3-P35	62.7	68.7	55.6	65.2	2.0	7.0	1.0	2.0
ARC3-R	ARC3-P36	52.4	61.7	41.7	59.7	3.0	1.0	0.0	0.0
ARC3-T	ARC3-P37	49.2	60.6	41.7	57.5	2.0	0.0	1.0	0.0
ARC4-A	ARC4-P52	46.6	71.0	78.0	60.4	3.0	6.0	1.0	3.0
ARC4-B	ARC4-P44	43.4	67.0	78.0	49.0	4.0	22.0	5.0	8.0
ARC4-C	ARC4-P45	31.6	54.0	44.0	42.6	1.0	2.0	0.0	0.0
ARC4-D	ARC4-P46	41.6	51.0	44.0	40.4	0.0	4.0	2.0	2.0
ARC4-E	ARC4-P47	39.6	56.0	56.0	43	1.0	0.0	0.0	0.0
ARC4-F	ARC4-P48	48.8	66.0	78.0	47.6	7.0	9.0	2.0	5.0
ARC4-G	ARC4-P49	45.4	57.0	33.0	55.8	1.0	1.0	0.0	1.0
ARC4-H	ARC4-P50	40.0	81.0	44.0	50.4	3.0	11.0	4.0	2.0
ARC4-I	ARC4-P51	52.0	80.0	78.0	68.0	2.0	10.0	3.0	1.0
ARC4-J	ARC4-P38	28.0	54.0	44.0	41.0	3.0	5.0	0.0	1.0
ARC4-K	ARC4-P39	47.8	79.0	78.0	65.6	4.0	33.0	14.0	18.0
ARC4-L	ARC4-P40	58.4	76.0	33.0	64.4	2.0	7.0	0.0	2.0
ARC4-M	ARC4-P41	32.6	57.0	33.0	43.6	0.0	2.0	2.0	0.0
ARC4-N	ARC4-P42	17.2	59.0	33.0	18.6	0.0	3.0	0.0	2.0
ARC4-O	ARC4-P43	27.4	59.0	44.0	40.6	2.0	7.0	0.0	5.0
ARC4-P	-	37.6	65.0	0.0	46.4	0.0	0.0	0.0	0.0

Notes:

- The “Atlas.ti” column shows the respondent codes used in the qualitative research. Not all teams undertook reflections, and consequently, there are more groups in the quantitative analysis than the qualitative analysis.
- Team ARC2-G was excluded from the quantitative study as they did not hand in their project.

Appendix F - Drivers of Effort Data Samples

(Layouts retained as per original documents)

ARC1 – ARC1-P10

	Self-Assessment Comments	Self-Assessment Score	Max Score
Introduction & Conclusion	We think that the introduction clearly maps out what to expect from the report and the conclusion clearly states the benefits that [<i>the client</i>]	5	5
Scoping & Stakeholder Analysis	We feel that a major EFFORT was put into the scoping diagram. We received some good feedback on it after the PRESENTATION , and we got some good advice from R. who is from [<i>the client</i>]. We made sure to fix everything and add the things we missed out. A good EFFORT was put into the stakeholder analysis, the team had some good experience with stakeholder analysis being taught in project management and computer science which helped	8	10
Business Case	A really good EFFORT was made here; last semesters project management course definitely came in handy. As a team we used our collective knowledge to do this as we had to apply small changes because the context of the business case was slightly different to the ones we did last semester. We also had to	5	5

	<p>make do with what we were given in terms of data. E.g. the baseline data, there were no KPI's for our specific process so we had to yes targets that the entire [<i>the client</i>] company uses, and had to make use of different business rules and best practices to formulate the baseline data.</p>		
<p>Customizing Environment/Org & Master Data</p>	<p>A good EFFORT was put here to categorise the organisational and master data in a retail setting. It was hard at first as the team was used to the concepts in a services setting, but after reading and learning it made sense.</p>	4	5
<p>Business Process/Activity Analysis</p>	<p>We think this was the hardest section in the project as it needed one to understand the process and each and every step in it. We think we did a good job in analysing the processes and understanding them as complex as they were.</p>	17	25
<p>Process Improvement</p>	<p>A really good EFFORT was put into process improvement, the team made sure to read the section on process improvement in the course reader. The team sat together and collaborated on different possible solutions for the process. We think that the process improvement knowledge was really engraved in our memory, this was one of the more pleasant group working experiences because everyone was just giving ideas and there was no arguing. We also think that these ideas can be implemented by [<i>the client</i>] in the near future.</p>	9	10

Process Reporting	<p>The team put a major EFFORT into the reports, since this counts a significant amount towards the assignment. It was also very pleasant doing this section because we have done reporting in INF2009. The team learnt more about reporting this time because we needed to learn more about dashboards. We think that the reports we created will add value to the <i>[the client]</i> and that will definitely aid in keeping the store properly merchandised and will result in less lost sales.</p>	15	16
Learnings	<p>This was a steep learning curve for the team and every member collaborated in everything which meant that we were all able to put our learnings to the test.</p>	9	9
Overall	<p>The team feels that the shutdown decreased the amount of time we had to do the assignment, and limited our access to resources, which had an impact on the work we handed in. We would've wanted more time so we could put more EFFORT into it because we enjoyed our process and working with <i>[the client]</i>.</p>		

ARC4 – ARC4-P48

Student 1:

- Going into the project, the team and myself were unsure exactly what the project was about and because of this **took quite a long time to start working on it** and contact the clients. This, in my opinion, was a bit of a problem, as it wasted valuable time at the start of the project that could have been used in a much better and productive way.

In my next project, I would like to better motivate the team to not waste valuable time at the start of the project.

- Another glaring problem the team had, was not coming together and achieving a shared vision of what we were doing with the project earlier in the project and before and after every meeting. This led the team members to not be focused on the core process that we should have been analysing. Every member would then have their own idea of what we were doing and what was going on. This also led to our questions in meeting to be all over the place and not being able to identify scope creep, as the scope itself was poorly outlined. In my next project I would like to urge the team to have pre-meeting talks and debriefing talks, to ensure the whole team is on the same page, as well as defining the scope early on.
- On my own personal level as the team leader, I found myself being too relaxed with the team. I was under the impression that my team members would out of **their own get work done** and would not have to be motivated, as I **knew them to be hard workers**. This led me to not always follow up on team members, as **I assumed the work would be done by the agreed upon time**, without having to check up on them. In future projects, if I am the team leader, **I would try to give better guidance** of what needs to happen within the group, delegate task in a better way and follow up on team members often, to **ensure that they are completing their work in time** for us to meet certain milestones on time.

Student 2:

- One issue that I saw affect this project was the seeming lack of motivation amongst the team for the project. This lack of motivation in turn caused later delivery times for key artefacts than we would have liked and possibly lower standards for said artefacts. I think this lack of motivation then also caused team members to sometimes “pass the buck”, not making time for group meetings or their tasks and **hoping someone else will get the work done**. Having said this, I believe the reason behind this is multifactorial. Firstly, I believe this lack of motivation first stemmed from the project not being well communicated to us in the first place by lecturers and our project sponsors. Thus, leading to the team **groping in the dark for purpose and a goal to work towards leading to wasted time and loss of motivation**. Secondly, the team suffered major motivational issues after the first **PRESENTATION** as we received a bad mark

after we had already analysed and done work on the project a great deal already in a direction we found to be the wrong one, thus compounding feelings of apathy and loss of motivation. This I feel is going to be a fairly common problem in future projects and thus I would try and refrain from starting a project before the scope and goals for the team are made clear. The power of common purpose cannot be understated here, a team needs a common goal and a well-defined problem to function more effectively. Positivity and success come from previous successes and the team needs to know what they're doing so they can achieve the early wins to build up to a better project in the later phases.

- Another factor I saw to be a potential weak point in the team's performance was the fact that it was difficult for members amongst the group to bring up any issues they were having with another team members work/performance etc. Causing feelings of bitterness and thereby also decreasing the team's overall effectivity. This is a common theme in group projects and perhaps one of the more difficult problems to face. But I feel in future projects I will try and work with the team more to provide public forum for grievances so that any issues can be dealt with as quickly as possible to keep the team at as high a level of performance as possible for the duration of the project.
- In terms of my own performance in this project I have learnt that in an environment where project goals and direction is likely to change it is important to you as well as your team to understand the project as fully as possible. This is important as it allows you to be a "jack of all trades" within the group thereby being able to help any group member that comes to you for help or being able to take over another group members duties due to timing or performance issues they might be having. In future projects I will try and be as cognisant of the projects scope and inner workings as possible, I have seen that specialising in a certain area and sticking to that area often tends to slow the team down and decrease their overall effectivity.

Student 3:

- One of the main issues I felt was that we were not given any context as to what the project entails. As a result, each team member had a different understanding as to what the project is about and hence did our tasks with what we had in mind instead of what was expected from us. We also didn't know what was required from us and

hence did poorly during our first **PRESENTATION**. This did however did teach us to always make sure we know what is expected from us and to take initiative.

- A problem that we had as team was scheduling days where **we could all come together and work on the project**. Due to our busy schedules as a 3rd year student, and extracurricular activities, it was almost impossible to find days that we all were free on the same day. This led to problems as we wasted time waiting on others to finish their part, where we could have discussed what each of us were doing and then complete our tasks based on that.
- Personally, I felt that I could have gone about this project differently. I should have put more time and **EFFORT** into the project. Knowing that this is the last project of the year and that it counts 18% of our year mark, **I should have been motivated to do work to the best of my ability**.
- **If I am to work on a different project I will always make sure I understand the scope of the project and what is required from me**. I will communicate better with my team members and ensure that I put in extra **EFFORT** doing my tasks. **I will try and motivate team members** if I feel that we are losing focus of the goal and always follow up when we are falling behind schedule.

Student 4:

- An issue with the project was structuring in terms of deadlines, although this did not necessarily impact me the most. My teammates are all majoring in Computer Science as well as Business Computing, so they had their capstone project due on the same day as our first team **PRESENTATION**, I feel this is unfair as the **PRESENTATION** could easily have been moved a week earlier or later. This put unnecessary pressure on the group as they were focusing on completing an arguably more complex project while **trying to find time** to present for INF3012. Then in the **PRESENTATION** which was admittedly rough, the lecturers decided to be overly critical and not constructive or helpful in any way.
- Other issues include a lack of direction in terms of knowing what problem the project is looking to deal with and then deciding on a process that the stakeholder believes to be 100% accurate. Maybe this is part of the learning experience.

- Have smaller team as having to coordinate between 5 people **can be time consuming and difficult**, this is not a reflection on my teammates, I just feel this would have been more efficient.
- Personally, I felt my focus particularly in the second term has been on INF3003 project and would have liked to contribute and engage more with this project but was not able to. I feel I gained a lot in terms of the soft skills needed to be part of a team, things like communication and engaging with an external stakeholder.

Student 5:

- There were several problems that I identified in terms of the communication with stakeholders.
 - One thing we struggled with as a team was to identify where the problem was in the current process and this was amplified by a few of the stakeholders selling the various systems and subprocesses as being “perfect”. As a learning experience, it was interesting to see how an organisation can sell itself even **when trying to find improvements**.
 - Secondly, specific to our process of card management, [*the client*] are looking to eliminate the use of [*credit/debit*] cards in the next 10-15 years and are thus were hesitant to answer questions about various problems we identified as they did not foresee them happening in the future do to this shift towards a cardless banking experience.
 - Lastly, and specifically with regards to our communication, I identified that there were times during the stakeholder meeting that I attended where it felt as if we weren’t listening to what we were being told, but rather just taking it in and writing it down. This became apparent when some of the prepared questions were asked that had already been answered in previous questions. My takeaway from this was that meetings like that should be more about listening and engaging with the stakeholders, and notes should be taken only for things you are likely to forget. One team member could also be the designated minutes taker.
- In terms of the team itself, our biggest problems came in misunderstanding both the brief in terms of deliverables and in terms of the scope of the process. This became very apparent during our first **PRESENTATION** which we walked out of very

disheartened. After that, we went back and re-analysed where we had fallen short and where we needed more information before going back to the stakeholders as well as our lecturer for his feedback.

- The learning experience from this is that every member in the team **should have as full an understanding** of both the project and the scope of it right from the onset, and that this is an essential part of ensuring project success.

Appendix G – Work Assignment (Project) Guidelines.

BPM Enterprise Systems Assignment Specifications

Table of Contents

1. Instructions, Business Processes and Team Selection
2. Deliverables and Dates
3. DP Requirement, Late Penalties, Bonuses and Evaluation Process
4. Structure and Presentation of your Assignment Report

Appendix 1. INF3012S Team Submission Form

Appendix 2. Reflection

Appendix 3. Assignment Presentation Evaluation Form [3.5%]

Appendix 4. Assignment Report Evaluation Form [10%]

Appendix 5. INF3012S Peer Review

Appendix 6. UCT Sponsor / Process Owner Evaluation [1.5% of year mark]

Appendix 7. Process Scoping and Stakeholder Analysis Examples

Appendix 8. Initial Process Change Project Business Case Worksheet

Appendix 9. Process Step Sample Worksheet

Appendix 10. Root Cause Analysis Example

Appendix 11. Process Reporting – Operational and Management Report Examples

Instructions, Business Processes and Team Selection

You are required to submit an assignment as specified in this document, or one approved by the course coordinator. In terms of the BP Trends methodology your team has been tasked with doing the **scoping, business case, analysis and design** for changing a business process. Many of these processes are supported by existing enterprise software applications. In other words in terms of the BP Trends Methodology this is a technology restricted / driven design.

In terms of ITIL or the SAP Solution Management Method this includes the Definition as well as the Design or Business Blueprint Phase. You need to write the report with the expectation that you might be selected to continue to the realization phase. To convince the host company's management of your skills, you need to demonstrate your understanding of the relevant Enterprise Systems and BPM concepts; the company's business process as well as their technology.

This assignment is carried out in teams. You need to form a team by submitting one copy of the Team Submission Form (See Appendix) for the entire team to the course convenor at the relevant lecture. For a new team experience and to encourage diverse teams there is a limit to the number of students from the same INF3003W group and course. The list of business processes and their respective host companies will be uploaded onto Vula and each team then needs to select business processes to analyse. Data-gathering is to be performed by you as a team. Data sources include interviews done by you supplemented by company documentation. **Ensure you interview all relevant stakeholders including a process customer.** You need to do the analysis yourselves and document the actual process as practiced and not what is described in documentation or what management believe or say happens. Using an existing process analysis document would constitute cheating.

We have made arrangements with several companies which make extensive use of enterprise systems and they have agreed to allow you to analyse their business process. **Working with these companies will give you a first-hand experience of working with real business processes. However, this comes with a price, due to their busy schedules as well as company policies you will be expected to adhere to a code of conduct and keep their information confidential.**

You are expected to **initiate contact with sponsors as soon as possible.** The purpose of the initial email is to introduce yourselves as a team and request an initial meeting. Make sure all emails have an appropriate subject, are written in a professional language and are sent during work hours.

The final report is a business report and you have to write it with the audience (Host Company Top Management) in mind. Please don't write user procedures.

Deliverables and Dates

The submission deadline for all hand-ins is 12:00 (midday)

30th July midday – Form Teams (see Appendix 1) & Select processes

04 September midday- submission of presentation slides

06 & 07 September – Presentations [3,5%]

16 August - 28th September – Facilitator Evaluation [2%]

08th October midday – Report Due [12,5%]

The facilitator will evaluate each team in terms of the reflection, project planning, team dynamics and stakeholder communication. During the evaluation period you will need to formally meet at least twice with the facilitator explaining all deliverables. The facilitator will also evaluate the shared understanding of the process and proposed solutions. Each team will be assigned a facilitator.

- All teams are required to setup a shared drive (preferably using One-Drive) share it with all team members as well as the facilitator and academics on the course. The contents of this drive will be reviewed at random times by the facilitator and will be used to assign marks.
- All **emails** sent to and coming from stakeholders must be saved in the shared folder.
- You are required to write down **minutes** for all meetings especially meetings with stakeholders, these minutes must be saved in the shared folder.
- You are required to develop and keep up to date on the shared folder, a **project plan** (preferably using Microsoft Project) reflecting all relevant tasks as well as dates for milestones, submissions and meetings. The plan needs to correlate with other relevant documents e.g. emails & meeting minutes.
- **Reflection** as shown in your reflection-for-action plan and your reflective journals (see Appendix 2).
- If you have any questions with regard to this evaluation do not hesitate to consult the facilitator.

06 & 07 September – Presentation [3.5%]

You need to present the core findings from your Scoping, Business Case and high-level Business Process analysis. The submission deadline for the presentation slides on Vula is **12:00 (midday) Tuesday 04 September for all teams**. Your slides will be pre-loaded onto the demonstration PC [no updates – no flash drives etc.] Late penalties will apply. The panel will include EY consultants, your lecturers, facilitators and process stakeholders. The 10 minute presentation should be done by the entire team and will be followed by 10 minutes of questions. All members of the team will be required to answer questions.

08th October 12:00 (midday) Documentation Hand-in [12.5%]

The submission deadline for all hand-ins is **12:00 (midday)**. You must hand in [1% for complete hand-ins]:

- 1) The electronic report in Microsoft Word to Vula as a single file through Turnitin. The report should be in 11pt font and should be approximately 25 pages in length. Late penalties will apply. Ideally the project manager should upload. If you make an error uploading simply upload using a second student account [10%].
- 2) Each team member needs to complete and upload a peer evaluation (to another assignment). Note marks for completed submission.
- 3) The sponsor evaluation needs to be e-mailed or delivered to the course convenor [1.5%]. Plan and schedule a report back meeting in advance to secure this.
- 4) The electronic modifiable (not graphic) original XML version of BPMN models (to another assignment). Note marks for completed submission.

17th October Thank & Celebrate Ceremony. There will be an awards ceremony at 17h30.

DP Requirement, Late Penalties, Bonuses and Evaluation Process

No exemptions will be granted for deliverables, and this deliverable needs to be completed for DP purposes.

Penalties apply to all deliverables:

- Late penalties. All times taken from Vula. Five percent (5%) of the total marks available for the assessment shall be deducted from the assessment mark for each 24 hours after the submission deadline (note 12:01 is after deadline), up to a maximum of five days. Work received more than five days after the submission deadline will receive a mark of zero.
- Penalties up to 5% for poor clarity of expression, poor readability, poor flow of ideas, wordiness, poor grammar and spelling.

Bonuses apply to all deliverables:

- Bonuses of up to 5% can be obtained by early handin, 1% for each 24 hours before the submission deadline, up to a maximum of 5%. All times taken from Vula.
- Bonuses of up to 5% can be obtained for clarity of expression, readability, flow of ideas, conciseness, and excellent grammar and spelling.

The assignment report as well as the presentation will be marked using the attached evaluation forms.

- **Unreadable graphics** can't be evaluated. Ensure all graphics are clear and readable in A4 format and form part of the documents or presentations.
- **Peer assessments** need to be done and will be used to re-adjust marks for team-members who have contributed inadequately to the assignment.

This should be a very enriching and rewarding experience for you and potentially UCT. **Start work early** and we hope that you thoroughly enjoy the experience.

Structure and Presentation of your Assignment Report

Your assignment should be in **one Microsoft Word document** and should contain the following report sections:

1. Title page and Plagiarism Declaration

Your assignment should have a title page. An example follows, please substitute the XXXXs:

ERP Business Process investigation: XXXX Process

An assignment presented to :

Submitted by: XXXX, XXX, XXX and XXXX

in partial fulfilment of the requirements for: The Information Systems (____) Course

Declaration

I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own. We have used the APA Convention for citation and referencing. Each contribution to, and quotation from, the works of other people has been attributed, and has been cited and referenced.

I acknowledge that copying someone else's assignment or essay, or part of it, is wrong, and declare that this is our own work.

I have not allowed, and will not allow, another person or group to copy our work with the intention of passing it off as their own work

All Signatures

Date .../.../.....

2. Table of contents

Generate this in MsWord (References -> Table of Contents).

3. Introduction [2.5]

Introduce the Assignment and your business process. Indicate who you interviewed and all sources of data and how the assignment report is structured.

4. Process Scoping and Stakeholder analysis [10]

The BP Trends method was discussed in lectures, some ideas from previous projects are shown in Appendix 7. Ensure diagrams are discussed.

- Include an analysis of all stakeholders for your process.

- Include a scoping diagram. In the centre of your scoping diagram include your high-level diagram of the existing process with Management activities. Indicate problems with all 6 categories.

5. Business Case [5]

Provide a Business Case for changing your process. Follow the template and samples provided in Appendix 8. Baseline metrics can be estimated, for example number of orders processed per day, however real numbers are preferred. Estimates need to be realistic and explained. Include interviewees' time in costs.

6. Business Process Analysis [15]

Do a complete analysis of the existing process following the recommendations in the BP Trends Methodology. In your discussion include:

- An organizational chart detailing all Departments and roles/resources *relevant to the business process. Don't include individual names.*
- A BPMN collaboration diagram of the business process following the guidelines in your workshops. Your process should ideally have 6 – 12 tasks. Include management and reporting steps. Number your activities and ensure all lanes are in your organisational chart. The diagram included in the report must be high resolution and chunked into multiple A4 pages if needed. *Unreadable diagrams will not be awarded marks.*
- Do a root-cause analysis of your problems
- Comment on the design effectiveness of the business process and any concerns you have in terms of risks.
- Include a discussion where you explain all problems. In support include quotes from interviewees and analysis of any secondary data. Remember your most important stakeholder is the customer. Try and identify the customer's needs.

7. Business Process Steps [10]

For EACH numbered task performed in your (as-is OR to-be) business process, enter a completed activity worksheet. See Appendix 9. For each step:

- Follow the numbering from your BPMN (state if it is your as-is OR to-be).

- Under tools indicate whether an existing SAP transaction; a new development; another system, a form, a manual task etc.
- Insert one graphic supporting the step such as a screen capture or a form or a photo or a mock-up. *If the transaction is on SAP, perform a similar transaction on our SAP system (to demonstrate your SAP skills) and insert a screen capture– Don't ask companies to send you graphics or perform transactions for you.*
- Indicate Master data required to support the step (e.g. Customer; material etc.)

8. Suggested Process Redesign [10]

Discuss process redesign options. If you have chosen to do the “to-be” steps in section 7 then include a “to-be” BPMN. The following is needed:

- Suggest controls to mitigate risks with the current process (identified in section 6) and how one would test these controls.
- Explain process improvements and how they would solve the root causes of the problems (identified in section 6).
- HR impact: Identify the changes in organisational structure, job descriptions and training needs required for the proposed changes. All process changes have a human impact.

9. Process Reporting [16]

Here you are required to create and discuss **two operational reports** (to manage exceptions in the business process) and **two management reports** (to measure at least two KPIs (Key Performance Indicators) for your business process). To create all 4 reports make use of SAP Lumira (available in Commerce Labs) or any other appropriate reporting tool but then check with Gwamaka first.

- Justify your choice of reports based on (or linked to) the business case and process improvement sections of your report.
- Describe the reporting interfaces / features using screen shots.
- Explain the source of data (Documents or Tables and fields in the existing applications) that will be used to generate the suggested reports.

10. Conclusion [2.5]

In conclusion you need to summarise your process change case for continuing to the realisation phase. Describe and discuss the total cost of the change and the benefit from the proposed changes.

11. Project Learnings and Team Self-Assessment [9]

Complete a team self-assessment for your project reflecting on the learnings from your project. Your reflection-on-action journals should assist you. Describe what you learnt through experience and what you would do differently if you were to start another similar project.

12. Appendices

Any relevant documentation you would like to include.

Appendix 1. INF3012S Team Submission Form

Please team up with colleagues into teams of four or five.

Each team needs to comprise at least **2 Science students and 2-3 Commerce students**.

Please submit this form for the entire team as requested.

Ensure you have confirmed arrangements with all team members before submitting.

If you are unable to find enough members for a team, you can submit your form with details of the members you do have and we will attempt to add other students to complete the team.

If your name is not in any of the forms submitted you will be randomly allocated into a team.

Team Member 1 (Commerce)	Team Member 3 (Science)
Surname:	Surname:
First Name:	First Name:
Student number:	Student number:
Cell number:	Cell number:
Degree:	Degree:
Team Member 2 (Commerce)	Team Member 4 (Science)
Surname:	Surname:
First Name:	First Name:
Student number:	Student number:
Cell number:	Cell number:
Degree:	Degree:
Team Member 5 (Commerce)	Your Process Choices in order of preference
Surname:	1
First Name:	2
Student number:	3
Cell number:	4
Degree:	5

Team Leader: _____

IMPORTANT: Only submit one form per team

Appendix 2. Reflection

Guidelines for Reflection-for-Action:

Reflection-for-Action is about planning to take some (positive) steps to apply what you have learned. Below are some guidelines and action challenges to help you prepare the assessment.

1. Design – How are we going to approach the assignment?
2. Imagine – What do we need to do?
3. Act – Who takes which action?

Ten action challenges to help your planning:

Challenge 1: Plan for Action	All action needs to be guided by a plan
Challenge 2: Allocate for Action	Effective action needs to be resourced appropriately
Challenge 3: Lead for Action	Action leading to improvement needs to be well led, because much depends upon the exercise of power, influence and persuasion
Challenge 4: Strengthen for Action	Who or what needs to be strengthened, if action leading to improvement is to stand a chance?
Challenge 5: Mobilize for Action	Action needs enthusiasm and motivated people to initiate it and keep it going
Challenge 6: Clarify for Action	If you haven't explained to staff why they need to act differently, they are unlikely to change what they are currently doing
Challenge 7: Cultivate for Action	Better, rather than simply different, action requires an understanding of each person's gifts and talents
Challenge 8: Integrate for Action	Action for improvement often requires new and different ways of working to overcome functional barriers ('we do this, in this way here') and cultural barriers ('This is why we do what we do, everyday,

Challenge 9: Wire for Action	with those we work with') Some action requires the support of modern (information) technologies – fast, accurate, useable and well-managed information (knowledge) systems are required
Challenge 10: Re-energize for Action	Any action takes energy; energy management and renewal is important to combat fatigue

Source: Redwood, S., Goldwasser, C., Street, S. and PricewaterhouseCoopers LLP (1999) *Action management*. New York, NY: John Wiley & Sons.

Guidelines for Reflection-on-Action

To help with the team self-assessment it is useful to keep regular reflective journals. One method is to share a Google Docs document and each team member enters their reflections directly after they have done any work on the assignment. This document is easily edited before final hand-in.

1. Awareness – What did I/we do?
2. Appreciation – What went well?
3. Imagine – What could I/we do better?
4. Design – How am I/are we going to do it better? What must I/we do next?
5. Judgement - Is this what I/we should be doing?

Appendix 3. Assignment Presentation Evaluation Form [3.5%]

User Names	Student Numbers	Marker	Initial mark					Penalty	Final Mark /100
							X		
Item	Remarks	0	1	2	3	4	5	Weight	= Score
Introduction	Introduce speakers and talk							1	/5
Scoping & stakeholder analysis	level, detail, correctness, interest							3	/15
Business Case	level, detail, correctness, interest							2	/10
As-is analysis	level, detail, correctness, interest							2	/10
Summary								1	/5
Visual Aids (quality / appeal / effect)								2	/10
Time Management	Usage of time. Not under or over, No rushing or repetition. Over time or late is heavily penalised.							2	/10
Structure / Flow								1	/5
Props / Demo								1	/5
Diction, Use of Language, Confidence								1	/5
Connection with Audience								1	/5
Question handling								1	/5
Overall impression and interest level								2	/10
Bonus (e.g. humour, unusual approach...)								1	/5
Penalties & Bonuses									

Appendix 4. Assignment Report Evaluation Form [10%]

Students		Initial mark	Penalty	Final Mark /100	
	Excellent	Good	Acceptable	Poor	
Introduction and Conclusion	Major effort	Above average effort	Reasonable effort	Little apparent effort	5
Scoping & stakeholder analysis	Excellent analysis of process, management and stakeholders.				10
Business Case	Includes scope, problem, quantified benefits, costs, plan, risks and concerns				5
Business Process/ Activity Analysis	Excellent analysis of problems and risks. Organisational chart, process diagram and steps all correspond.	Comprehensive explanations. No omissions.	Errors or omissions. Did not give impression of full understanding.	Scrappy effort, major elements missing. No screen shots from SAP	25
Process Redesign	Excellent analysis and suggestions in terms of controls, changes and HR impact. Well explained.	Good suggestions described comprehensively	Not clearly explained.	Patchy effort, no explanations given.	10
Process Reporting	Excellent report specifications and motivation. Reporting interfaces well explained.	Reports well selected, justified and described comprehensively	Reports not well chosen or motivated. Not clearly explained.	Patchy effort, no explanations given.	20
Reflection	Major effort	Above average effort	Reasonable effort	Little apparent effort	10

Overall	5	4 3	3 2	2 0	
Integration between sections	Completely integrated and logical	Occasional lack of connection between sections	Significant disjoint between sections	Sections appear written independently	5
Spelling, Grammar & Style	No errors Excellent, masterful style	Very few (minor) Well written, professional	Acceptable (1 pp) Readable, lapses, quite business-like	Execrable (> 3 pp) Verbose/ waffle, colloquial style, not business-like	5
General presentation	Lots of effort, stands out as superior. Good use of tables and figures, perfect headings and titles. One document with high clarity graphics.	Crisp, consistent, aesthetically pleasing	Neat but with some inconsistencies in graphics, headings and titles	Scrappy, untidy	5
Penalties & Bonuses					

Appendix 5. Peer Review

TEAM NUMBER:		YOUR NAME :		
		Signature:		
REST OF TEAM:				
NAME 1 :	NAME 2 :	NAME 3 :	NAME 4 :	NAME 5 :

Please rate YOURSELF and the contribution of the team members for each category in the column corresponding to the specific team member

0- Unacceptable/None 1- Significantly Less 2- Less 3- Equal 4- More 5- Significantly more

TEAM RATING:	Self- evaluation	REST OF TEAM:				
		NAME 1 :	NAME 2 :	NAME 3 :	NAME 4 :	NAME 5 :
Participation in team meetings						
Participation in stakeholder interviews						
Communication						
Reliability and adherence to deadlines						
Contribution to the Presentation						
Contribution to the Final Report						

PROBLEMS EXPERIENCED AND ATTEMPTS TO SOLVE THEM:

Team Dynamics:	Comments
Other:	Comments

Appendix 6. Sponsor / Process Owner Evaluation [1.5% of year mark]

Sponsor / Process Owner Name:

Business Process:

Scale Definition

Extremely Dissatisfied	Dissatisfied	Not Quite Satisfied	Satisfied	Extremely Satisfied	Unknown or Not Relevant
1	2	3	4	5	X

The purpose of this project was for the student team to highlight problems in a process and suggest improvements. Please rate your satisfaction with the team using the scale above

The team..	Rate 1-5
...demonstrated insight into your business issues?	
...was able to identify problems and give constructive critique?	
...was proactive in providing practical recommendations?	
...set meetings, communicated and met with you in a professional manner?	
...responded to requests and enquiries in a timely manner?	
...provided a team that worked well in your environment?	
...effectively addressed and acted on your feedback?	
Please rate your overall satisfaction with the quality of work	

Would you recommend this project to other process owners?

Please comment on any areas that have exceeded your expectations or any areas where we could improve:

--

Please comment on how this project resulted in any fresh perspectives and improvements to the process:

--

Please send this evaluation to:

Information Systems Department