



THE IMPACT OF ENTERPRISE RESOURCE PLANNING
(ERP) EDUCATION IN ZAMBIA

By

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DEDICATION

To my late mother Mrs Inonge Sibutu Aongola Lubasi

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.

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ABSTRACT

The Impact of Enterprise Resource Planning (ERP) Education in Zambia

This socio-technical study describes and explains the impact of an ERP course, introduced at the University of Zambia. Zambia lacks local ERP expertise required for the implementation and support of ERP systems in organisations. The research investigated the impact of this ERP education on the postgraduate students that went through the course and the resultant potential impact on organisations in Zambia.

The research paradigm used to answer the research question was interpretivism and the research has three-parts. Study 1 used a deductive approach and Sen's Capability Approach to explain how student choices and personal, social, and environmental conversion factors impact student capabilities and functionings enabled by ERP education. The Zambian context which restricts higher salaries and employment prospects is evident.

Study 2 inductively investigated the course outcomes of ERP education and the contextual factors that impact ERP education course outcomes. The impact of the teaching model and the course limitations on course outcomes were explained and a richer understanding and impact of the Zambian context, in which foreign expertise is preferred over local expertise is presented.

Study 3 inductively investigated the ERP challenges experienced by organisations in Zambia and the potential impact of ERP education on organisations and on the outsourcing of ERP expertise from outside Zambia. Multiple potential benefits of ERP education on organisations were described and challenges that reduced the impact of ERP education on environmental, project-related, and organisational challenges were explained.

The contribution to practice is an ERP education explanatory model that can be used to foster collaboration between industry and academia, to assist universities in appropriately integrating ERP systems into university curricula, and to assist organisations in maximising their benefit from graduates with ERP education. The contribution to theory is a description of the Zambian ERP context and a holistic explanation of how contextual factors impact and are impacted by ERP education. The study underscores the importance of contextual factors when incorporating new information systems' courses into university curricula.

PUBLICATIONS

During the course of this study, 3 papers were published. These papers presented findings and contributions of this study. The papers were accepted and presented at 3 conferences and published as full papers as outlined below:

- Lubasi, M, Seymour, LF & Phiri, J (2017) A Capabilities Approach to Enterprise Resource Planning Education. In Proceedings of the IEEE –International Conference in Information and Communication Technologies (**ICICT**), Lusaka, Zambia, 74-78. ISBN: 978-9982-70-301-7
- Lubasi M. & Seymour LF. (2019) The Impact of Enterprise Resource Planning Education: A Case Study of the University of Zambia. In: Kabanda S., Suleman H., Gruner S. (eds) ICT Education. SACLA 2018. **Communications in Computer and Information Science** (CCIS), vol 963, 331-344. ISSN 1865-0929. Springer, Cham. https://doi.org/10.1007/978-3-030-05813-5_22
- Lubasi, M. & Seymour, LF. (2022). Understanding the Significance of Enterprise Resource Planning Education in Zambia: A Case of an ERP Short Course at University of Zambia. **Communications in Computer and Information Science** (CCIS) 1461, 149-164, ISSN 1865-0929. Springer, Cham. https://doi.org/10.1007/978-3-030-95003-3_10 50th Annual Conference of the Southern African Computer Lectures' Association (**SACLA** 2021). 41% acceptance

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1 INTRODUCTION

The adoption of Enterprise Resource Planning (ERP) Systems in organisations to manage business processes has led to an increasing demand for ERP professionals (Jheengut et al., 2020). ERP systems are “well-organised collections of software that work together to timely integrate business processes and support the management of effective cross-functional operations within an organisation” (Prakash et al., 2022), including automation, finance, human resources, supply chain, manufacturing, sales, and marketing (Chopra et al., 2022).

One of the problems that has been identified in ERP projects is that non-technical issues like people are ignored and more focus is placed on technical issues and finance (Ravasan & Mansouri, 2014). Implementing an ERP system largely depends on an organisation’s ability to employ and retain personnel with the appropriate competencies (Ravasan & Mansouri, 2014). Retention strategies are recommended to maintain experienced employees so that knowledge and expertise do not leave the organisation, and to reduce the cost of hiring and training new employees (Elsafty & Oraby, 2022). Developing in-house ERP expertise reduces dependence on vendors and aids in the resolution of ERP technical problems (Akrong et al., 2022).

One of the challenges that organisations face in ERP implementation is lack of in-house ERP expertise (Sar & Garg, 2022). Challenges of ERP implementation are also increased by poor consultant effectiveness (Akrong et al., 2022). It has been noted that if organisations rely solely on consultants, they may not be able to assess whether processes were implemented correctly and adapted to the organisation’s needs (Bawack & Kala Kamdjoug, 2023). To prevent such risks, it is recommended that consultants transfer their knowledge to in-house employees who will be able to maintain the system after implementation (Bawack & Kala Kamdjoug, 2023).

It has been noted that consultancy fees make up a considerable part of ERP project costs (Bawack & Kala Kamdjoug, 2023). It is therefore recommended that in order for organisations to reduce their dependence on outside sources, they should endeavour to improve their employees’ competence levels (Akrong et al., 2022). Employees’ competence levels can be improved by consultants transferring their knowledge to internal staff who can easily absorb the training (Bawack & Kala Kamdjoug, 2023). This internal capability can be built by having employees with ERP education, as the ERP graduates already have ERP background knowledge; hence, they would be able to absorb the knowledge transfer quicker.

The demand for employees with ERP competencies and the popularity of ERP systems has prompted universities to integrate ERP systems into their business school and information systems curriculum to help bridge the gap in ERP competencies (Ravesteyn & Kohler, 2009). Literature shows that the trend in ERP education research is also increasing as the demand for ERP skills and the adoption of ERP curricula in higher education increases (Wijaya, 2023).

1.1 Empirical Context

Zambia launched its first National Information and Communication Technology (ICT) Policy in 2006 whose aim was to address the following identified ICT challenges (Ministry of Communications and Transport, 2006):

- *Low ICT literacy in the country, which is a major obstacle to the development of Zambia's information society.*
- *High cost of technology acquisition, thus making ICT technology and skill development programmes inaccessible to most Zambians*
- *The 'brain drain' problem, which is resulting in considerable loss of the few skilled personnel from Zambia to other countries in search of better job opportunities.*
- *Limited local ICT industry thus offering inadequate services and few job opportunities.*
- *Lack of standardisation and certification programmes in the IT field resulting in external courses with little localisation to the Zambian education curriculum.*
- *Inadequate institutional capacity among formal training providers to increase intake and output numbers of ICT graduates*

The government of Zambia recently revised the 2006 National ICT Policy and launched the 2023 National ICT Policy (Ministry of Technology and Science, 2023a). The objectives of the 2023 ICT Policy are outlined below (Ministry of Technology and Science, 2023a):

- *To increase availability, accessibility and usage of ICT products and services*
- *To enhance human development and ICT skills in all sectors.*
- *To promote ICT research, innovation, and entrepreneurship.*
- *To promote the development and utilisation of e-services in both public and private sectors.*
- *To promote the deployment and enhancement of ICT infrastructure.*
- *To ensure a safe and secure ICT environment.*

As noted from the 2023 National ICT Policy, Zambia hopes to enhance human development and ICT skills in all sectors. The government of Zambia hopes to achieve this by revising curricula at all levels of education to include basic, intermediate, and advanced ICT skills and the introduction of specialised ICT programmes at higher institutions of education as outlined in the National ICT Policy Implementation Plan (Ministry of Technology and Science, 2023b). Zambia has insufficient ERP skills and relies on outsourcing of ERP expertise. Lack of local expertise was identified as one of the challenges organisations in Zambia face in ERP implementation (Mkokweza & Phiri, 2016); hence, the need to build capacity in ERP expertise. It has also been noted that the Zambian public sector has inadequate ICT skills, inadequate funding for ICTs and inadequate ICT infrastructure (Smart Zambia Institute, 2019). Most technology solutions in Zambia are outsourced from foreign-based providers which has led to high maintenance costs and licensing fees (Ministry of Technology and Science, 2023a). Therefore, ERP education would aid in building capacity for ICT skills in Zambia and help to reduce the cost of outsourcing ERP expertise. In this research, the integration of ERP systems into university curricula is referred to as ERP education.

ERP education was introduced in African universities through the Enterprise Systems Education For Africa (ESEFA) programme (Enterprise Systems Education For Africa, n.d). ESEFA was established to help meet the demand for skilled ICT personnel by empowering students in African universities with enterprise systems skills. The University of Zambia (UNZA) was one of the first universities in Africa to join the ESEFA programme. African enterprises are not homogenous but contextual factors such as infrastructure, culture, economy, government policy, and the sector an enterprise operates in influence the implementation and support of ERP systems as well as ERP education (Abdellatif, 2014). As noted in the Zambia National ICT Policy of 2006, there is a need for curricula that is localised and relevant to the Zambian context (Ministry of Communications and Transport, 2006).

1.2 Research Problem

It has been noted by researchers that while universities have implemented ERP education, there were limited studies on the benefits or added value of ERP education (Bradford et al., 2003; Hepner & Dickson, 2013). Since this call for research was made, many studies have been conducted on the outcomes of ERP education, but these studies have not determined the contextual factors that impact these outcomes and the potential impact that ERP education course outcomes could have on organisations. Further research on ERP education has been recommended by developing and testing theoretical frameworks that would assist in improving

ERP education course outcomes and enhance the learning experience of students (Wijaya, 2023).

It has been argued that social phenomena cannot be explained without considering context; therefore, context should be part of theory building (Welch et al., 2022). Context provides insight and a better understanding of the transferability of research (Welch et al., 2022). This study therefore seeks to contribute to research on the benefits or added value of ERP education by describing and explaining the impact of ERP education on students who went through ERP education at UNZA and the contextual factors that impacted ERP education. The research also investigates the ERP challenges faced by organisations in Zambia and the potential impact of ERP education on these organisations. The study therefore seeks to answer the following research question:

- What is the impact of ERP education on students and organisations, and what contextual factors impact ERP education?

In answering this research question, the following sub-questions were asked:

- RQ1: How do conversion factors and choices influence the impact of ERP education on student capabilities and functionings?
- RQ2: What are the course outcomes of ERP education, and what contextual factors impact these course outcomes?
- RQ3: What ERP challenges are experienced by organisations in Zambia?
- RQ4: What is the potential impact of ERP education on organisations and outsourcing of ERP expertise?

1.3 Justification of Research

The research focuses on the Zambian context, where no research on ERP education has previously been done. Therefore, the research contributes to the body of knowledge on ERP education research and the impact of contextual factors. Academic institutions that have implemented ERP education and those that are yet to implement ERP education could benefit from this research. The research has the potential to help academic institutions evaluate how well their ERP curriculum is meeting the needs of industry and provide justification for investment in ERP education. The research can also assist organisations in knowing what course outcomes to expect from ERP education graduates and can also encourage collaboration between industry and academia. This research seeks to achieve the following objectives:

- To determine the student capabilities and functionings that are enabled by ERP education.
- To determine the contextual factors that impact student capabilities and functionings.
- To determine the potential impact of ERP education course outcomes on organisations.
- To determine how ERP education course outcomes will impact ERP challenges and outsourcing of ERP expertise in organisations.

To achieve these objectives, three studies were undertaken. The first study looks at the impact of ERP education on students using a deductive approach. The second study looks at the impact of ERP education on students using an inductive approach. The third study looks at the potential impact of ERP education on organisations using an inductive approach.

1.4 Structure of Thesis

The rest of the thesis is organised as follows: Chapter 2 reviews the literature on ERP education, highlighting the gaps identified and linking them to the research problem. Chapter 3 discusses the research method that was used in the collection and analysis of data. Chapter 4 presents the data analysis for Study 1, which is the deductive study. Chapter 5 presents the data analysis for Study 2, which is the inductive study and presents an explanatory model on ERP education. Chapter 6 discusses ERP challenges faced by organisations in Zambia. Chapter 7 discusses the potential impact of ERP education on organisations. Chapter 8 discusses the relationships in Study 3 and presents a final explanatory model linking Study 2 to Study 3. Chapter 9 presents the conclusion of the research and recommendations for further research.

2 LITERATURE REVIEW

This chapter presents the literature review on ERP education research showing the research gap in ERP education. The literature review process was performed using a hermeneutic approach. The chapter begins by discussing ERP implementation challenges and proceeds to look at the skill requirements of ERP graduates, the challenges of ERP education, and the ERP curriculum integration models. It then proceeds to look at ERP education research and concludes by looking at the theoretical framework for the deductive study of the research.

2.1 Hermeneutic Approach

The literature review was conducted using the hermeneutic framework presented in Figure 2-1. The hermeneutic framework consists of the search and acquisition inner circle and the analysis and interpretation wider circle (Boell & Cecez-Kecmanovic, 2014). The steps followed for both the inner hermeneutic circle and the wider hermeneutic circle will now be described.

2.1.1 Inner Hermeneutic Circle

In order to identify the gap in ERP education, a search was conducted on Google Scholar for papers under the topics, ERP education, impact of ERP education, and ERP curriculum integration. This enabled the identification of the research gap on the value or benefits of ERP education. The research evolved over time with the identification of a theory that would assist in the initial design of the research questions. Sen's Capability Approach was identified as the theoretical framework, supplemented by Gigler's Alternative Evaluation Framework (AEF). As the research progressed, new papers were read and reviewed, and EndNote referencing software was used to manage references.

A search for relevant publications on ERP education research conducted in Africa from 2010-2023 was also done on Google Scholar and on Scopus. The keywords used for the search on Google Scholar were "ERP education in Africa" and "ERP curriculum integration in Africa." The keywords used for the search on Scopus were "ERP education" and countries in Africa were selected. Publications that looked at the teaching of ERP systems in higher education and required ERP competencies were selected. The selected publications were acquired and read, which led to further publications being selected and the search being refined.

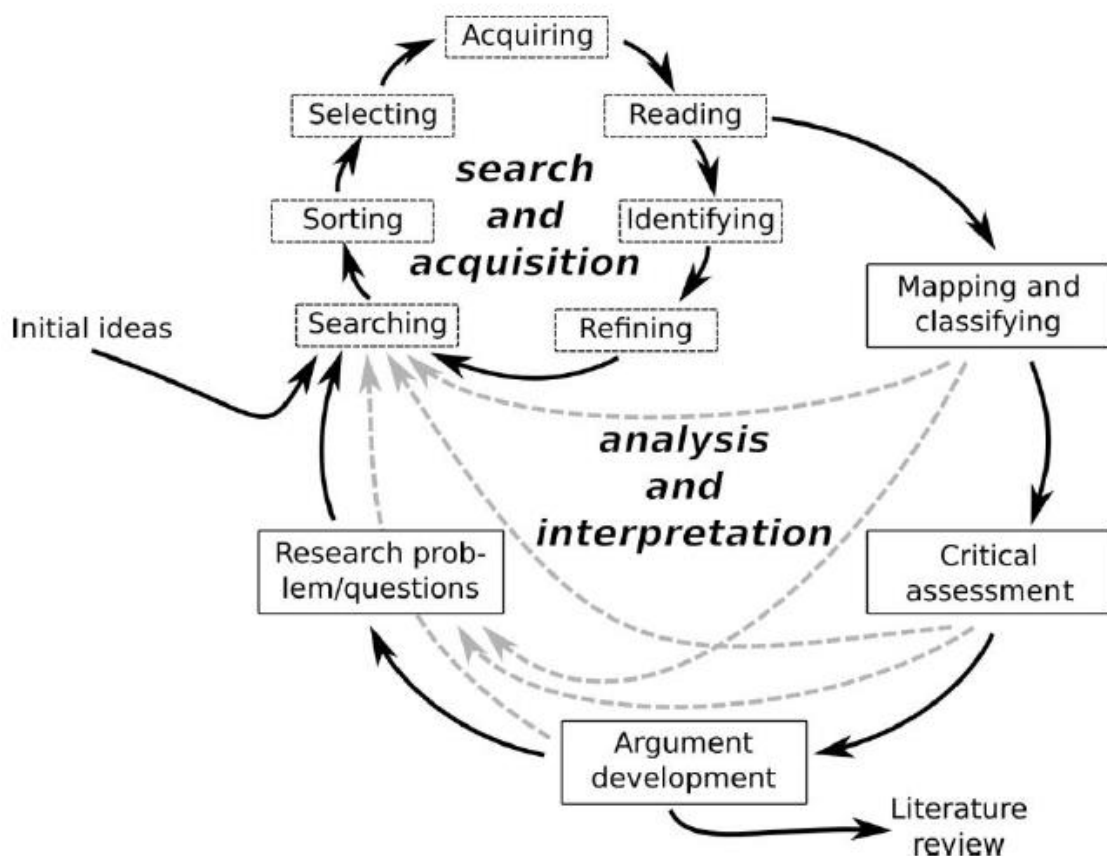


Figure 2-1 Hermeneutic Framework for The Literature Review Process

(Boell & Cecez-Kecmanovic, 2014)

2.1.2 The Hermeneutic Circle of Analysis and Interpretation

This circle focuses on the analysis and interpretation of selected papers after the reading process. After selected papers were read, mapping and classification was done according to the main findings or concepts in the paper as presented in Table 2-1. As more papers were read, it became clear that contextual factors and benefits of ERP education are different in each country. The literature review showed that the research that has been conducted in Africa can be categorised into challenges of ERP education, frameworks developed for ERP education, competencies required from ERP professionals, and evaluation of ERP education courses. The assessment process showed that there was no study done on ERP education in Zambia. There were limited studies found that determined how context impacts student capabilities and functionings enabled by ERP education and how student capabilities and functionings can impact organisations. Hence, this research seeks to address this gap on how ERP education impacts students and organisations.

Table 2-1 ERP Education Research in Africa

| Region | Findings | Citation |
|----------------------|---|---------------------------|
| South Africa | Proposed a framework for mobile learning of ERP systems. | (Scholtz & Kapeso, 2014) |
| Africa | Presents the integration of ERP software into school curricula in Sub-Saharan Africa through the erp4school programme. This paper does not present the outcomes or impact of this programme on students. | (Ansen, 2014) |
| Namibia and Tanzania | Identified challenges in teaching ERP systems in higher education institutions. These challenges include administration challenges, resources challenges, technology challenges, students' challenges, and teaching challenges. | (Mahanga & Seymour, 2016) |
| South Africa | Proposed a comprehensive competency framework for ERP system adoption in IS higher education. | (Scholtz et al., 2012) |
| Sub-Saharan Africa | Highlighted ERP education challenges and efforts to overcome these challenges. These efforts through the ESEFA programme included providing application and technical support, lecturer training, and coordinating research and industry engagements. | (Mwalemba, 2019) |
| Sub-Saharan Africa | Investigated competencies gained by students from an ERP education course. Findings showed that business process knowledge was the most improved competence while the least improved competence was interpersonal skills. | (Ampeire & Seymour, 2016) |
| South Africa | Identified seven ERP primary competencies required from ERP professionals. These competencies were business process management, ERP theory and concepts, ERP transactions, ERP implementation and | (Scholtz et al., 2010) |

| | | |
|--------------------|--|-------------------------------|
| | configuration, ERP programming, ERP management, and ERP Security. | |
| South Africa | Explored the use of gamification to teach ERP systems using LearnERP system. LearnERP was used to evaluate system usability and students' user experience. | (Mloza-Banda & Scholtz, 2017) |
| Mauritius | Proposed and implemented a web-based simulation game for teaching ERP systems. An evaluation of students who used this game showed that students had a better understanding of ERP concepts. | (Munogee et al., 2019) |
| Mauritius | Evaluated different ERP teaching methods and recommended incorporating ERP simulation games in ERP Teaching. | (Jheengut et al., 2020) |
| Mauritius | Proposed a gaming approach to ERP education even as higher learning institutions moved to online learning due to the covid-19 pandemic. | (Jheengut et al., 2021) |
| South Africa | Evaluated a SYSPRO ERP e-learning system based on perceived ease of use and perceived usefulness. | (Scholtz et al., 2014) |
| Sub-Saharan Africa | Discussed sustainability in ERP education by considering several dimensions, that is, cultural characteristics, administrative structures, technical and infrastructural features, and academic customs and practices and curricula content. | (Zschieck et al., 2016) |
| Mauritius | Identified ERP competencies required for ERP project implementations. These were classified as general skills and ERP-specific skills. | (Cadersaib et al., 2020) |
| Nigeria | Identified factors that prevent women from achieving SAP ERP skills. These constraints were the high cost of infrastructure, the software was not user friendly, poor background of business | (Alawode et al., 2019) |

| | | |
|--------------|--|--------------------------|
| | processes, payment for training, and payment for examination to obtain a proficiency certificate. | |
| South Africa | Provided an ERP framework for teaching ERP skills to disadvantaged youth | (Tokosi et al., 2021) |
| Nigeria | Evaluated an ESEFA SAP ERP course and presented several recommendations on how the course could be improved. | (Alawode et al., 2015) |
| Mauritius | Proposed a framework that integrates business analytics for teaching ERP systems in higher education. This framework was evaluated on undergraduate students in Mauritius, and it was found to increase student interest, learning, and understanding. | (Cadersaib et al., 2022) |

2.2 ERP Implementation Challenges

Organisations have encountered several challenges in the implementation and support of ERP systems. These challenges have been grouped into several categories by different researchers. ERP post implementation challenges in India were identified as operational challenges, analytical challenges, organisation-wide challenges, and technical challenges (Singh et al., 2023). It was noted that organisation-wide challenges had the highest prominence, followed by analytical challenges, operational challenges, and lastly technical challenges. Technical challenges were found to influence organisation-wide challenges, analytical challenges, and operational challenges. Organisation-wide challenges influence analytical challenges and operational challenges. Operational challenges were found to influence analytical challenges.

In Nigeria, ERP challenges were classified as project management-related factors, ERP systems-related factors, technology-related factors, and management-related factors (Amade et al., 2022). Cultural challenges in the Middle Eastern developing countries identified technophobia and lack of commitment to training as the dominant ERP challenges (Ali et al., 2023). Another study conducted in Bangladesh showed that ERP challenges in developing countries can be classified as technical, operational, and human challenges with technical challenges being dominant (Saif et al., 2021).

Critical challenges in ERP implementation have also been grouped into human, technological, and organisational dimensions (Menon et al., 2019). Additional categories include project management, HR, and managerial (Mahmood et al., 2019). Managerial challenges include top management approach, change management, and consultant/vendor selection (Mahmood et al., 2019). HR challenges include training and development, and team empowerment (Mahmood et al., 2019). Organisational challenges include effective communication, and organisational culture (Mahmood et al., 2019). Technical/technological challenges include system integration of ERP modules, and business process re-engineering (Mahmood et al., 2019). Project management challenges include poor project management, project team formation, and data migration (Mahmood et al., 2019).

Critical factors that affect ERP implementation can also be classified into national/environmental and organisational/internal factors (Abdellatif, 2014). Environmental factors include infrastructure, economy, culture, government policy, and manufacturing strengths. Internal factors include business size, IT maturity, top management commitment, and change management. It was noted that limited studies have tried to determine the inter-relationships between the different categories of challenges identified. Lack of qualified ERP personnel was identified as a challenge in ERP projects (Amade et al., 2022). Hence, the need to build capacity in ERP skills in the organisation to help mitigate some of the ERP challenges identified. This capacity can be built through ERP education.

2.3 Skill Requirements of ERP Graduates

Key ERP skills that organisations require from ERP graduates were identified by Boyle and Strong (2006) as ERP technical skills, technology management knowledge, business functional knowledge, interpersonal skills, and team skills. Their research showed that IT specialists involved in the implementation and support of ERP systems considered business functional knowledge as the most important skill followed by technology management. The third most desired skills were interpersonal and team skills, and the least important skill was ERP technical knowledge. ERP practitioners consider team skills, business and application understanding, project management and, systems analysis and integration as critical skills required for entry level ERP employees (Peslak & Boyle, 2010). The identified competencies can be used as a benchmark to determine how well an ERP curriculum is meeting the needs of industry. For example, a study found that change management and people management skills, which are soft skills required for ERP implementation success, are often overlooked in ERP education (Mohamed & McLaren, 2009).

Seven competencies required by ERP professionals were identified as business process management, ERP theory and concepts, ERP transactions, ERP implementation and configuration, ERP programming, ERP management, and ERP security (Scholtz et al., 2010). A review of skills relevant to ERP implementation projects found that ERP competencies can be categorised into general skills and ERP-specific skills (Cadersaib et al., 2020). General skills include interpersonal skills, strategic skills, problem-solving skills, business skills, and management skills (Cadersaib et al., 2020). ERP-specific skills include ERP foundation skills, ERP technical skills, ERP transaction processing and reporting skills, and ERP implementation and configuration skills (Cadersaib et al., 2020). Identifying skills relevant to ERP projects can assist industry in defining training needs and academia when doing curriculum design (Cadersaib et al., 2020).

2.4 Barriers to ERP Education

One of the hurdles of ERP integration in courses is ensuring that students are not only trained in using the ERP software but also in understanding the problems created and solved by the software and the business processes (Boykin & Martz, 2004). ERP education is not an easy task as universities have encountered a number of challenges, such as inadequate ERP skills among academic staff, lack of appropriate material to incorporate into curriculum, selecting an appropriate enterprise system, high costs of procurement and maintenance of ERP systems, lack of vendor support, difficulty in achieving learning outcomes, and creating a curriculum that has both business-centric and technology-oriented approaches (Akre et al., 2013). Other barriers identified are highlighted below (Cunion & Barbier, 2020; Shanneb, 2020):

- Training of academic staff. Training costs are high.
- No champion
- No faculty buy-in. Resistant faculty due to added workload and curriculum change.
- Curriculum development costs
- Students do not understand business processes, integration, and terminology.
- SAP University Alliance cost.
- Technical issue resolution such as Graphical user interface (GUI) download. Server availability.
- Funding for training, infrastructure, and issue resolution.
- Lack of clear messages or instructions on how to resolve issues in SAP as SAP ERP is a business application.

- Technical issues such as account set-up, maintenance issues, connectivity issues, and lack of real-time support.

2.5 ERP Curriculum

SAP was the first vendor to offer its ERP system for classroom use to universities and launched its academic alliance program in 1996 (Sager et al., 2006). The SAP alliance program has helped universities on their program with remote hosting, supply of classroom material and workshops for faculty. Some of the resources required for ERP integration are a faculty team with appropriate ERP experience and training, funding, infrastructure, employer involvement, pedagogy, and leadership (Hepner & Dickson, 2013).

ERP curriculum taught by universities can be classified according to five levels of maturity (Antonucci et al., 2004). Level 1 has little, or no process awareness and the curriculum is not well defined as the university is just beginning to investigate possibilities. Level 2 has ERP concepts and some ERP modules implemented in curricula. Level 3 has several ERP modules and concepts defined, and the curriculum is maintained. Level 4 introduces extended ERP concepts, and the curriculum is integrated in more than one business discipline. In level 5, the curriculum is well-managed and implemented across all disciplines.

According to Guthrie and Guthrie (2000), academic institutions can also choose from five levels of technical immersion to integrate ERP systems into their curriculum. They identify these immersion levels as enterprise model, tutorial, laboratory project, dedicated course, and integrated practicum. In Enterprise model, the ERP software is used for classroom demonstrations and lectures. This model provides little or no hands-on experience with the software except browsing and navigation. Tutorial provides self-guided learning activities for students to complete outside the formal classroom environment. This model provides brief exposure to the ERP interface and functionality. Laboratory project provides a hands-on assignment in a simulated ERP environment. Dedicated course is designed to teach ERP skills. Integrated practicum is a semester-long project conducted in a live business environment or simulation environment.

There are five approaches that universities use for ERP curriculum integration which are ERP training, ERP via business processes, information systems, ERP concepts, and hybrid (Hawking et al., 2004). The ERP training approach focuses on a particular ERP system and is the least preferred approach. ERP via business processes focuses on business processes using an ERP system. The information systems approach uses ERP systems to teach information

systems concepts. The ERP concepts approach focuses on ERP systems and concepts rather than on a specific ERP system. The hybrid approach is a combination of the four approaches.

Other than the various levels of maturity, immersion levels and approaches, various pedagogical methodologies are also used in teaching ERP systems. These pedagogical methodologies include hands-on experience, case teaching, technical implementation, and simulations (Wang & Hwang, 2011). Hands-on experience teaches navigation, exploring, processing transactions, and configuring ERP systems, while focusing on step-by-step execution of instructions and not on business logic. Students therefore learn how to execute technical tasks without understanding why. Hands-on experience is of benefit when integrated with class discussions. Case teaching enhances process-oriented thinking and develops high-order reasoning skills when integrated with hands-on experience, thus increasing student motivation and interest. However, case teaching does not expose students to the challenges they will encounter in the real world with changing business processes. Simulation encourages high-order reasoning and decision-making skills and also increases student motivation. Technical implementation teaches configuration issues rather than strategic issues related to the use and adoption of ERP systems. Gamification has been used in the teaching of ERP systems and studies have shown that gamification improves decision-making, problem-solving and critical thinking, as well as enhancing student engagement, motivation, and participation (Pakinee & Puritat, 2021).

2.6 Outcomes of ERP Education

Several studies have been conducted on the evaluation of ERP courses to determine student learning outcomes. However, these studies have not looked at how contextual factors impacted learning outcomes. In this section, the outcomes of ERP education from the different ERP education integration models discussed in the previous section are outlined in Table 2-2.

Table 2-2 ERP Education Integration Models and Graduate Outcomes

| Pedagogical Approach/Methodology | Graduate Outcomes |
|---|---|
| Hands-on experience focusing on ERP Training | <ul style="list-style-type: none"> • Increased Employment prospects (Bae & Lee, 2021; Davis & Comeau, 2004), increased confidence in managing and using ERP systems, appreciation of complexities involved in mastering an ERP system well enough to use it in a production environment and insights on system issues affecting corporate performance (Davis & Comeau, 2004). • Understanding of information flows across departments (Ayyagari, 2011). |
| Case teaching focusing on information systems | <ul style="list-style-type: none"> • Insight into ERP systems and SAP functionality (Cunio & Barbier, 2020). |
| ERP Simulation focusing on business processes | <ul style="list-style-type: none"> • Increased business process knowledge, ERP technical knowledge, ERP transaction knowledge and positive impact on student motivation and their future course engagement (Beranič & Heričko, 2022). |
| Technical implementation using ERP systems and concepts | <ul style="list-style-type: none"> • Helps to develop three elements of competencies, namely cognitive or conceptual capacity, procedural capacity, and attitudinal capacity (Enriquez et al., 2018). Enables students to face the challenges of developing an ERP system (Enriquez et al., 2018). |
| Gamification | <ul style="list-style-type: none"> • Motivates further learning and quicker and better understanding of ERP concepts (Dhondee et al., 2022). Enhances performance of knowledge, enhances ERP comprehension and skills, and encourages student engagement and participation (Dhondee et al., 2022; Pakinee & Puritat, 2021). |

2.7 Calls for Research on Benefits of ERP Education

It has been noted that many schools have invested in ERP education but there is scarce evidence of the benefits of ERP education (Hepner & Dickson, 2013). A call was therefore made for impact studies on whether ERP education has given ERP graduates an advantage in the workplace or not (Bradford et al., 2003). It has been noted that researchers have claimed that ERP education has led to higher demand for ERP graduates and increased salaries but there is no evidence of an increase (Hepner & Dickson, 2013). It was also noted that an unanswered question is whether hands-on ERP education teaches ERP implementation competency or successful use of ERP systems (Hepner & Dickson, 2013). It is also not clear whether students who have done ERP implementation and configuration courses influence the success of ERP implementations and upgrades of their future employers (Hepner & Dickson, 2013).

Gaps in ERP education research have been identified, and it has been suggested that research be undertaken to provide evidence on the following: pre-and post-assessment of student's knowledge of ERP and critical success factors, learning curve to show whether the time for results of ERP performance improvements can be shortened by ERP education, and investigating whether there are certain ERP integration levels or modules that hiring companies prefer (Hepner & Dickson, 2013).

It has been noted that the effectiveness of ERP education can be more fully realised by assessing its influence on the employability of students and their ability to apply their skills and knowledge in the workplace (Seethamraju, 2007). Hence, there is a need to assess the potential impact of ERP education on organisations. Calls have been made for studies on ERP usage in educational institutes and the processes that need to be put in place to maximise the success of ERP education (Shanneb, 2020).

It has also been noted that student satisfaction with an ERP system is a critical determinant when assessing the impact of ERP systems in education (Costa et al., 2020). It was further noted that most ERP education evaluations are based on feedback from students instead of getting feedback on real projects to determine the practical knowledge gained by students (Motahar et al., 2018a). Research on the potential impact of ERP education on organisations is therefore recommended to determine how student capabilities and functionings will impact ERP projects in the organisation.

There are limited studies on ERP education that have tried to look at the potential impact of ERP education on organisations that have implemented ERP systems. It has been noted that

most of the ERP education research has been conducted in Germany, the U.S.A and Canada, and fewer studies have been conducted in developing countries (Jheengut et al., 2020). Hence, the need for more ERP education studies to be conducted in developing countries.

2.8 Choice of Theoretical Framework: Sen's Capability Approach

Sen's Capability Approach was used as the theoretical framework in Study 1, to determine the capabilities and functionings that are enabled by ERP education, and the contextual factors that impacted these capabilities and functionings. Sen's Capability Approach was pioneered by Amartya Sen, an economist and philosopher and focuses on what people are effectively able to do and to be, that is, their capabilities (Robeyns, 2005). The core concepts of Sen's Capability Approach are functionings and capabilities (Saito, 2003). A functioning is an achievement, whereas a capability is the ability to achieve (Saito, 2003). Capability Approach scholars view capability in two ways, that is, capability as an opportunity to choose a valuable type of life and capability as the ability or skill to achieve one's objectives (Ueda, 2021). The achievement of certain beings and doings is influenced by three conversion factors, that is, personal conversion factors, social conversion factors, and environmental conversion factors (Robeyns, 2005). Personal conversion factors include physical condition and intelligence; social conversion factors include public policies, social norms and societal hierarchies; and environmental conversion factors include climate and geographical location (Robeyns, 2005). The choices one makes influence the level of achieved functionings (Robeyns, 2005).

Sen's Capability Approach is not an education theory but it illuminates the concept that education has both intrinsic and instrumental value (Saito, 2003). Sen's Capability Approach has also been used in research studies in education. Sen's Capability Approach was used to determine the capabilities enabled by students' use of internet resources (Hatakka & Lagsten, 2012). In another study, Sen's Capability Approach was used to explore the impact of ICT on indigenous people in Bangladesh (Hasan et al., 2022). Sen's Capability Approach was also used to explore how ICT use by refugees can lead to social inclusion (Diaz Andrade & Doolin, 2016).

As shown in Figure 2-2, conversion factors enable or restrict the conversion of an intervention, such as training, into capabilities, which are potential functionings. The conversion of capabilities into functionings is influenced by choice and conversion factors.

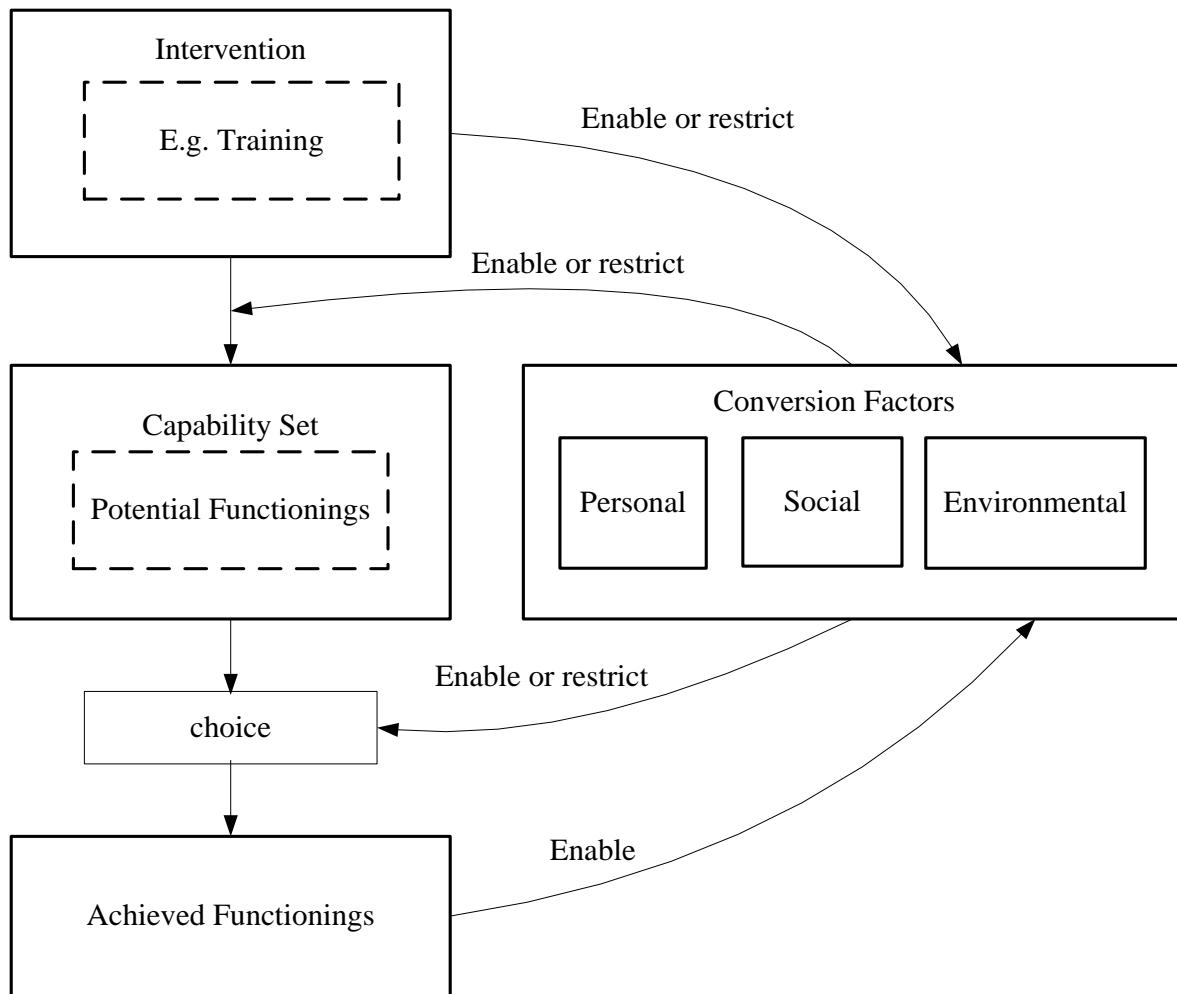


Figure 2-2 Sen's Capability Approach

(Hatakka & De, 2011)

2.9 Gigler's Alternative Evaluation Framework

Gigler developed an Alternative Evaluation Framework (AEF) of ICT interventions by operationalising Amartya Sen's Capability Approach and this framework is used to evaluate the impact of ICT programmes (Gigler, 2004). AEF consists of six key dimensions of individual empowerment which contribute to a person's human capabilities in different ways (Gigler, 2004). These indicators are presented in Table 2-3 and were used to determine the dimensions of individual empowerment that are impacted by ERP education.

Table 2-3 Gigler’s Indicators of Individual Empowerment

| Dimension | Objective | Outcome Indicator |
|------------------------|---|---|
| Informational | To improve the access to information and informational capabilities. | Improved capacity to use different forms of ICTs. |
| Psychological | To support a process of self-reflection (critical conscientisation) and problem-solving capacity. | Strengthened self-esteem. Improved ability to analyse own situation and solve problems. |
| Social (Human Capital) | To strengthen people’s human capital (skills, knowledge, ability to work and good health). | Enhanced ICT literacy and technology skills. Enhanced leadership skills. |
| Economic | To enhance people’s capacity to interact with the market. | Enhanced entrepreneurial skills. Alternative sources of income. Improved employment opportunities. Improved income. |
| Political | To improve people’s participation in decision-making processes at the community-level and the political system. | Improved access to government information/services (e-government). Improved awareness about political issues. Improved capabilities to interact with local governments. |
| Cultural | To strengthen people’s cultural identity | Use of ICTs as a form of cultural expression. Increased awareness of own cultural identity. |

2.10 Chapter Summary

This chapter provided a literature review on ERP education research. The research gap identified was that there are limited studies that have looked at contextual factors and their impact on ERP education, and the potential impact of ERP education on organisations. The chapter also described Sen's Capability Approach, the theoretical framework that was used to determine the capabilities and functionings enabled by ERP education, and the contextual factors that impacted ERP education in Study 1. The chapter also discussed Gigler's AEF, which was used to determine the human dimensions impacted by ERP education. The next chapter discusses the research method that was used in the collection and analysis of data.

3 RESEARCH METHOD

This chapter discusses the method that was used to answer the research questions. The first study looks at the impact of ERP education on postgraduate students who took an ERP course at UNZA using a deductive approach. The second study looks at the impact of ERP education on postgraduate students from an inductive perspective. The third study looks at the potential impact of ERP education on organisations that have implemented ERP systems and are potential employers of ERP graduates in Zambia. The different layers of the research onion are used to explain the research method (Saunders et al., 2009).

3.1 Research Philosophy

Research philosophy refers to a system of beliefs and assumptions about the development of knowledge (Saunders et al., 2009). The research paradigm or philosophy that was used is interpretivism. Interpretivism adopts the position that our knowledge of reality is a social construction by human actors (Walsham, 1995a). In interpretive research, dependent or independent variables are not pre-defined, but the focus is on the complexity of human sense-making as the situation emerges (Myers, 1997). Interpretivism was used because it has the potential to produce deep insights in information systems research as it seeks to understand a phenomenon of study through the meanings assigned by human actors (Klein & Myers, 1999). Interpretive research seeks to understand the context within which research is conducted by understanding the process through which an information system is influenced by the context and how the context influences the information system (Klein & Myers, 1999). An interpretive approach therefore gave an understanding of how the Zambian context impacted ERP education.

3.2 Research Approach

The research approach or reasoning that was used was initially deduction and then induction. Deduction begins with a theory and then predicts something based on that theory (Omair & Alturki, 2020). Deduction follows a top-down approach while induction follows a bottom-up approach (Omair & Alturki, 2020). An inductive approach allows research findings to emerge from dominant or significant themes inherent in raw data without the restraints imposed by a theoretical framework (Thomas, 2006). The justification for using an inductive approach is that if pre-existing theory and terminology are used, there is a possibility of missing the participants' sense-making by imposing our pre-ordained understandings on their experience (Gioia et al., 2013). In this research, initially a deductive approach was used in Study 1, and

then an inductive approach was used in Study 2 to identify broader themes that were not identified in Study 1. In Study 3 an inductive approach was also used. A deductive approach was initially used to assist in the identification of capabilities and functionings enabled by ERP education and contextual factors that impact ERP education. The reason for going inductive is that themes identified in the deductive approach were limited to the theory and did not allow for the identification of other themes that did not fit into the theory. An inductive approach allowed for the identification of other themes outside of Sen's Capability Approach.

3.3 Ethics

Before undertaking data collection, ethics clearance was obtained from the University of Cape Town (UCT) and from UNZA. Ethics approval from UCT is contained in Appendices 1,2 and 3. Ethics approval from UNZA is contained in Appendices 4 and 5. A copy of the interview questions was submitted to both universities when applying for ethics clearance. Appendices 6 and 7 contain the student interview questions. For Studies 1 and 2, consent forms were signed by the participants before the interviews were recorded. A sample of the consent form is contained in Appendix 8. Participants were notified prior to data collection that anonymity would be provided during the compilation of the research. The students who took part in the research were also provided with participant information sheets that provided a brief overview of the research. A sample of the participant information sheet is provided in Appendix 9.

For Study 3, a joint letter from UCT and UNZA was submitted to the organisations prior to data collection. A sample of the letter is contained in Appendix 10. Participants initially filled in qualitative questionnaires and follow-up interviews were conducted via MS Teams and Zoom to clarify some of the responses provided in the questionnaires. A sample of the questionnaire is contained in Appendix 11. Verbal permission was obtained from participants before the recording of the interviews via MS Teams and Zoom. Participants were assured that all data collected would purely be used for research purposes and that the interviews would be based on the questionnaires which they had already responded to. Interviews were held with six of the respondents who had initially filled in questionnaires. Codes were used to refer to the participants in the final write-up to provide anonymity.

3.4 Research Strategy

The choice of a research strategy is determined by the research questions or objectives, philosophy underpinning the research, existing knowledge, time available and resources (Saunders et al., 2009). The strategy that was used to collect data for Studies 1 and 2 was a

single case study research using semi-structured interviews. A case study is an empirical enquiry that investigates a phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (Yin, 2011). Since the case study method emphasises the study of a phenomenon within its real-world context, it favours the collection of data in a natural setting (Yin, 2011). A case study method seeks to understand the dynamics present in a single setting and can be used to provide description, test theory, and generate theory (Eisenhardt, 1989).

Case study research can be used when addressing a descriptive or explanatory question. In this research, case study research was used to describe and explain the impact of ERP education on students. Interpretive case studies can produce generalisations through generation of theory, development of concepts, drawing specific implications and contributions of rich insights (Walsham, 1995a). Studies 1 and 2 were based on a holistic single case study (Yin, 2012). The unit of analysis was the ERP course taught at UNZA, and the unit of observation was postgraduate students who went through ERP education. Study 3 was a qualitative study and not a case study. The unit of analysis in Study 3 was the ERP course, and the unit of observation was organisations that had implemented ERP systems.

3.5 Case and Organisation Description

UNZA was one of the first universities in Africa to join the ESEFA programme and the first in Zambia to introduce ERP education. The ERP course at UNZA was offered to four groupings of students. These groupings are Computer Science undergraduate students, Computer Science postgraduate students (postgraduate diploma and Masters), Engineering postgraduate students and Economics postgraduate students. The ERP course was offered as a short course to postgraduate students and incorporated into the third-year Database course for the Computer Science undergraduate students. The course has a case study component, *Zambikes*, based on a Zambian bamboo bike manufacturing company and workshops, which are lab exercises. There is an exam at the end of the course and an SAP University Alliances/ESEFA certificate of proficiency is issued upon successfully passing the exam. The following topics are covered:

- Zambikes Case Study
- Business Processes
- Enterprise Systems Knowledge
- SAP ERP Navigation and Reporting
- Procure to Pay

- Sales to Cash
- Inventory Management

The duration of the course was 4-6 weeks and about forty-one postgraduate students took the ESEFA ERP course. Most of the students who took the course were from Computer Science and Engineering with an IT background. Very few students from Economics took the ERP course.

For Study 3, nine organisations took part in the study, while three declined to take part, and one organisation did not respond despite numerous follow-ups. The nine organisations have implemented different types of ERP systems which include SAP, Sage, Oracle, and JD Edwards. The organisations were selected based on the researcher's knowledge of those that had implemented ERP systems and feedback received from Studies 1 and 2. It should be noted that the organisations in this study are not the only ones that have implemented ERP systems in Zambia.

Data collection was cross-sectional as it was collected at one point in time. Initial data for Studies 1 and 2 was collected in November 2016. Additional data for Studies 1 and 2 was collected in February 2019. During the second round of interviews conducted in February 2019, more students from Engineering were interviewed as only one Engineering student was interviewed in the first round of interviews. Data for Study 3 was collected in August 2019 through qualitative questionnaires and follow-up interviews were held with six of the nine organisations in October and November 2022 and in November 2023. The follow-up interviews were conducted to clarify the responses that were provided in the questionnaires.

3.6 Data Collection and Analysis for Study 1

Study 1 was a deductive study and data was collected using semi-structured interviews. A sample of the interview questions is contained in Appendices 6 and 7. The justification for using semi-structured interviews is that they assist in obtaining both retrospective and real-time accounts of people experiencing the phenomenon of interest (Gioia et al., 2013). Twenty-one postgraduate students were interviewed in Study 1. The participant information for Studies 1 and 2 is presented in Table 3-1.

Convenience sampling was used in selecting participants for the interviews. Convenience sampling selects participants based on availability or expedience (Baltes & Ralph, 2022). The availability of respondents at the time of the interviews was the most determining factor when selecting interviewees. Postgraduate students were chosen as most of them were employed at

the time and were studying part-time. The justification for this was to determine how ERP education had impacted the students in the workplace. Two students were not employed at the time of the interviews. The students were provided with a participant information form that provided details of the study. A sample of the participant information sheet is provided in Appendix 9. They also signed a consent form for participation in the study and recording of the interviews. A sample of the consent form is provided in Appendix 8. The following steps were followed (Fereday & Muir-Cochrane, 2006):

Table 3-1 Participant Information for Studies 1 and 2

| Programme of Study | No. of Respondents | Code |
|---------------------------|---------------------------|-------------|
| Economics and Finance | 2 | ACC |
| Computer Science | 11 | CS |
| Engineering | 8 | ENG |

3.6.1 Developing the Code Manual

A codebook was developed from the research questions and interview questions. The codebook is presented in Table 3-2 and specifies the code or label, the definition of the code, and data extracts from the interviews showing the occurrence of the code.

Table 3-2 Code Book

| Code | Definition | Data Extract |
|--|---|---|
| Improved capacity to use different forms of ERP systems (Gigler, 2004) | Increased ability to use different types of ERP systems | <i>“I have capacity to use different types of integrated systems as a result of the training.” (CS1)</i> |
| Increased ERP knowledge and skills (Zadeh et al., 2020) | An enhancement in the knowledge of ERP systems and the ability to use ERP systems | <i>“It has really strengthened my knowledge and I think even my ability to work.” (ACC2)</i> |
| Increased problem-solving skills (Hussein et al., 2019) | Being able to solve ERP-related problems in the workplace | <i>“We have a pool office where I work from and most of the times people call you for troubleshooting, when they have problems, they ask you what you think this would be and that has become common place presently because of the knowledge I</i> |

| | | |
|---|--|--|
| | | <i>have acquired so yeah that has really given me that enhanced feeling of being able to handle problems.” (ACC1)</i> |
| Strengthened sense of inclusion in the modern ERP world (Gigler, 2004) | Being included in the knowledge and use of ERP systems | <i>“Yeah, I guess because, since you now can speak a little bit more business than just technical so you get included a bit more now in discussions.” (CS3)</i> |
| Increased ability to map business to technology (Beranič & Heričko, 2022) | Increased entrepreneurial skills or understanding of how to run a business | <i>“It gave me a view of what goes on in running sort of companies and also what it would take to start up your own and what would be needed of you in that case.” (CS8)</i> |
| Increased marketability and employment prospects (Sager et al., 2006) | Increased market value and having more opportunities to get employment | <i>“Generally, it has made me more marketable.” (CS4)</i> |
| Increased ability to secure a higher salary (Cronan & Douglas, 2012) | An increase in income or in the likelihood of getting higher income | <i>“Most of the multi-nationals operating here I think all rely on ERP systems so I think it would definitely lead to a higher salary.” (CS8)</i> |
| Increased decision-making skills (Monk & Lycett, 2016) | Being able to make decisions related to ERP systems in the organisation | <i>“I’m in the same position but in terms of making decisions for acquiring software for the company I think that has changed very much because of doing the course.” (ENG1)</i> |
| Capabilities and functionings (Owens et al., 2022) | “Capabilities are the genuine freedoms, opportunities, or causal powers that a person has to be or do things.” (Owens et al., 2022). Functionings are achievements (Owens et al., 2022) | <i>“For us who are in industry we know, and we see where we have limitations in what we’re running currently and so if this part was actually implemented in there and taken into their lane then it changes everything.” (ENG1)</i> |
| Choices (Robeyns, 2005) | Decisions that students made that enabled or restricted capabilities and functionings | <i>“I really like, want to concentrate on my masters, finish my masters then after finishing my masters then I’ll be able to launch myself again on the market.” (ACC2)</i> |

| | | |
|---|--|---|
| Personal conversion factors (Owens et al., 2022) | Any personal factor that enabled or restricted student capabilities and functionings | <i>“In fact, after going through that course it motivated me even to do a business course. I went on to do a business course and it made more sense because I’ve the ERP.” (ENG5)</i> |
| Social conversion factors (Owens et al., 2022) | Any social factor that enabled or restricted student capabilities and functionings | <i>“I think most organisations still prefer to look outside the country for expertise especially in ERP which isn’t that big locally, so I think the decision for them to look out rather than look in, I think that’s a big hindrance for most of the graduates of the ESEFA programme locally.” (CS8)</i> |
| Environmental conversion factors (Owens et al., 2022) | Any factor in the students’ environment that enabled or restricted student capabilities and functionings | <i>“I’m working in an organisation particularly in a department where we are not using an ERP so in terms of an immediate impact of course I’m not using that knowledge just now.” (CS2)</i> |

3.6.2 Evaluating the Reliability of the Code

The reliability of the codes was tested by checking the occurrence of the code in the data. Data extracts for each code were identified and on this basis, the code was deemed reliable.

3.6.3 Summarising Data and Identifying Initial Themes

Data was summarised through outlining key points. Initial themes were identified, and some themes were merged into one.

3.6.4 Applying Template of Codes and Additional Coding

The codes in the codebook were applied to the data and these were coded as nodes in NVivo software. The student interviews were imported into NVivo software prior to the coding.

3.6.5 Connecting the Codes and Identifying Themes

Themes that were identified from the analysis were coded under nodes in NVivo software.

3.6.6 Corroborating and Legitimizing Coded Themes

The findings were corroborated with literature to confirm the legitimacy of the codes.

3.7 Data Collection and Analysis for Study 2

Study 2 was an inductive study. Sample interview questions are contained in Appendices 6 and 7. The interviews were recorded, transcribed, and coded using NVivo software. Data for the inductive study was analysed using thematic analysis. Thematic analysis is “a method for identifying, analysing, and reporting patterns (themes) within data,” (Braun & Clarke, 2006). The following phases of thematic analysis were followed (Braun & Clarke, 2006):

1. Familiarising myself with the data - Transcribing data, reading and re-reading the data
2. Generating initial codes - Coding interesting features of the data systematically across the entire data set.
3. Searching for themes - Collating codes into potential themes.
4. Reviewing themes - Checking if 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. First-order analysis uses informant-centric terms and codes, and second-order analysis uses researcher-centric concepts, themes and dimensions (Gioia et al., 2013).
5. Determining relationships between themes – Relationships in the data were determined from the analysis of data.

3.8 Data Collection and Analysis for Study 3

Study 3 was an inductive study, and data was initially collected using qualitative questionnaires as the respondents were not comfortable with recorded interviews at the time. Hence, the interview questions were converted to questionnaire questions. A sample of the questionnaire that respondents completed is contained in Appendix 11. Qualitative questionnaires allow respondents to respond in an open-ended manner, thus not restricting responses and allowing a depth and richness of data (Braun et al., 2013). Qualitative questionnaires allow standardisation in questions and easy comparison across a data set (Braun et al., 2013).

Qualitative questionnaire data collected by written responses can be less rich compared to data collected by interviews (Fernholm et al., 2020). However, insights on the potential impact of ERP education on organisations were obtained through the questionnaires. Data was collected from nine organisations. Table 3-3 shows the respondent information for Study 3. Each organisation completed one questionnaire, hence a total of nine questionnaires were completed by the organisations. Interviews were later held with six of the respondents to clarify responses provided in the questionnaires; hence, six organisations took part in the interviews. The other

three respondents who had initially responded to the questionnaires did not respond when contacted for follow-up interviews and hence could not be interviewed.

Table 3-3 Industry Participant Information

| Company Code | Firm Size | Industry Type | Department | ERP Implemented | No. of Questionnaires and Interviews |
|---------------------|------------------|--|-----------------------------|------------------------|---|
| A | Less than 1000 | NGO | Finance | Sage x3 | 1 questionnaire and 1 interview |
| B | 1000-5000 | Government Agency | ICT | Sage 300 | 1 questionnaire and 1 interview |
| C | 1000-5000 | Manufacturing | IT | J D Edwards | 1 questionnaire and 1 interview |
| D | Over 10,000 | Government Ministry | Business Systems Support | SAP | 1 questionnaire and 1 interview |
| E | Less than 1000 | Government Agency/ Financial services | ICT | Oracle | 1 questionnaire |
| F | Over 10,000 | Government Ministry/ Agency | Business Systems IT Support | SAP | 1 questionnaire and 1 interview |
| G | Less than 1000 | Automotive | IT | SAP | 1 questionnaire and 1 interview |
| H | Less than 1000 | Telecommunications | Systems Support | Oracle | 1 questionnaire |
| I | 1000-5000 | Government Agency | Procurement | SAP | 1 questionnaire |

Data was analysed inductively using thematic analysis and coded using NVivo software. The steps followed in Study 2 were also followed in Study 3. Some of the organisations in Zambia that were known to have implemented ERP systems were selected to take part in the research.

3.9 Walsham's Recommendations for Interpretive Case Studies

Walsham makes several recommendations to follow for interpretive case studies (Walsham, 1995b). These recommendations and how they were followed in this research will now be discussed.

3.9.1 Use of Theory in Interpretive Studies

Theory in interpretive research can be used as an initial guide to design and data collection, as part of an iterative process of data collection and analysis, and as a final research product. (Walsham, 1995b). In this study, theory was used in the initial phase of the study, that is, in Study 1, as an initial guide to design and data collection. Sen's Capability Approach was used to identify student capabilities and functionings as well as initial contextual factors in the form of conversion factors. Giger's indicators of individual empowerment supplemented Sen's Capability Approach to identify human dimensions impacted by ERP education.

Study 2 builds on Study 1 and hence used an inductive approach due to limitations identified in the use of theory, in the identification of additional themes that could not be coded in the theoretical framework that was used in Study 1. In Studies 2 and 3, theory was the final research product. In Study 2, the final research product was an explanatory model on how ERP education impacts students. In Study 3, the final research product was an explanatory model on the potential impact of ERP education on organisations. A final explanatory model linking Studies 2 and 3 was also developed.

3.9.2 Conduct of Empirical Work

This section looks at three aspects of how empirical work was conducted:

- **Role of the Researcher**

A researcher can take on two different roles, that is, outside observer and involved researcher (Walsham, 1995b). Walsham notes that neither of these roles are those of an objective reporter as the researcher's subjectivity will influence the collection and analysis of data (Walsham, 1995b). In this research, the role of the researcher was that of a subjective reporter as my subjectivity influenced the research, having taken the same ERP course from UCT. Hence, I was an involved researcher.

- **Evidence From Interviews**

Walsham notes that it has been argued that data for case studies may be obtained from six sources, namely, documents, archival records, interviews, direct observation, participant observation, and physical artefacts (Walsham, 1995b). Walsham argues that for interpretive case studies, interviews are the primary data source (Walsham, 1995b). Walsham recommends that interviews be recorded, supplemented by note taking in order to capture the people's interpretations accurately (Walsham, 1995b). Data for Studies 1 and 2 was collected through interviews which were recorded and transcribed. Data for Study 3 was collected through qualitative questionnaires which were followed up by interviews. These interviews were also recorded and transcribed.

- **Reporting Methods**

Walsham recommends that among other things, reporting should include details of the research site chosen and the reasons for this choice, the number of people interviewed and their positions, and over what period the research was done (Walsham, 1995b). In this research, details have been provided on the research sites and the reasons for the choice. For Studies 1 and 2, UNZA was chosen as it was the first university in Zambia to provide ERP education and one of the first to join the ESEFA programme in Africa. The organisations that participated in the research were chosen because they were identified as having implemented ERP systems. Details on the number of people interviewed, when the data was collected, other data sources used and how data analysis was carried out have also been provided in this research.

3.10 Quality of Data Analysis

This section discusses the steps taken to ensure quality of data analysis in the research.

3.10.1 Klein and Myers' Principles of Interpretive Field Research

Klein and Myers' principles on interpretive field research (Klein & Myers, 1999) were followed in this research and will now be discussed.

- **The Fundamental Principle of the Hermeneutic Circle**

This principle suggests that human understanding is achieved by iterating between the individual parts and the whole (Klein & Myers, 1999). The principle was applied by trying to understand how the various parts or components of the ERP course contributed to the overall impact of the course on the students. Students from each discipline, that is,

Engineering, Economics, and Computer Science were interviewed to understand the different perspectives of ERP education. In Study 3, we tried to understand the potential impact of ERP education on the organisations by assessing how each capability and functioning would impact organisations. Organisations from diverse types of industries were included in the study to also get different perspectives on the study.

- **The Principle of Contextualization**

This principle requires a critical reflection on the social and historical background of the research setting for the intended audience to understand how the current situation emerged (Klein & Myers, 1999). In Studies 1 and 2, an interview protocol was followed when interviewing students which enabled an understanding of the Zambian context. In Study 3, the qualitative questionnaires with standard questions completed by the different respondents also helped in understanding the Zambian context. The interviews which were later conducted in Study 3 further helped in understanding the Zambian context and provided rich insights.

- **The Principle of Interaction Between the Researchers and the Subjects**

This principle requires critical reflection on how research data was socially constructed through interaction between the researchers and participants (Klein & Myers, 1999). Interaction with participants was through physical interviews in Studies 1 and 2. The questions in the second round of interviews were adjusted based on findings in the first round of interviews. The research findings were compared with findings from the other students and with literature. In Study 3, there was no direct interaction between the researcher and the participant as the respondents in the organisations were not initially prepared to be interviewed, hence they completed questionnaires. Six of the respondents who had initially completed questionnaires were later interviewed via MS Teams and Zoom.

- **The Principle of Abstraction and Generalisation**

This principle requires relating the idiographic details revealed by the data interpretation through the application of the first two principles to theoretical, general concepts that describe the nature of human understanding and social action (Klein & Myers, 1999). The data in Study 1 was analysed deductively using Sen's Capability Approach as a theoretical lens to understand the phenomenon of study. In Studies 2 and 3, data was analysed inductively, and an explanatory model was developed from the data. The explanatory

model can be applied in similar studies, and the study can be replicated in other research settings.

- **The Principle of Dialogical Reasoning**

This principle requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings. Data was critically analysed to ensure that the findings were what was contained in the data, and we were mindful of the possible contradictions between preconceptions and actual findings.

- **The Principle of Multiple Interpretations**

This principle requires sensitivity to possible differences in interpretations among the participants. In Studies 1 and 2, since we had students from three disciplines, we were mindful of the fact that there would be differences in interpretation. In Study 3, since several organisations from different types of industries completed the questionnaires, six of whom took part in follow-up interviews, we were also mindful that there would be different interpretations from the different organisations. The data was validated by corroborating the findings with literature.

- **The Principle of Suspicion**

This principle requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants. The findings in the research were validated with findings from literature to ensure that there was no possible bias or distortion.

3.10.2 Trustworthiness of Qualitative Research

There are four criteria used to determine the trustworthiness of qualitative research which are credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). This section discusses how these criteria were used to ensure the trustworthiness of this research.

- **Credibility**

Techniques used to ensure credibility are prolonged engagement, persistent observation, triangulation, peer debriefing, negative case analysis, referential adequacy, and member checking (McGinley et al., 2021). In addition to these techniques, other scholars have established other techniques which are time sampling, interview techniques, authority of researcher, structured coherence, investigator's background, qualification, and experience

checking, random sampling, previous findings examination, interactive questioning, and thick description of the phenomenon under investigation (McGinley et al., 2021).

In this research, credibility was ensured through triangulation of data analysis and examination of previous findings from literature. In the first stage of the research, data was analysed deductively using Sen's Capability Approach. In the second and third stages of the research data was analysed inductively using thematic analysis. Research findings in all three stages were corroborated with previous research findings from literature.

- **Transferability**

Transferability refers to the degree to which qualitative results can be transferred to other contexts with other respondents; hence, it is the interpretive equivalent of generalisability (Anney, 2014). Transferability, also known as applicability, is the product of rigorous qualitative studies that contain thick description and thick interpretation (Amin et al., 2020). Thick description is a means of building trustworthiness and validity and should illuminate social interactions and their meanings (Amin et al., 2020). Thick description allows the reader to see for themselves the depth of the data and analysis (Amin et al., 2020). The depth of the descriptions allows the reader to determine how the findings can be transferred to other situations (Amin et al., 2020). In this research the phenomenon under study has been described with sufficient detail for the findings to be transferable to another context, thus achieving transferability.

- **Dependability**

Dependability or consistency refers to the idea that another scholar would find similar results (McGinley et al., 2021). It has been noted that other scholars would not necessarily get the same results but would find similar patterns in the data (McGinley et al., 2021). In (Stenfors et al., 2020), dependability is defined as the extent to which research could be replicated in similar conditions. Dependability can be achieved when there is sufficient information to enable another researcher to follow the same steps but possibly reach different conclusions (Stenfors et al., 2020).

Dependability is established by using an audit trail, code re-code strategy, stepwise replication, triangulation, and peer examination or iterator comparisons (Anney, 2014). An audit trail involves the examination of the data collection and analysis to validate the data (Anney, 2014). Stepwise replication is where two or more researchers analyse the same

data separately and compare results (Anney, 2014). The code re-code strategy involves the researcher coding the same data twice (Anney, 2014). In peer examination, the researcher discusses the research process and findings with neutral colleagues, and it is similar to member checking (Anney, 2014).

It has been noted that dependability is based on the quality of the data collection and analysis, and this is shown when the research systematically shows that it achieved the objective of the study (Ponelis, 2015). In order to achieve dependability, the research process should be logical, traceable and clearly documented (Nowell et al., 2017). In this research, to ensure the quality of the data collection and analysis, data collected was recorded and transcribed. The coding and analysis of data was done with the help of NVivo software. The interviews that were conducted for the first two stages of the research were recorded and transcribed verbatim. For the last stage of the research qualitative questionnaires were initially used. Interviews were later held with six of the respondents who had completed questionnaires. These interviews were recorded and transcribed.

- **Confirmability**

Confirmability is the degree to which results of an inquiry can be confirmed or corroborated by other researchers (Anney, 2014). The use of an audit trail, reflexive journal, researcher triangulation, member checking, and using quotations to link the findings to raw data can be used to achieve confirmability of research (Amir et al., 2021; Anney, 2014). A reflexive journal includes all events that happened in the field and personal reflections (Anney, 2014). In this research confirmability was achieved by using quotations to link the findings to the raw data. Quotations from the raw data were used for each theme that was identified throughout the three stages of the research.

3.11 Chapter Summary

This chapter looked at the research method that was used in answering the research questions for Studies 1, 2 and 3. Some of the different layers of the research onion were used in explaining the research method. These layers include the research philosophy, research approach, and research strategy. A detailed description on how quality of analysis was ensured using Walsham's recommendations for interpretive case studies and Klein and Myers' principles of interpretive research was provided. The chapter also provided details on how the trustworthiness of the research was ensured. The next chapter looks at the data analysis and discussion for Study 1.

4 STUDY 1: FINDINGS AND DISCUSSION

This chapter discusses the research findings of the deductive approach for Study 1. The deductive approach makes use of Sen's Capability Approach supplemented by Gigler's AEF to determine the capabilities and functionings that are enabled by ERP education and the contextual factors that enabled or restricted these capabilities. These contextual factors were identified as personal, social, and environmental conversion factors. Thematic analysis was used to identify the enabled capabilities and functionings, the contextual factors, and student choices, using the steps identified in Chapter 3.

This chapter addresses the following research question:

- How do conversion factors and choices influence the impact of ERP education on student capabilities and functionings?

4.1 Capabilities and Functionings Enabled by ERP Education

Capabilities are genuine freedoms and opportunities that a person has to be or do things (Owens et al., 2022). A functioning is an achievement, whereas a capability is the ability to achieve (Saito, 2003). Several capabilities and functionings that were enabled by ERP education were identified. The capabilities and functionings identified are presented in Table 4-1. In the table, the number of respondents represents the number of students that mentioned a particular theme while the number of statements represents the frequency or number of times a particular theme was mentioned by the students. The capabilities and functionings enabled by ERP education can, therefore, be classified into informational, psychological, social, and economic capabilities. These capabilities and functionings will now be discussed.

Table 4-1 Capabilities and Functionings Enabled by ERP Education

| Theme | No. of Respondents | No. of Statements | Functioning | Category |
|--|---------------------------|--------------------------|--------------------|-----------------|
| Increased capacity to use different forms of ERP systems | 11 | 12 | Yes | Informational |
| Increased ERP knowledge and skills | 21 | 28 | Yes | Social |
| Increased marketability and employment prospects | 16 | 24 | No | Economic |
| Increased self-confidence in applying ERP knowledge | 16 | 19 | Yes | Psychological |
| Increased ability to secure a higher salary | 11 | 11 | No | Economic |
| Increased ability to map business to technology | 10 | 13 | Yes | Economic |
| Increased decision-making skills | 4 | 4 | Yes | Psychological |
| Increased problem-solving skills | 2 | 3 | Yes | Psychological |
| Strengthened sense of inclusion in the modern ERP world | 7 | 7 | Yes | Psychological |
| Increased ability to identify software limitations | 1 | 1 | Yes | Social |

4.1.1 Increased Capacity to Use Different Forms of ERP Systems

Eleven out of twenty-one respondents interviewed felt that ERP education had increased their capacity to use different forms of information systems, in particular, ERP systems, as they now had experience in using SAP ERP systems through the labs they went through during the course. The students felt that they would not be confident in using ERP systems had they not had hands-on experience with ERP systems through the labs. The students learnt about SAP transactions and business process integration thus gaining a better understanding of how ERP

systems work. Literature shows that integrating ERP courses into university curricula provides hands-on experience to students through lab exercises and enables them to understand how ERP systems work (Pridmore et al., 2014; Stevenson, 2007). In another study, it was observed that an ERP course based on a simulation game provided students with hands-on understanding of concepts underlying ERP systems (Seethamraju, 2011). Hence, the findings in this study are similar to what is recorded in literature. The following quotes are sample quotes from the interviews related to the theme *increased capacity to use different forms of ERP systems*, represented by CS8, ACC1 and CS1:

“It gave us an appreciation of how exactly the systems work because I’m sure a number of us had just heard of ERP but that gave us at least the hands-on experience.” (CS8)

“It was really nice to have that hands-on, and it gave you the confidence really because I think if we had just gone through it on the board without having gone to the PC it wouldn’t, you know, give you that confidence out there, but after the study there was that confidence that remained because we had the hands-on experience from the workshops themselves.” (ACC1)

“I have capacity to use different types of integrated systems as a result of the training.” (CS1)

4.1.2 Increased ERP Knowledge and Skills

All twenty-one students interviewed said that ERP education increased their ERP knowledge as they now understand how ERP systems work. Students who took an ERP course at a university in the United States of America based on Microsoft Dynamics AX felt that the ERP course had increased their knowledge of ERP (Zadeh et al., 2020). Hence, the findings in this study are similar to what is recorded in literature. The following quotes are sample quotes from the interviews related to the theme *increased ERP knowledge and skills*, represented by ACC2, CS3 and ACC1:

“It has really strengthened my knowledge and I think even my ability to work, because I think like in Sage there are certain functionalities I wasn’t able to explore before, despite me using that program. But after the training there are certain things I know ok if I do ABCD the result will be like this, so I think it has” (ACC2).

“I knew much more about how it works in an organisation and with the exercises that we had, I got a bit of experience on how the day to day running of an institution can be affected or an organisation can be affected by an ERP program.” (CS3)

“The knowledge really increased, because now we are able to break down the activities that go into an organisation.” (ACC1)

4.1.3 Increased Marketability and Employment Prospects

Sixteen out of twenty-one respondents interviewed said that ERP education had increased their marketability and employment prospects as they now had an additional skill. Although most of the respondents were still working for the same organisations they were working for before they did the course, they felt that the course had given them an added advantage due to the ERP knowledge they gained. Literature has recorded similar results showing that students who have taken ERP courses have increased employment prospects and increased market value (Sager et al., 2006). Literature shows that students who took an ERP course based on SAP were confident that the skills and knowledge they gained from the course would enhance their employment opportunities and competitiveness in the job market (Qiu et al., 2020). In the Zambian context, the capability, *increased marketability, and employment prospects*, was not converted into a functioning as the students continued to work for the same organisations they were working for before they did the ERP course. The following quotes are sample quotes from the interviews related to the theme *increased marketability and employment prospects*, represented by ACC1, ENG1 and CS4:

“I think it enhances my marketability in the business of Accounting and Accountancy because I have an advantage” (ACC1)

“In terms of getting a better job I think definitely it’s increased my market value only that I haven’t used that to make an application in a different organisation.” (ENG1)

“Generally, it has made me more marketable.” (CS4)

4.1.4 Increased Self-Confidence in Applying ERP Knowledge

Sixteen out of twenty-one respondents interviewed said that ERP education had increased their self-confidence in using SAP ERP systems due to the hands-on experience from the labs. The students felt that they were also confident to talk about ERP systems as they had experience in using ERP systems. Similar results have been reported in literature showing that students in Canada who took an ERP course that had a management theory component and a lab component expressed confidence in their ability to manage ERP systems (Davis & Comeau, 2004). The students in the study conducted in Canada regarded themselves as potential users of ERP systems and not managers. In another study, students who took an ERP course based on a simulation game developed confidence as a result of the different tasks they went through

in the simulation game (Seethamraju, 2011). Postgraduate students who took an ERP course in Australia self-reported increased levels of confidence and the ability to apply the knowledge gained (Karim et al., 2020). Hence the findings in this study are similar to what is recorded in literature showing that ERP education leads to increased self-confidence in applying ERP knowledge. The following quotes are sample quotes from the interviews related to the theme *increased self-confidence in applying ERP knowledge*, represented by CS6, ACC1 and ACC2:

“This one it did yes boost a lot of confidence because when I wrote the test the first time, I was the only one who passed, and I was the only lady in class so that is where the confidence I guess came up.” (CS6)

“Well, most certainly yes there are benefits because even in my handling of work at the office it has enhanced my confidence, I mean it’s improved my confidence with the package we work with.” (ACC1)

“It has really given me one self-confidence on how to go about certain things and how to just handle a number of transactions which are IT related.” (ACC2)

4.1.5 Increased Ability to Secure a Higher Salary

Eleven out of twenty-one respondents interviewed felt that ERP education would increase their ability to secure higher salaries if they moved to organisations that are using ERP systems. The students were still working for the same organisations they worked for before they took the ERP course and had not received any salary increment at the time of data collection. This capability, therefore, was not converted to a functioning. Business students who took an ERP course based on SAP at a university in Qatar felt that the ERP course would enhance their future careers, increase their employment opportunities, and contribute to them getting higher salaries. Literature shows that ERP graduates with an ERP intensive background received higher salaries (Sager et al., 2006). In another study, students who had enrolled in an ERP fundamentals course had higher starting salaries compared to all business graduates (Cronan & Douglas, 2012). The findings in the Zambian context are different from what is recorded in literature, as ERP education did not lead to higher salaries. The following quotes are sample quotes from the interviews related to the theme *increased ability to secure a higher salary*, represented by CS6, CS8 and ACC1:

“If I’m going to add on another skill then yeah it’s supposed to bring higher salary.” (CS6)

“I think it would, most of the multi-nationals operating here I think all rely on ERP systems so I think it would definitely lead to a higher salary.” (CS8)

“An increment? Well that one not really unless probably if I went into another organisation that appreciated the kind of training I've received in terms of ERPs but otherwise in the current organisation where I am what increases my salary has to do with the other qualifications that I've been pursuing.” (ACC1)

4.1.6 Increased Ability to Map Business to Technology

Ten out of twenty-one respondents interviewed said that the ERP course increased their ability to map business to technology through the business processes that were part of the ERP course. Similar results have been obtained in literature showing that ERP education increases business process knowledge (Cronan & Douglas, 2012). Literature also shows that students who go through ERP courses have an increased understanding of business processes and functions (Fulford, 2011). Hence, the findings in this study are similar to what is recorded in literature. The following quotes are sample quotes from the interviews related to the theme *increased ability to map business to technology*, represented by ACC1, CS3 and CS6:

“I feel empowered because like I said earlier, I have been thinking of looking at a venture of customising a certain ERP for commercial basis so I feel empowered in the sense that I can look at a business, look at the business processes that are there and then try and make something that can work for them.” (ACC1)

“Yeah it did actually because it was very practical, the example they used, was that production, then there's also the sales part. So, the whole process from production to things being stored and also being sold. It did actually, made a lot of sense on how a business is run.” (CS3)

“Well, you learn about the business integration and everything else and how a business is run.” (CS6)

4.1.7 Increased Decision-Making Skills

Four out of twenty-one respondents interviewed said that they are now involved in decision making on software acquisition in their organisations as a result of having gone through ERP education. Having background knowledge of ERP systems gave them an advantage in the workplace when it came to making decisions on software acquisition. Literature shows that ERP education through the use of ERP simulation games increases decision-making as students have to analyse transaction data during the simulation game (Setyono & Arnandiansyah, 2018).

Literature shows that students who have gone through an ERP course based on an ERP simulation game have increased decision-making skills due to the various business decisions made during the ERP simulation game (Monk & Lycett, 2016). In this study, the decision-making was on software acquisition in the organisation. The following quotes are sample quotes from the interviews related to the theme *increased decision-making skills*, represented by ACC1, ENG1 and ENG6:

“I was one of the people that was chosen to become a decision maker when they have to do certain things, they will consult you.” (ACC1)

“I’m in the same position but in terms of making decisions for acquiring software for the company I think that has changed very much because of doing the course.” (ENG1)

“Let me point out that in decision making and in middle management where I am when it came to choosing what application we’ll use, whether Pastel Accounting software and Navision Accounting software, the full ERP, everyone in the institution depended on me to make the final decision and my conclusion was we’ve to go with Navision. So, at the moment we’ve done away with Pastel Accounting software.” (ENG6)

4.1.8 Increased Problem-Solving Skills

Two out of twenty-one respondents said that the ERP course increased their problem-solving skills as they are now able to assist other users in resolving ERP related problems in the workplace. It has been observed in other studies that students who have gone through ERP courses based on an ERP simulation game develop problem-solving skills (Foster & Hopkins, 2011). Literature shows that ERP courses based on gamification lead to increased problem-solving skills in students (Hussein et al., 2019). Hence the findings in this study are similar to what is recorded in literature. The following quotes are sample quotes from the interviews related to the theme *increased problem-solving skills*, represented by ACC1 and ENG6:

“We have a pool office where I work from and most of the time people call you for troubleshooting, when they have problems, they ask you what you think this would be and that has become common place presently because of the knowledge I have acquired so yeah that has really given me that enhanced feeling of being able to handle problems.” (ACC1)

“When I was taught ERPs at UNZA it opened up my knowledge to even help the accountants who are using IFMIS and Navision Accounting software at this institution.” (ENG6)

4.1.9 Strengthened Sense of Inclusion in the Modern ERP World

Seven out of twenty-one respondents interviewed felt that ERP education had strengthened their sense of inclusion in the modern ERP world as they now understood ERP systems. Those from an IT background felt that instead of them just being technical they could also now understand and speak the business language thus strengthening their sense of inclusion in the business world. Literature shows that technological adoption, participation in the use of a particular digital technology, and empowerment are part of digital inclusion (Pandey & Zheng, 2023). Hence, ERP education can contribute to digital inclusion as ERP systems are part of digital technology. The following quotes are sample quotes from the interviews related to the theme *strengthened sense of inclusion in the modern ERP world*, represented by CS3 and CS8:

“Since you now can speak a little bit more business than just technical so you get included a bit more now in discussions.” (CS3)

“Most people are using these things so with this training familiarising ourselves with these systems I think it gives us that sense of being at the cast of whatever is going on out there.” (CS8)

4.1.10 Increased Ability to Identify Software Limitations

One out of twenty-one respondents interviewed felt that the ERP course increased their ability to identify software limitations of the systems they currently have in their organisation. ERP systems act as a central location for storing and distributing data across departments and manage business processes across different functional areas (Prakash et al., 2022). Hence limitations in software systems can be identified where ERP systems are not implemented. The following quote is a sample quote from the interviews related to the theme *increased ability to identify software limitations*, represented by ENG1:

“For us who are in industry we know, and we see where we have limitations in what we’re running currently and so if this part was actually implemented in there and taken into their lane then it changes everything.” (ENG1)

4.2 Personal Conversion factors

Personal conversion factors relate to a person’s embodied limits, talents, abilities, and dispositions (Owens et al., 2022). The personal conversion factors that impacted student capabilities were identified and are presented in Table 4-2. In the table, the number of respondents represents the number of students that mentioned a particular theme while the

number of statements represents the frequency or number of times a particular theme was mentioned by the students. These personal conversion factors will now be discussed.

Table 4-2 Personal Conversion Factors

| Personal Conversion Factor | No. of Respondents | No. of Statements |
|---|---------------------------|--------------------------|
| Increased motivation to pursue further training | 3 | 4 |
| Interest in information systems | 1 | 1 |

4.2.1 Increased Motivation to Pursue Further Training

Three out of twenty-one respondents interviewed felt that the ERP course increased their motivation to pursue further training in finance and other software packages. Two of the respondents were motivated to do business courses after going through the ERP course. One respondent was selected to pursue further training on several software packages in their organisation. The ERP knowledge obtained through the ERP course laid a good foundation for the respondents to pursue further training. Literature shows that students who took an ERP course based on gamification were motivated to continue learning (Dhondee et al., 2022). In this research the students were motivated to pursue further training in business courses and other software packages. The following quotes are sample quotes from the interviews related to the theme *increased motivation to pursue further training*, represented by ACC1, ENG5 and CS9:

“Even in the section where I am, I was identified as one of the few people to do further training among peers because I seem to be aware as to what these packages are all about.” (ACC1)

“In fact, after going through that course it motivated me even to do a business course. I went on to do a business course and it made more sense because I’ve the ERP.” (ENG5)

“I started the CIMA programme cause again most of the information people are interested in, in the business is financial so I had to start the CIMA programme just to have an academic qualification in finance.” (CS9)

4.2.2 Interest in Information Systems

One out of twenty-one respondents interviewed said that interest in information systems motivated him to take the course. Hence interest in information systems enabled capabilities. Interest has been shown to benefit learning in all content areas and encourages learners to

search for more information and persevere in understanding material (Renninger & Hidi, 2022). The following quote is a sample quote from the interviews related to the theme *interest in information systems*, represented by ACC1:

“Well, what motivated me is I have interest in information systems really because having worked with them at the university and personally having interest in Information Technology gave me a drive to do the course.” (ACC1)

4.3 Student Choices

It has been noted in literature that a person’s preferences as well as other factors such as conversion factors and practical reason can influence their choices (Owens et al., 2022). Two student choices were identified as having impacted the conversion of capabilities into functionings. These choices are presented in Table 4-3. In the table, the number of respondents represents the number of students that mentioned a particular theme while the number of statements represents the frequency or number of times a particular theme was mentioned by the students. These choices relate capabilities to functionings and will now be discussed:

Table 4-3 Choices

| Choice | No. of Respondents | No. of Statements |
|---------------------------------|---------------------------|--------------------------|
| Not looking for another job yet | 4 | 4 |
| Need to complete other studies | 2 | 2 |

4.3.1 Not Looking for Another Job Yet

Four out of twenty-one respondents interviewed said that they were not yet looking for other jobs and had not used their ERP qualifications to look for other jobs. This choice restricted the capability *increased marketability and employment prospects* from translating into a functioning. The following quote is a sample quote from the interviews related to the theme *not looking for another job yet*, represented by ACC2:

“I’m not yet looking for another job I want to finish with my Masters, then I can start looking for another job.” (ACC2)

4.3.2 Need to Complete Other Studies

Two out of twenty-one respondents interviewed said they first wanted to complete the other studies they were pursuing. This choice restricted the capabilities *increased marketability and employment prospects and increased ability to secure a higher salary* from translating into

functionings. The following quote is a sample quote from the interviews related to the theme *need to complete other studies*, represented by ACC1:

“For now, I still have to complete my other courses because then with the SAP training itself I’m not able to get a job.” (ACC1)

4.4 Environmental and Social Conversion Factors

Environmental conversion factors relate to infrastructure, institutions, public goods, climate, and natural resources (Owens et al., 2022). Several environmental conversion factors that restricted the students’ capabilities were identified. These environmental factors relate to existing conditions in industry or the workplace that restricted the students’ capabilities and functionings. Social conversion factors relate to features of economic, political, social, and cultural life such as legislation and labour market conditions (Owens et al., 2022). One social conversion factor that restricted the students’ capabilities was identified. The environmental and social conversion factors are presented in Table 4-4 and will now be discussed. In the table, the number of respondents represents the number of students that mentioned a particular theme while the number of statements represents the frequency or number of times a particular theme was mentioned by the students.

Table 4-4 Environmental and Social Conversion Factors

| Environmental and Social Conversion Factor | No. of Respondents | No. of Statements |
|---|---------------------------|--------------------------|
| Lack of awareness of ERP education at university | 9 | 10 |
| ERP systems are not implemented in the workplace | 8 | 8 |
| Lack of organisational understanding of ERP systems | 3 | 4 |
| No job advertisements requiring ERP skills | 2 | 2 |
| ERP qualification is not appreciated in the workplace | 2 | 5 |
| Preference of foreign over local expertise | 8 | 11 |

4.4.1 Lack of Awareness of ERP Education at University

Nine out of twenty-one respondents interviewed felt that organisations were not aware of the presence of ESEFA ERP graduates in Zambia; hence, this had restricted them from fully benefitting from ERP education. It has been noted that when there is collaboration between academia and industry, it gives organisations an opportunity to meet up with future employees at an early stage and assist with student internships or thesis supervision (Hawking & McCarthy, 2000; Taratukhin et al., 2016). The respondents felt that if the university was marketing the course and collaborating with industry, then organisations would be aware of the ERP course and provide employment opportunities to the students. Hence, lack of awareness of ERP education at university limited student capabilities. The following quotes are sample quotes from the interviews related to the theme *lack of awareness of ERP education at university*, represented by ENG2, CS7 and ENG6:

“The organisations out there, they are not aware about SAP at UNZA being offered.” (ENG2)

“First and foremost, employers should understand that the ESEFA graduates are within the country and then two, institutions should be able to sensitise the employers on the kind of graduates they have produced.” (CS7)

“I think most people are not aware that this programme is offered locally, and we have got graduate students from University of Zambia who have been trained there and have got our own local trainers, they are not aware. I was at the University of Zambia for two years; I didn't know that we had it.” (ENG6)

4.4.2 ERP Systems Are Not Implemented in the Workplace

Eight out of twenty-one respondents interviewed said that they do not have ERP systems implemented at their workplace hence, they are not able to apply the knowledge gained from the ERP course. It has been noted in literature that high costs of ERP implementation and low levels of IT maturity are some of the reasons why organisations have not implemented ERP systems (Aggrey et al., 2021). In developing countries like Zambia, ERP is still in its early stages because of limited IT infrastructure, government policies and lack of ERP expertise (Abdellatif, 2014). Hence, the lack of ERP systems in the workplace limited capabilities as students had nowhere to apply their ERP knowledge. The following quotes are sample quotes from the interviews related to the theme *ERP Systems are not implemented in the workplace*, represented by CS2 and CS10:

“I’m working in an organisation particularly in a department where we are not using an ERP, so in terms of an immediate impact, of course I’m not using that knowledge just now.” (CS2)

“We don’t have maybe at the moment as an institution, capacity to afford such licences to deploy such a solution in our setting so I think that is one of the limiting factors which means there is nowhere we can continuously apply the knowledge that was learnt.” (CS10)

4.4.3 Lack of Organisational Understanding of ERP Systems

Three out of twenty-one respondents interviewed felt that organisations do not fully understand ERP systems and the work that is required in implementing ERP systems; therefore, they did not appreciate the value that ERP graduates could add. Hence, lack of organisational understanding of ERP systems limited student capabilities. It has been noted that ERP is still in its early stages in developing countries with low IT maturity (Abdellatif, 2014), hence this could be a reason why some organisations may not fully understand ERP systems. The following quotes are sample quotes from the interviews related to the theme *lack of organisational understanding of ERP systems*, represented by CS9, ENG3 and CS7:

“Not everybody understands the work which is required to somehow have a fully operational enterprise system because everyone forgets the aspect of putting in the raw data to fit the components.” (CS9)

“So not until a good number of people understand the strength of ERP systems, they will not be able to appreciate it.” (ENG3)

“This disadvantage we have in Zambia is that it seems that most people, they don’t know about ERP so even when you mention ERP both people who are practicing already, I’m talking about the ICT people, you will be amazed that some of them, they don’t even know about ERP. So, it is some kind of a challenge even to start introducing that to employers because they don’t really understand what is involved there.” (CS7)

4.4.4 No Job Advertisements Requiring ERP Skills

Two out of twenty-one respondents interviewed said that there were no jobs requiring ERP skills as they had not seen any ERP job advertisements. Hence, no job advertisements requiring ERP skills limited student capabilities. It has been noted in literature that organisations prefer to use consultants in most ERP projects due to their ERP expertise (Kumar et al., 2003; Wijaya & Utomo, 2021), and that ERP is still in its early stages in developing countries (Abdellatif, 2014) hence these could be reasons for not advertising ERP jobs in Zambia. The following

quotes are sample quotes from the interviews related to the theme *no job advertisements requiring ERP skills*, represented by CS7 and CS6:

“I have tried to apply for jobs here and there, but it seems even when it comes to the job adverts that are currently in Zambia, it’s very rare to find the ERP qualification appearing which means that most people, they still don’t know about it.” (CS7)

“I haven’t seen a lot of job adverts. I haven’t seen adverts maybe I think when you’re already in an organisation and then they want to implement it, then you would have that opportunity to, but I haven’t seen organisations that are going to advertise and say they want someone with this skill.” (CS6)

4.4.5 ERP Qualification Is Not Appreciated in the Workplace

Two out of twenty-one respondents interviewed felt that the ERP qualification was not as valued as other qualifications that they were pursuing. Hence, lack of appreciation of ERP qualification in the workplace limited student capabilities. Literature shows that some students who took an ERP course were not sure that they gained skills and understanding that would be rewarded in the job market (Seethamraju, 2011). Other studies have shown that ERP skills are appreciated in the workplace as ERP graduates received higher salaries, increased employment prospects, and increased market value (Sager et al., 2006). Literature also shows that graduates with an ERP background receive higher starting salaries than those without; hence, organisations value ERP qualifications (Colvin & Carmona, 2020). In contrast, this study did not find this to be the case in the Zambian context. The following quotes are sample quotes from the interviews related to the theme *ERP qualification is not appreciated in the workplace*, represented by ACC1 and ENG3:

“To begin with organisations should recognise the course we did, I don’t think there’s a way in which, I would submit the qualification to them, but they don’t recognise it like it’s a value adding certificate on their part, you know what I mean, I have the knowledge and they benefit from it but then my paper is not as valued as the other qualifications that we are busy pursuing.” (ACC1)

“In Zambia, SAP even if you get certification it is still treated as a Cinderella. It’s just like in the tale, they don’t appreciate.” (ENG3)

4.4.6 Preference of Foreign Over Local Expertise

Eight out of twenty-one respondents interviewed felt that organisations in Zambia prefer foreign expertise to local expertise, thus disadvantaging ERP graduates. Hence, the preference of foreign expertise in Zambia over local expertise limited student capabilities. This was identified as a social conversion factor. Organisations engage consultants in ERP projects as there is a need for expert guidance and this expertise is usually not available internally (Wijaya & Utomo, 2021). Literature shows that since ERP demands product-specific and business skills, dependence on consultants as implementation partners increases (Kumar et al., 2003). Many firms have moved towards outsourcing ERP skills rather than investing and developing them internally (Kumar et al., 2003). The following quotes are sample quotes from the interviews related to the theme *preference of foreign over local expertise*, represented by CS8, CS4 and CS9:

“I think most organisations still prefer to look outside the country for expertise especially in ERP which isn’t that big locally, so I think the decision for them to look out rather than look in, I think that’s a big hindrance for most of the graduates of the ESEFA programme locally.” (CS8)

“I’m coming from a government institution where people would rather rush off to get an expatriate than someone that’s within their own organisation or maybe even if they train you but then they’ll still retain the expatriate, so me as a person who was trained I have very little or no roles.” (CS4)

“I’ve always felt discriminated locally because I’ve been working in the IT circles since the early 2000s but regardless of having certain skills the people always still look out to outside people to do things for them.” (CS9)

4.5 Summary of Student Capabilities, Functionings and Conversion Factors

The findings on student capabilities and functionings that were enabled by ERP education, and the conversion factors that impacted ERP education are summarised in Figure 4-1. The intervention or capability input is ERP education, which is the means to achieve the student capabilities and functionings identified. The achieved functionings were identified as *increased self-confidence in applying ERP knowledge, increased problem-solving skills, increased decision-making skills, increased ERP knowledge and skills, increased ability to map business to technology, increased capacity to use different forms of ERP systems, strengthened sense of*

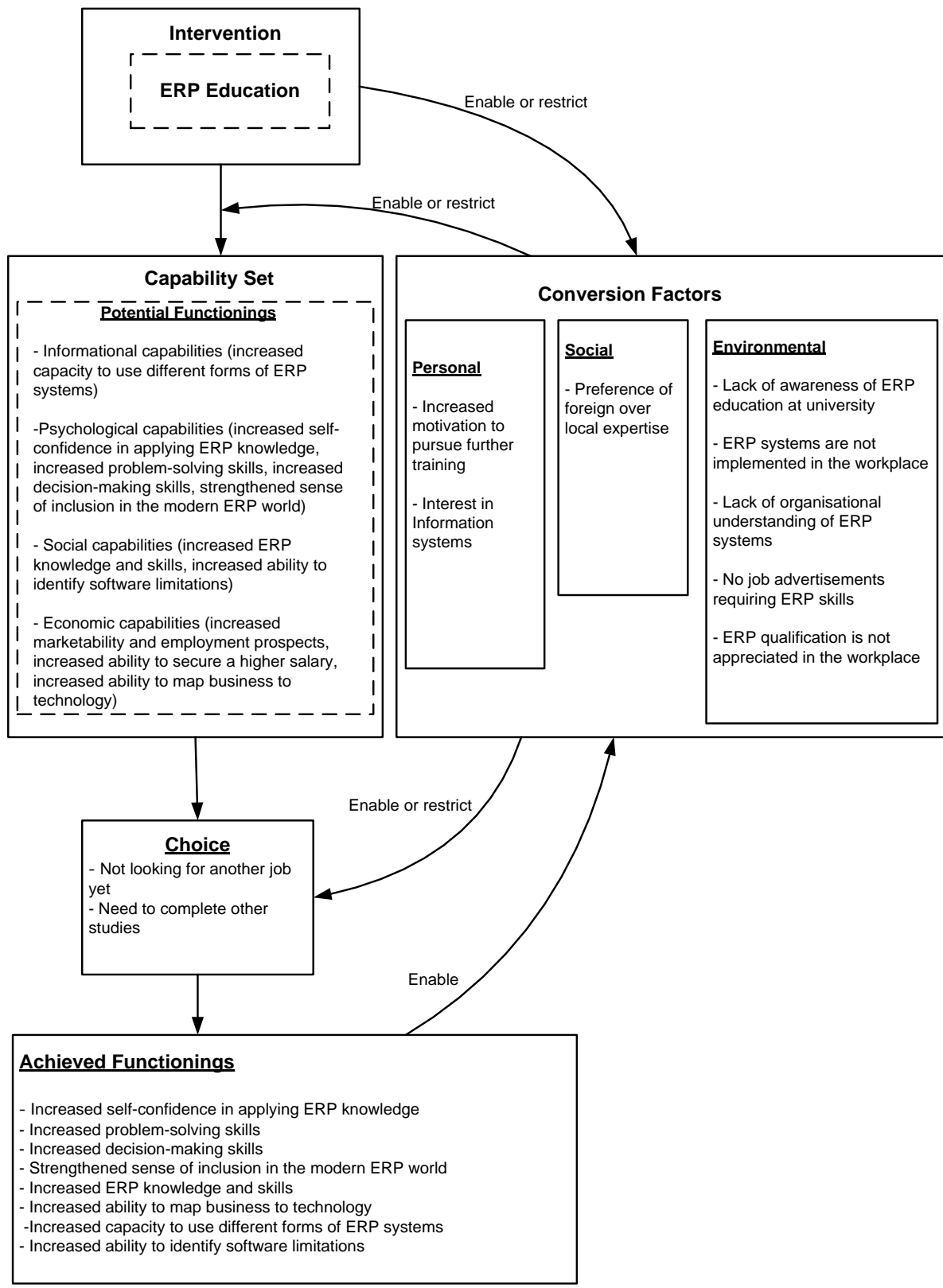


Figure 4-1 Conversion Factors, Capabilities, Functionings and Choices

inclusion in the modern ERP world, and increased ability to identify software limitations. Two student capabilities, namely increased ability to secure a higher salary and increased marketability and employment prospects were not converted to functionings due to some student choices that were made, as well as environmental and social conversion factors that restricted capabilities and functionings. These choices were not looking for another job yet and need to complete other studies.

It was noted that personal conversion factors enabled capabilities while environmental and social conversion factors restricted capabilities. Environmental and social conversion factors were unique to the Zambian context. It has been reported in literature that students that have gone through ERP education have received higher salaries and increased employment opportunities. However, this is not the case in the Zambian context as ERP graduates did not get better jobs neither did they receive higher salaries. Some of the students had actually not seen any job advertisements requiring ERP skills. Therefore, ERP education leading to higher salaries and increased employment prospects is not applicable in the Zambian context.

4.6 Suitability of Sen's Capability Approach and Gigler's AEF for ERP Education

Sen's Capability Approach was selected to assist in identifying the student capabilities and functionings enabled by ERP education and the contextual factors that impacted student capabilities and functionings. Gigler's indicators of individual empowerment were used to identify the dimensions of individual empowerment impacted by ERP education. Some of the capabilities and functionings were therefore identified in advance from literature and Gigler's AEF, and these were searched for in the data. Sen identifies contextual factors as personal, social, and environmental conversion factors. The specific conversion factors identified from the data were not found prior in literature but were identified from the data analysis. The Zambian context was evident through the environmental and social conversion factors. The Zambian context showed that ERP education does not lead to a higher salary or increased employment prospects as ERP graduates in Zambia were not able to get jobs, nor did they receive higher salaries.

Several factors relating to the ERP course, which in this case is the intervention were identified but could not be coded as Sen's Capability Approach does not critique the intervention. Hence an inductive study was undertaken to identify other themes that were not limited to the theory. A limitation of the deductive approach, which was noted in this research is that important themes that do not fit into the theory might be overlooked (DeJong et al., 2004). The main

advantage of using an inductive approach is that there is no need to use a pre-defined framework or model (Zalaghi & Khazaei, 2016).

4.7 Chapter Summary

This chapter presented the deductive analysis for Study 1 and identified the student capabilities and functionings enabled by ERP education. The chapter also identified the conversion factors and choices that enabled or restricted ERP education. We found limited studies where Sen's Capability Approach has been applied in ERP education to determine how conversion factors and choices impact student capabilities and functionings. The findings in this chapter showed that personal conversion factors enabled capabilities and functionings while environmental and social conversion factors restricted capabilities and functionings. The contribution of this chapter is that contrary to what is recorded in literature, ERP education does not always lead to higher salaries and increased employment prospects as was the case in the Zambian context; hence, benefits of ERP education are not applicable to all contexts. The next chapter discusses the inductive study that was undertaken.

5 STUDY 2: FINDINGS AND DISCUSSION

Student capabilities, functionings, choices, and contextual factors in the form of personal, social, and environmental conversion factors were identified in the deductive study. In this chapter, additional themes that were identified using an inductive approach will be discussed. The chapter, therefore, discusses the research findings of Study 2, which looks at the impact of ERP education on students using an inductive approach and addresses the following research question:

- What are the course outcomes of ERP education and what contextual factors impact these course outcomes?

5.1 Course Outcomes

In addition to the student capabilities and functionings identified in the deductive study, two other course outcomes were identified. Course outcomes were used as a category because they were broader than student capabilities and functionings as they included other course outcomes other than student capabilities and functionings. These additional course outcomes were *increased motivation to pursue further training* and *ability to obtain an ERP certificate*. *Increased motivation to pursue further training* was identified as a personal conversion factor in the deductive study. *Ability to obtain an ERP certificate* was not identified in Study 1 but was identified as a new theme in Study 2. The course outcomes are presented in Table 5-1. In the table, the number of respondents represents the number of students that mentioned a particular theme while the number of statements represents the frequency or number of times a particular theme was mentioned by the students. The course outcome, *ability to obtain an ERP certificate* will now be discussed as the other course outcomes were discussed in the deductive study.

Table 5-1 Course Outcomes

| Course Outcome | No. of Respondents | No. of Statements |
|--|---------------------------|--------------------------|
| Increased capacity to use different forms of ERP systems | 9 | 9 |
| Increased ERP knowledge and skills | 21 | 22 |
| Increased marketability and employment prospects | 15 | 22 |
| Increased self-confidence in applying ERP knowledge | 16 | 19 |
| Increased ability to secure a higher salary | 4 | 4 |
| Increased ability to map business to technology | 10 | 11 |
| Increased decision-making skills | 4 | 4 |
| Increased problem-solving skills | 2 | 3 |
| Strengthened sense of inclusion in the modern ERP world | 7 | 7 |
| Increased ability to identify software limitations | 1 | 1 |
| Increased motivation to pursue further training | 3 | 4 |
| Ability to obtain an ERP certificate | 3 | 3 |

- **Ability to Obtain an ERP Certificate**

Two out of twenty-one respondents interviewed felt that since they did not obtain ERP certificates due to either not writing the exam or passing the exam, this had restricted them from applying for other jobs as they did not have proof of having done the ERP course. They felt that their busy schedule had prevented them from obtaining certificates. One of the motivating factors for doing the ERP course was that they would have an ERP certificate that they hoped would increase their job prospects. Hence, not obtaining a certificate limited course outcomes. One other respondent felt that the ERP certificate increased their marketability and employment prospects, and they added it to their LinkedIn profile. Literature shows that when students perceive value in a vendor certificate like SAP ERP, it will motivate them to pursue

that certificate to improve their job prospects (Kung & Kung, 2017). The following quotes are sample quotes from the interviews related to the theme *ability to obtain an ERP certificate*, represented by ENG2, ENG6 and ENG4:

“I didn’t even get the certificate therefore it is even very difficult for me to talk about it when I’ve been called for interviews.” (ENG2)

“Yes, there are restrictions to benefit fully, education wise you know we need to pay to get certified, yes at that level and we missed the opportunity because of our busy schedules and the pressure from our school, to do our programme.” (ENG6).

“So immediately I got my certificate I put it on LinkedIn so I would say it actually did.” (ENG4)

5.2 Zambian Environmental Challenges

Several Zambian environmental challenges that impacted course outcomes were identified. *Zambian environmental challenges* were selected as a classification because the challenges identified were related to existing environmental conditions in the Zambian context that limited course outcomes. These environmental challenges were identified as environmental conversion factors in the deductive study and are presented in Table 5-2. In the table, the number of respondents represents the number of students that mentioned a particular theme while the number of statements represents the frequency or number of times a particular theme was mentioned by the students. One social conversion factor *preference of foreign over local expertise* was classified as an environmental challenge in the inductive study.

Table 5-2 **Zambian Environmental Challenges**

| Zambian Environmental Challenge | No. of Respondents | No. of Statements |
|---|---------------------------|--------------------------|
| Lack of awareness of ERP education at university | 9 | 10 |
| Preference of foreign over local expertise | 8 | 11 |
| ERP systems are not implemented in the workplace | 8 | 8 |
| Lack of organisational understanding of ERP systems | 3 | 4 |
| ERP qualification is not appreciated in the workplace | 2 | 5 |
| No job advertisements requiring ERP skills | 2 | 2 |

5.3 Course Limitations

Several course limitations that impacted course outcomes were identified. These limitations were related to existing ERP course conditions that had a huge impact on course outcomes. The course limitations were not coded in the deductive study hence they were not shown in the framework. These limitations are presented in Table 5-3 and will now be discussed. In the table, the number of respondents represents the number of students that mentioned a particular theme while the number of statements represents the frequency or number of times a particular theme was mentioned by the students.

Table 5-3 Course Limitations

| Course Limitation | No. of Respondents | No. of Statements |
|--|---------------------------|--------------------------|
| ERP course content was too basic | 3 | 6 |
| Lack of university collaboration with industry | 3 | 3 |
| Challenging exam | 3 | 4 |
| Connectivity and set-up challenges | 2 | 2 |
| ERP interface was difficult to navigate | 1 | 1 |
| ERP tutorial software was restricted to university | 1 | 2 |
| ERP exercises lacked an implementation aspect | 2 | 2 |
| Lack of integration of ERP course with university qualifications | 4 | 5 |

5.3.1 ERP Course Content Was Too Basic

Three out of twenty-one respondents interviewed felt that the knowledge gained from the ERP course was too basic for them to compete with foreign ERP experts or consultants. The students had hoped for a more advanced follow-up course. Hence more time would be required for the students to do a more advanced course to be able to compete with ERP experts or consultants. This, therefore, limited course outcomes. Literature shows that students who took an ERP course felt that they did not get enough technical practice and training (Seethamraju, 2011). Hence, the findings in this study are similar to what is recorded in literature. The following quotes are sample quotes from the interviews related to the theme *ERP course content was too basic*, represented by ENG3, ENG2 and CS7:

“People still depend on consultants and what we do there at University of Zambia is still very basic. What is needed is they need to be exposed to compete with consultants.” (ENG3)

“To me that knowledge to be frank didn’t impact much, yes, it was too basic.” (ENG2)

“They just taught us some fundamentals so we thought we would get more after that.” (CS7)

5.3.2 Lack of University Collaboration with Industry

Three out of twenty-one respondents interviewed felt that university collaboration with industry would enable organisations to be involved in the ERP programme at UNZA thus providing employment opportunities for students. Literature shows that collaboration between universities and industry helps to bridge the gap between skills of university graduates and those required by industry (Hawking & McCarthy, 2000). It also helps to build stronger links between universities and industry thus helping to motivate students and providing employment opportunities to students (Hawking & McCarthy, 2000). In this research, it was noted that there was lack of collaboration between the university and industry. Hence, this limited course outcomes. The following quotes are sample quotes from the interviews related to the theme *lack of university collaboration with industry*, represented by ENG1 and ENG4:

“More interaction with industry because for some of the people that do it like the undergraduates, they haven’t been in industry, so they still are looking at it from just a theoretical part of it but for us who are in industry we know, and we see where we have limitations in what we’re running currently and so if this part was actually implemented in there and taken into their lane then it changes everything.” (ENG1)

“So, I think one way they could incentivise this is by sponsoring the course and I think that would also help them know about the skill sets that’s available. So, I think that would be one of the things that I would say actually around that. Because I don’t really think they are involved.” (ENG4)

5.3.3 Challenging Exam

Three out of twenty-one respondents interviewed said that they found the exam challenging and only passed after the second attempt. Hence the fact that some initially failed the exam limited course outcomes. Students who took a similar ESEFA ERP course in Nigeria noted that the course did not have enough practice exam questions; hence, this could lead to students finding the ERP course exam challenging (Alawode et al., 2015). The following quotes are sample quotes from the interviews related to the theme *challenging exam*, represented by CS1, CS7 and CS5:

“I flopped in the first exam when I felt well, I’ve made it and I had to repeat the missed exam and that’s the one that I managed.” (CS1)

“To be honest, the first time when I attempted, I didn’t make it. I only made it after the second time. Because it’s something whereby, just as I said, if really you haven’t understood the questions then it’s very difficult for somebody to pass.” (CS7)

“The only challenge was the exam.” (CS5)

5.3.4 Connectivity and Set-up Challenges

Two out of twenty-one respondents interviewed said that at times, they had connectivity challenges when they were taking the course, and their time was limited. Hence, connectivity and set-up challenges limited course outcomes. It has been noted that most universities in Africa have limited infrastructure such as internet access, bandwidth, hardware and software provision, and unreliable access to electricity, which can lead to connectivity issues (Mahanga & Seymour, 2016). In order to connect to the SAP server in Germany, an internet connection is required; hence, if a university has an unstable internet connection or unstable electricity supply, connectivity issues will be experienced. The following quotes are sample quotes from the interviews related to the theme *connectivity and set-up challenges*, represented by CS10 and ENG1:

“What we just needed was more time and if I remember very well, there were challenges to do with connectivity at that time so sometimes we’d have some problems of connectivity.” (CS10)

“Yeah, the learning experience was wonderful although in the beginning we had some hitches getting to start and running, of course connecting to the system, getting the passwords and the usernames. I think after we had gone through that stage then we were able to get through. The only problem was that we didn’t have enough time where you could come in yourself with your lab material, log in, start working through it and so on.” (ENG1)

5.3.5 ERP Interface Was Difficult to Navigate

One out of twenty-one respondents interviewed felt that the ERP interface was not user-friendly; hence, it was difficult to navigate. The ERP interface which was difficult to navigate therefore limited course outcomes. Students who took a similar ERP course in Nigeria felt that the ERP tutorial software should be more user-friendly to facilitate proficiency (Alawode et al., 2015). In another study, students also found the SAP screens and interface challenging to navigate. (Seethamraju, 2011). Hence, the findings in this study are similar to what is recorded in literature. The following quote is a sample quote from the interviews related to the theme *ERP interface was difficult to navigate*, represented by CS3:

“I think the only challenge was the interface of the application. I think getting people to work with it regularly would be very, very difficult.” (CS3)

5.3.6 ERP Tutorial Software Was Restricted to University

One out of twenty-one respondents interviewed felt that since the ERP software could only be accessed from the university, this had restricted her from practicing at home or elsewhere. Hence this limited course outcomes. Literature shows that students in Nigeria who took a similar ERP course also identified this as a limitation (Alawode et al., 2015). For a user to access the SAP server in Germany, the SAP GUI needs to be installed on the computer. The SAP GUI was not made available to students off campus. The IP address of the computer should also be allowed to access the SAP server as there are IP restrictions in accessing the SAP server. The research did not investigate why the SAP GUI was not made available to the students off campus. Hence, the findings in this study are similar to what is contained in literature. The following quote is a sample quote from the interviews related to the theme *ERP tutorial software was restricted to university*, represented by CS6:

“The only thing is the software is confined to here, so you cannot really practice at home. You just have to practice when you’re here, like it’s a software that is not shared.” (CS6)

5.3.7 Lack of Integration of ERP Course with University Qualifications

Four out of twenty-one respondents interviewed felt that the ERP course should be combined with another qualification to be beneficial to the employee and the hiring organisation. Two of the four respondents felt that since the ERP course was not integrated into their Engineering programme, they focused on the ERP course only during their free time, hence this limited course outcomes. It has been noted in literature that an academic qualification such as a degree assists in long-term career objectives (Marquardson & Elnoshokaty, 2020). Degrees and certifications both have value for job seekers and a combination of both education and certification seems to be the best solution (Marquardson & Elnoshokaty, 2020). Hence, the lack of integration of ERP course with university qualifications limited course outcomes. The following quote is a sample quote from the interviews related to the theme *lack of integration of ERP course with university qualifications*, represented by ACC1:

“I think you need to have it in conjunction with another course so that you become more beneficial to the organisation that employs you. So, I think for now that’s a restriction in the sense that though I’m an Accountant, there are certain levels of my accounting qualifications that I haven’t yet finished.” (ACC1)

5.3.8 ERP Exercises Lacked an Implementation Aspect

Two respondents from Computer Science, out of the twenty-one students interviewed said that since the course lacked programming and an implementation aspect, they did not benefit from the course. It has been noted in literature that most ERP teaching models focus on business processes with less focus on implementation (Motahar et al., 2018a). The paper noted that ERP training models are not designed for implementation independent of the ERP vendor, and the focus is on business processes because it is one of the required skills for ERP consultants. Hence, the lack of programming or customising the system limited course outcomes. The following quotes are sample quotes from the interviews related to the theme *ERP exercises lacked an implementation aspect*, represented by CS7, CS3 and CS5:

“We should have been given something to implement ourselves, it’s like we were just working on something which is already implemented. We were hoping to be given another part of ESEFA which involves programming which was lacking.” (CS7)

“I honestly think there is a customisation module so it would have been nice to see how you can customise the actual enterprise system to fit an organisation.” (CS3)

“I think you know, being a Computer Scientist, I think the science that I’m doing is deeper than just the understanding of ERP. Because the programme as we did it, ERP was more like the front end. And I was actually looking forward to the next level that would involve programming.” (CS5)

5.4 Personal Characteristics and Situation

The personal characteristics and situation of the students that impacted course outcomes were also identified. One personal characteristic and situation theme, *interest in information systems* was identified as a personal conversion factor in the deductive study. *Disciplinary background knowledge, time to devote to course, and alignment of work with ERP systems* were identified in Study 2. The classification in the inductive study was broader than personal conversion factors in the deductive study as it included the students’ characteristics and situation. The personal characteristics and situation are presented in Table 5-4 and will now be discussed. In the table, the number of respondents represents the number of students that mentioned a particular theme while the number of statements represents the frequency or number of times a particular theme was mentioned by the students.

Table 5-4 Personal Characteristics and Situation

| Personal Characteristic and Situation | No. of Respondents | No. of Statements |
|--|---------------------------|--------------------------|
| Disciplinary background knowledge | 7 | 7 |
| Time to devote to course | 5 | 7 |
| Alignment of work with ERP systems | 5 | 5 |
| Interest in information systems | 1 | 1 |

5.4.1 Disciplinary Background Knowledge

Insufficient disciplinary background knowledge was identified as a limitation for seven out of twenty-one respondents interviewed. Six respondents who did not come from an accounting background had challenges understanding accounting principles in the course. One respondent from an accounting background had challenges with some IT jargon used during the course. Another respondent said that they did not have sufficient knowledge about the course and what it entailed before they took the course hence, they did not know what to expect. Hence, insufficient disciplinary background knowledge limited course outcomes. Other studies have also shown that inadequate knowledge of accounting and finance was a challenge for students from an IT background who took an ERP course based on an ERP simulation game (Seethamraju, 2011). Another study also found that students need to have a basic understanding of business principles before learning business processes from ERP systems (Monk & Lycett, 2016). Three of the twenty-one respondents had some background knowledge of ERP systems which enabled them to understand the course better. Literature shows that students with prior experience with ERP systems have a more favourable perception towards usefulness and ease of use of ERP systems (Grandón et al., 2021). The following quotes are sample quotes from the interviews related to the theme *disciplinary background knowledge*, represented by CS4 and ACC1:

“The only challenges that we had I think is because most of us our background is Computer Science so if you are going to start talking about sales, you are introducing concepts that are foreign to me. So those were the biggest challenges that we had. We had to learn concepts that are in accounting, that are in sales and inventory management that naturally are not within our scope of work or within our knowledge scope if I can use that word.” (CS4)

“I think the jargon that came in, there were some certain aspects that were a bit easy for the people that do IT.” (ACC1)

5.4.2 Time to Devote to Course

Five out of twenty-one respondents interviewed felt that they had limited time to focus on the ERP course as they were working full time and focusing on the postgraduate programme. The respondents felt that this had restricted them from fully benefitting from the course. Hence limited time to devote to course impacted course outcomes. Students who took a similar ERP course in Nigeria felt that more time should be given to the labs as they did not have enough time for the labs (Alawode et al., 2015). In another study students who took an ERP course felt that the course presented too much work and the pace was too fast; hence, they requested more time in the lab (Davis & Comeau, 2004). In this study, the students did not have enough time to dedicate to the course due to their busy schedules. The following quotes are sample quotes from the interviews related to the theme *time to devote to course*, represented by ENG4 and ENG1:

“I’d say the challenge that I had with it was the fact that I was taking another programme and so time was a little bit limited.” (ENG4)

“The only problem was that we didn’t have enough time where you could come in yourself with your lab material log in, start working through it and so on.” (ENG1)

5.4.3 Alignment of Work with ERP Systems

Five out of twenty-one respondents interviewed felt that they did not benefit from the course because the ERP course and their current role at work were different. Hence, the respondents were not able to apply the knowledge gained from ERP education in their work environment. Since working on ERP systems was not in the students’ line of work, this limited course outcomes. Literature shows that the role of IT personnel should not be limited to responding to technical issues, but they should also have a business partnership role (Badewi et al., 2020). Business partnership role is the ability of the IT personnel to assess users’ needs from time to time to determine whether there are new business needs an ERP system should take into consideration (Badewi et al., 2020). The following quotes are sample quotes from the interviews related to the theme *alignment of work with ERP systems*, represented by CS4 and CS3:

“Our organisation does use SAP but then as IT members of staff we don’t have a role in the system as yet, so we just support other users who use it.” (CS4)

“Right now, in my current role I couldn’t say it’s beneficial because the actual course and what I’m doing are totally different.” (CS3)

5.5 Study 2 Thematic Networks

Contextual factors that impacted course outcomes were identified as *Zambian environmental challenges*, *course limitations*, and *personal characteristics and situation*. *Course limitations* were not coded in the deductive study but were coded in the inductive study. These course limitations were *lack of university collaboration with industry*, *challenging exam*, *connectivity and set-up challenges*, *ERP interface was difficult to navigate*, *ERP tutorial software was restricted to university*, *ERP exercises lacked implementation aspect*, and *lack of integration of ERP course with university qualifications*. Three personal characteristics and situation themes, namely *disciplinary background knowledge*, *time to devote to course*, and *alignment of work with ERP systems* were not coded in the deductive study but were coded in the inductive study.

The themes that were identified from the data analysis are presented in thematic network diagrams shown in Figure 5-1 and Figure 5-2. The additional themes identified in the inductive study were combined with the initial themes identified in the deductive study. Figure 5-1 shows the contextual factors that impacted ERP education in the *Zambian context*. In Figure 5.1, the new themes identified in Study 2 are all the themes under *Course limitations* and three themes under *personal characteristics and situation*, namely *disciplinary background knowledge*, *time to devote to course*, and *alignment of work with ERP systems*. Figure 5-2 shows the course outcomes of ERP education. In Figure 5-2 the new theme that was coded in Study 2 was *ability to obtain an ERP certificate*. The dominant themes are presented in bold font in Figure 5-1 and Figure 5-2. These were interpreted as dominant due to the regularity of the themes being cited by the students.

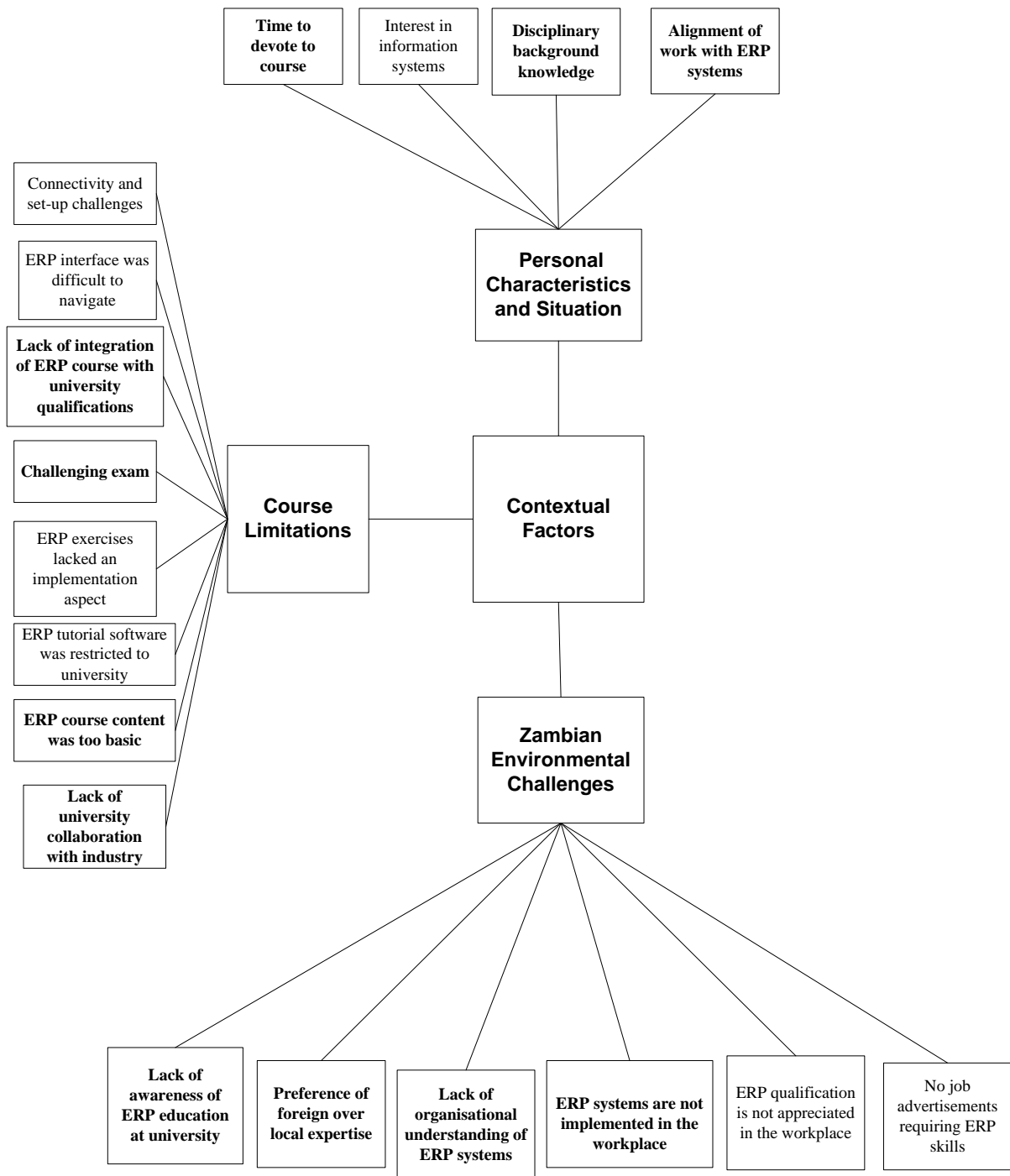


Figure 5-1 Contextual Factors Thematic Network

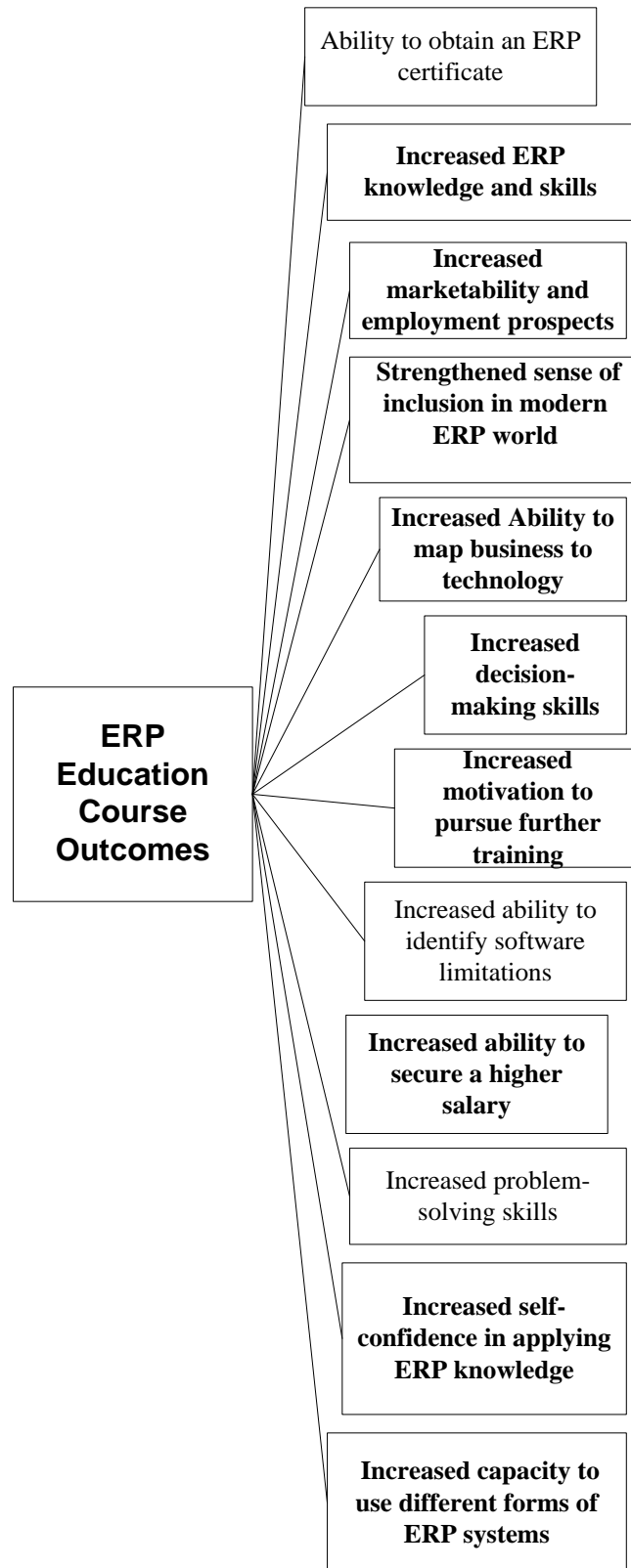


Figure 5-2 ERP Education Course Outcomes Thematic Network

5.6 Level 1 Relationships Identified from The Data

The relationships were identified from the analysis of the data. Matrix coding using NVivo software supplemented the analysis. Matrix coding query is a theory building query where pairs of items are cross-tabulated and displayed as a matrix (Bazeley & Jackson, 2013). Matrix coding queries in NVivo have been used in prior studies to determine relationships between concepts and categories in a grounded theory approach (Hutchison et al., 2010) . Table 5-4 shows the node matrix for Level 1 relationships, and Table 5-5 shows the matrix key where short codes were used to represent the different themes.

The rows and columns show the identified themes, that is, the student capabilities, functionings, and contextual factors that impacted these capabilities and functionings. The cell shows the number of statements coded for that theme. The relationships in the node matrix were identified by the co-occurrence of two different themes in one cell, highlighted in green. Level 1 relationships are the relationships between the different themes that were identified at first-order analysis. First-order analysis is based on terms used by informants. These relationships are depicted in Figure 5-3. The dotted lines represent the relationships. These relationships will now be discussed.

Table 5-4 Node Matrix

| | CC | CB | IC | IA | CI | TS | OC | SL | KS | PS | DM | EP | BT | SC | HS | FT | CE | Labs | Zambikes | TC | FE | QA | SW | AE |
|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------|----------|----|----|----|----|----|
| CC | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| CB | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| IC | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| IA | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| CI | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| TS | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| OC | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| SL | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| PS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| EP | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| BT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| SC | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 18 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| HS | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| FT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CE | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 12 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| Labs | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 8 | 10 | 0 | 0 | 0 | 0 | 0 | 0 |
| Zambikes | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 |
| PK | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TC | 2 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 |
| FE | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 |
| QA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| SW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 |
| AE | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |

Table 5-5 Matrix Key

| Theme | Short Code |
|--|-------------------|
| Connectivity and setup challenges | CC |
| ERP course content was too basic | CB |
| Lack of integration of ERP course with university qualifications | IC |
| ERP exercises lacked implementation aspect | IA |
| Lack of university collaboration with industry | CI |
| ERP tutorial software restricted to university | TS |
| Ability to obtain an ERP certificate | OC |
| Increased ability to identify software limitations | SL |
| Increased ERP knowledge and skills | KS |
| Increased problem-solving skills | PS |
| Increased decision-making skills | DM |
| Increased marketability and employment prospects | EP |
| Increased ability to map business to technology | BT |
| Increased self-confidence in applying ERP knowledge | SC |
| Increased ability to secure a higher salary | HS |
| Increased motivation to pursue further training | FT |
| Increased capacity to use different forms of ERP systems | CE |
| ERP lab exercises | Labs |
| Zambikes case study | Zambikes |
| Inadequate prior knowledge | PK |
| Time to devote to course | TC |
| Preference of foreign over local expertise | FE |
| ERP qualification is not appreciated in the workplace | QA |
| ERP systems are not implemented in Workplace | SW |
| Lack of awareness of ERP education at university | AE |

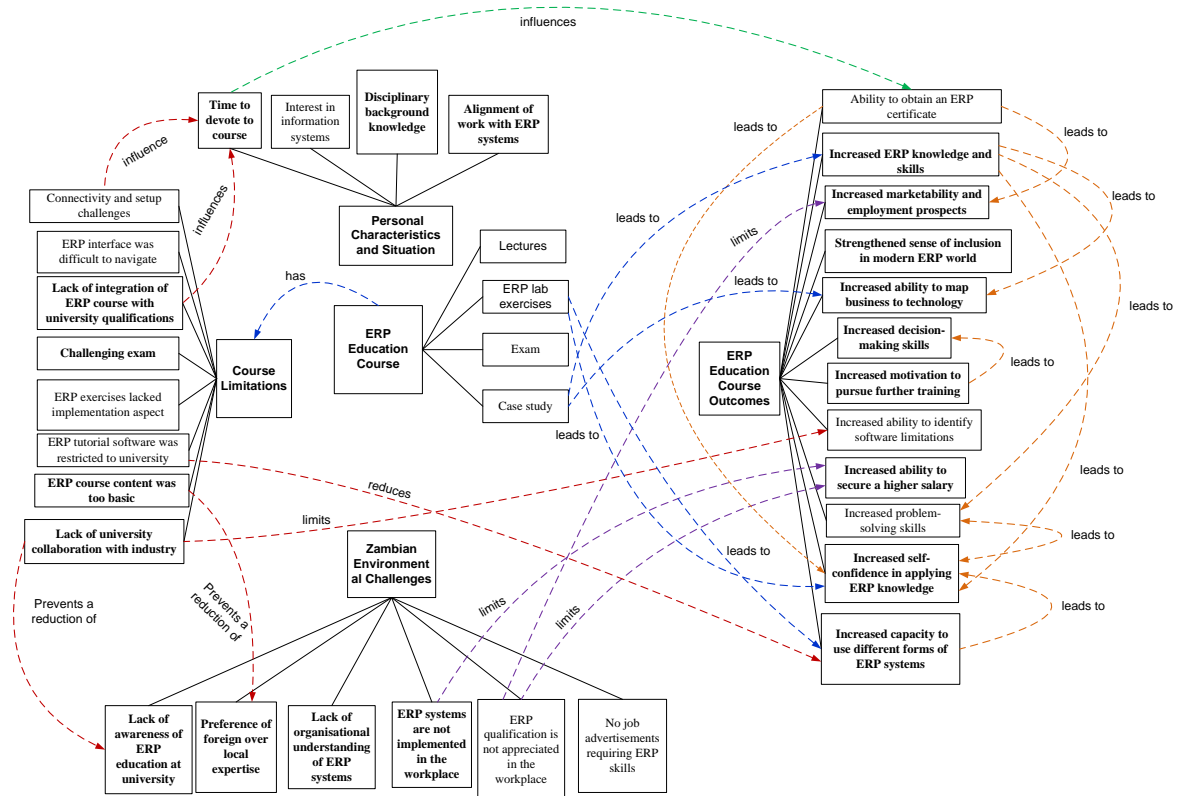


Figure 5-3 Level 1 Relationships

5.6.1 Increased Capacity to Use Different Forms of ERP Systems – Increased Self-Confidence in Applying ERP Knowledge Relationship

There was a relationship noted between *increased capacity to use different forms of ERP systems* and *increased self-confidence in applying ERP knowledge*. This relationship is depicted in Figure 5-4. Without hands-on experience through the ERP lab exercises, the students in this study would not have developed the confidence to use ERP systems and be able to apply ERP knowledge. The following quote is a sample quote from the interviews related to the relationship between the themes *increased capacity to use different forms of ERP systems* and *increased self-confidence in applying ERP knowledge*, represented by ACC1:

“It was really nice to have that hands-on and it gave you the confidence really because I think if we had just gone through it on the board without having gone to the PC it wouldn’t, you know, give you that confidence out there but after the study there was that confidence that remained because we had the hands- on experience from the workshops themselves.” (ACC1)

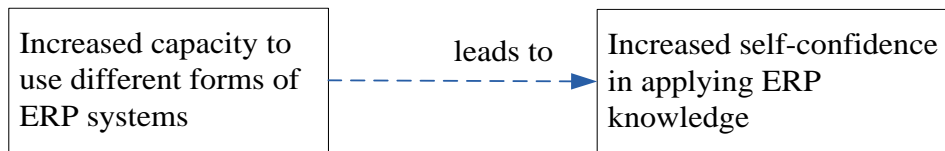


Figure 5-4 Increased Capacity to Use Different Forms of ERP Systems and Self-Confidence in Applying ERP Knowledge Relationship

Hence, the following relationship was noted:

Increased capacity to use different forms of ERP systems leads to increased self-confidence in applying ERP knowledge.

5.6.2 Increased Self-Confidence in Applying ERP Knowledge – Increased Problem-Solving Skills Relationship

A relationship between *increased self-confidence in applying ERP knowledge* and *increased problem-solving skills* was noted. This relationship is depicted in Figure 5-5. Having increased self-confidence in applying ERP knowledge increased the students’ ability to assist in resolving ERP related problems. The ability to assist users in the workplace with ERP related problems in turn increased self-confidence in applying ERP knowledge. The following quote is a sample quote from the interviews related to the relationship between the themes *increased self-confidence in applying ERP knowledge* and *increased problem-solving skills*, represented by ENG6:

“Yes, it has boosted my self-confidence. Before, as I explained earlier, you know I used to keep a distance when it came to helping the accounting team just to do their purchases and transactions in ERP systems yes, and it has helped me to spearhead the deployment of ERP at this institution.” (ENG6)

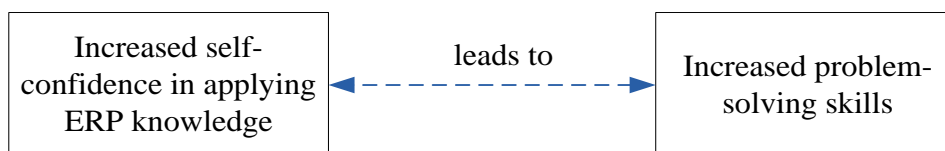


Figure 5-5 Increased Self-Confidence in Applying ERP Knowledge and Increased Problem-Solving Skills Relationship

Hence, the following relationships were noted:

Increased self-confidence in applying ERP knowledge leads to increased problem-solving skills.

Increased problem-solving skills lead to increased self-confidence in applying ERP knowledge.

5.6.3 Lack of University Collaboration with Industry – Lack of Awareness of ERP Education at University Relationship

It was also noted that collaboration with industry would lead to organisations being aware of ERP education at UNZA. Therefore, there was a relationship noted between *lack of university collaboration with industry* and *lack of awareness of ERP education at university*. This relationship is depicted in Figure 5-6. The following quote is a sample quote from the interviews related to the relationship between the themes *lack of university collaboration with industry* and *lack of awareness of ERP education at university*, represented by ENG4:

“One way they could incentivise this is by sponsoring the course and I think that would also help them know about the skill sets that’s available.” (ENG4)

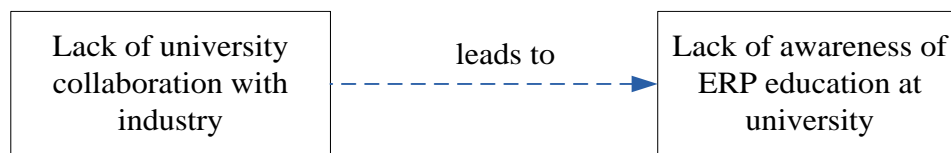


Figure 5-6 Lack of University Collaboration with Industry and Lack of Awareness of ERP Education at University Relationship

Hence, the following relationship was noted:

Lack of university collaboration with industry leads to lack of awareness of ERP education at university.

5.6.4 ERP Course Content Was Too Basic - Preference of Foreign Over Local Expertise Relationship

It was noted that organisations depend on consultants or foreign experts, and the knowledge that the students acquired through the ERP course was too basic to enable them to compete with ERP consultants. Therefore, there was a relationship noted between *ERP course content was too basic* and *preference of foreign over local expertise*. This relationship is depicted in Figure 5-7. The following quote is a sample quote from the interviews related to the relationship between the themes *ERP course content was too basic* and *preference of foreign over local expertise*, represented by ENG3:

“People still depend on consultants and what we do there at University of Zambia is still very basic. What is needed is they need to be exposed to compete with consultants.” (ENG3)

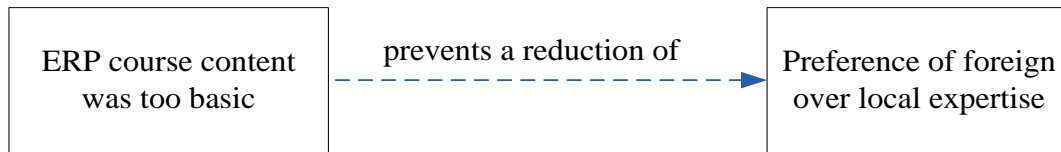


Figure 5-7 ERP Course Content Was Too Basic and Preference of Foreign over Local Expertise Relationship

Hence, the following relationship was noted:

ERP course content being too basic prevents a reduction of preference of foreign over local expertise.

5.6.5 Connectivity and Set-up Challenges - Time to Devote to Course Relationship

It was noted that sometimes the students in this study had challenges connecting to the ERP training software, and they also did not have enough time to work on the labs. Therefore, a relationship between *connectivity and set-up challenges* and *time to devote to course* was noted. This relationship is depicted in Figure 5-8. The following quote is a sample quote from the interviews related to the relationship between the themes *connectivity and set-up challenges* and *time to devote to course*, represented by CS10:

“What we just needed was more time and if I remember very well, there were challenges to do with connectivity at that time so sometimes we’d have some problems of connectivity.” (CS10)

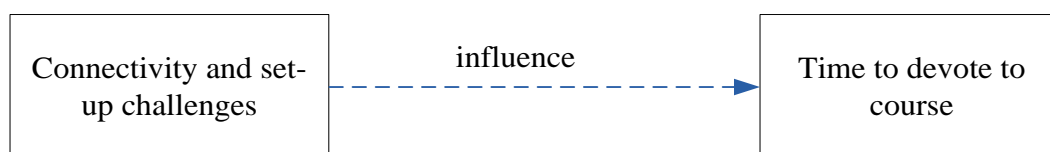


Figure 5-8 Connectivity and Set-up Challenges and Time to Devote to Course Relationship

Hence, the following relationship was noted:

Connectivity and setup challenges influence the time to devote to course.

5.6.6 Time to Devote to Course – Ability to Obtain an ERP Certificate Relationship

It was also noted that some students were not able to obtain the ESEFA ERP certificate due to their limited time. Therefore, a relationship between *time to devote to course* and *ability to obtain an ERP certificate* was noted. This relationship is depicted in Figure 5-9. The following quote is a sample quote from the interviews related to the relationship between the themes *time to devote to course* and *ability to obtain an ERP certificate*, represented by ENG6:

“Yes, there are restrictions to benefit fully, education wise you know we need to pay to get certified, yes at that level and we missed the opportunity because of our busy schedules and the pressure from our school, to do our programme.” (ENG6)

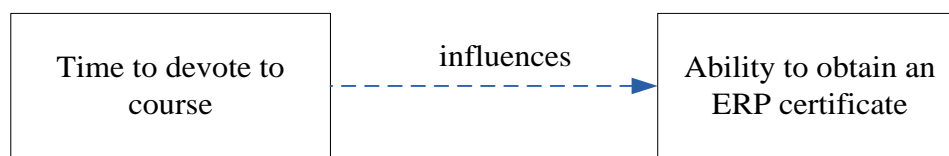


Figure 5-9 Time to Devote to Course and Ability to Obtain an ERP Certificate Relationship

Hence, the following relationship was noted:

Time to devote to course influences the ability to obtain an ERP certificate.

5.6.7 ERP Qualification is Not Appreciated in the Workplace - Increased Ability to Secure a Higher Salary Relationship

It was noted that since students felt that their ERP qualification was not appreciated in the workplace, this limited their ability to secure a higher salary in the organisation. Therefore, there was a relationship noted between *ERP qualification is not appreciated in the workplace* and *increased ability to secure a higher salary*. This relationship is depicted in Figure 5-10. The following quote is a sample quote from the interviews related to the relationship between the themes *ERP qualification is not appreciated in the workplace* and *increased ability to secure a higher salary*, represented by ACC1:

“An increment? Well, that one not really unless probably if I went into another organisation that appreciated the kind of training I've received in terms of ERPs but otherwise in the current organisation where I am what increases my salary has to do with the other qualifications that I've been pursuing.” (ACC1)

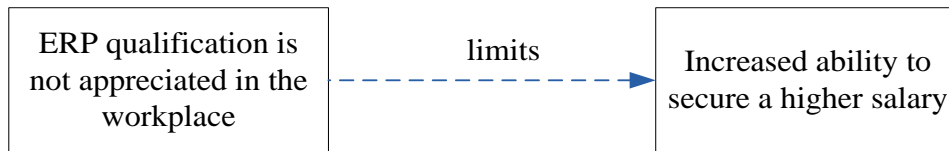


Figure 5-10 ERP Qualification Is Not Appreciated in the Workplace and Increased Ability to Secure a Higher Salary Relationship

Hence, the following relationship was noted:

Lack of appreciation of ERP qualification in the workplace limits the ability to secure a higher salary.

5.6.8 ERP Systems Are Not Implemented in the Workplace – Increased Ability to Secure a Higher Salary Relationship

It was noted that since ERP systems are not implemented in the workplace, this has impacted the students’ competitive advantage, thus limiting their ability to secure a higher salary. Therefore, there was a relationship noted between *ERP systems are not implemented in the workplace* and *increased ability to secure a higher salary*. This relationship is depicted in Figure 5-11. The following quote is a sample quote from the interviews related to the relationship between the themes *ERP systems are not implemented in the workplace* and *increased ability to secure a higher salary*, represented by CS1:

“Well, if I was in an organisation where ERP is being used of course that was going to give me competitive advantage but now like it is, it’s not being used.” (CS1)

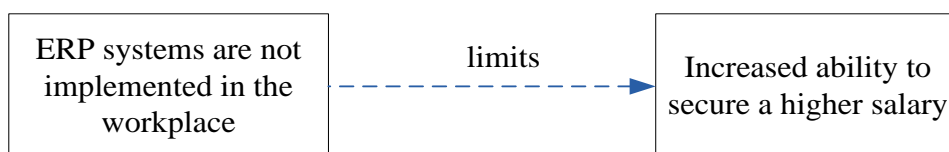


Figure 5-11 ERP Systems are Not Implemented in the Workplace and Increased Ability to Secure a Higher Salary Relationship

Hence, the following relationship was noted:

Lack of implementation of ERP systems in the workplace limits the ability to secure a higher salary.

5.6.9 Ability to Obtain an ERP Certificate – Increased Marketability and Employment Prospects Relationship

It was noted that the inability to obtain an ERP certificate impacted one’s marketability and employment prospects. Therefore, there was a relationship noted between *ability to obtain an ERP certificate* and *increased marketability and employment prospects*. This relationship is depicted in Figure 5-12. The following quote is a sample quote from the interviews related to the relationship between the themes *ability to obtain an ERP certificate* and *increased marketability and employment prospects*, represented by ENG2:

“I didn’t even get the certificate therefore it is even very difficult for me to talk about it when I’ve been called for interviews because there’s no paper that was given to me. I can only talk about it with a support document.” (ENG2)

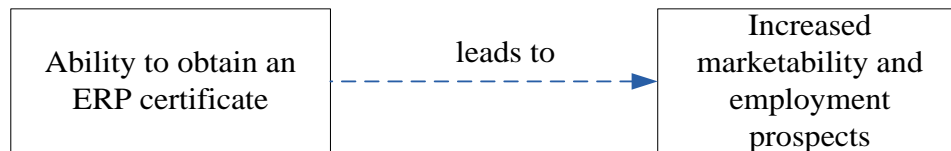


Figure 5-12 Ability to Obtain an ERP Certificate and Increased Marketability and Employment Prospects Relationship

Hence, the following relationship was noted:

The ability to obtain an ERP certificate leads to increased marketability and employment prospects.

5.6.10 Lack of Integration of ERP Course with University Qualifications - Time to Devote to Course Relationship

It was noted that since the ERP course was not integrated into the university qualifications, the students had limited time to devote to the course as they did the course during their free time. Had the ERP course been integrated into their university qualification, they would have had more time to devote to the course. Therefore, a relationship was noted between *lack of integration of ERP course with university qualifications* and *time to devote to course*. This relationship is depicted in Figure 5-13. The following quotes are sample quotes from the interviews related to the relationship between the themes *lack of integration of ERP course with university qualifications* and *time to devote to course*, represented by ENG4 and ENG6:

“The learning experience for the ESEFA course was ok but I’d say the challenge that I had with it was the fact that I was taking another programme and so time was a little bit limited

but that was because of the other programme. Yeah so, the only issue that I had is the fact that my time, at that particular point was limited because I was working full time and also doing the master's programme full time so that really pushed me a little bit.” (ENG4)

“What was happening was that when we're at the University of Zambia we were doing parallel work, our main programmes under Engineering and you know, we go to school up to 17, in the evenings and then..... when we are free, we do the other, so it was a packed programme. No, it was not one of the main courses, there were other courses, it was just an additional to have.” (ENG6)

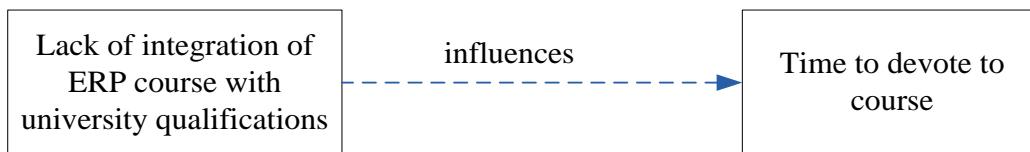


Figure 5-13 Lack of Integration of ERP Course with University Qualifications and Time to Devote to Course Relationship

Hence, the following relationship was noted:

Lack of integration of ERP course with university qualifications influences the time to devote to course.

5.6.11 Lack of University Collaboration with Industry – Increased Ability to Identify Software Limitations Relationship

It was noted that the lack of university collaboration with industry had limited students from being able to identify software limitations of some of the systems being run in industry in comparison to ERP systems, as collaboration with industry would have exposed them to some of these systems. Therefore, a relationship between *lack of university collaboration with industry* and *increased ability to identify software limitations* was noted. This relationship is depicted in Figure 5-14. The following quote is a sample quote from the interviews related to the relationship between the themes *lack of university collaboration with industry* and *increased ability to identify software limitations*, represented by ENG1:

“More interaction with industry because for some of the people that do it like the under graduates they haven't been in industry, so they still are looking at it from just a theoretical part of it but for us who are in industry we know, and we see where we have limitations in what we're running currently and so if this part was actually implemented in there and taken into their lane then it changes everything.” (ENG1)

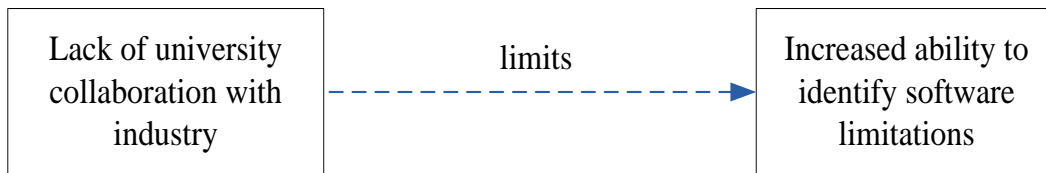


Figure 5-14 Lack of University Collaboration with Industry and Increased Ability to Identify Software Limitations Relationship

Hence, the following relationship was noted:

Lack of university collaboration with industry limits the ability to identify software limitations.

5.6.12 Ability to Obtain an ERP Certificate – Increased Self-Confidence in Applying ERP Knowledge Relationship

It was noted that obtaining an ERP certificate increased the students’ self-confidence in applying ERP knowledge. Therefore, there was a relationship noted between *ability to obtain an ERP certificate* and *increased self-confidence in applying ERP knowledge*. This relationship is depicted in Figure 5-15. The following quote is a sample quote from the interviews related to the relationship between the themes *ability to obtain an ERP certificate* and *increased self-confidence in applying ERP knowledge*, represented by ENG4:

“Yes, I would say so. So immediately I got my certificate I put it on LinkedIn so I would say it actually did.” (ENG4)

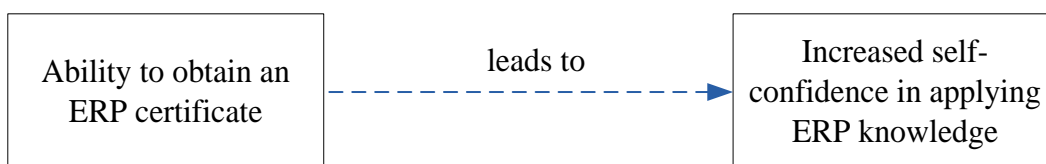


Figure 5-15 Ability to Obtain an ERP Certificate and Increased Self-Confidence in Applying ERP Knowledge Relationship

Hence the following relationship was noted:

The ability to obtain an ERP certificate leads to increased self-confidence in applying ERP knowledge.

5.6.13 ERP Tutorial Software Was Restricted to University – Increased Capacity to use Different Forms of ERP Systems Relationship

It was noted that since the ERP tutorial software was restricted to the university, students were not able to practice on the software when they were off campus, thus limiting their capacity to use different forms of ERP systems. Therefore, there was a relationship noted between *ERP tutorial software was restricted to university* and *increased capacity to use different forms of ERP systems*. This relationship is depicted in Figure 5-16. The following quote is a sample quote from the interviews related to the relationship between the themes *ERP tutorial software was restricted to university* and *increased capacity to use different forms of ERP systems*, represented by CS6:

“I think it’s a good course when you get to implement, or you tend to practice because most of this software you need to practice what you learnt and then if you don’t practice then you tend to forget what you learnt and how to go about the processes. So, it needs a lot of practising, and the only thing is that the software well because it’s restricted to the university so you can’t practice elsewhere other than here.” (CS6)

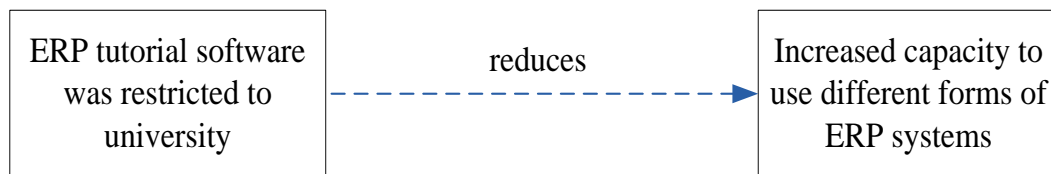


Figure 5-16 ERP Tutorial Software was Restricted to University and Increased Capacity to use Different Forms of ERP Systems Relationship

Hence, the following relationship was noted:

ERP tutorial software being restricted to the university reduces the capacity to use different forms of ERP systems.

5.6.14 Increased Motivation to Pursue Further Training – Increased Decision-Making Skills Relationship

It was noted that motivation to pursue further training led to increased decision-making in the organisation. This relationship is depicted in Figure 5-17. Therefore, there was a relationship noted between *increased motivation to pursue further training* and *increased decision-making skills*. The following quote is a sample quote from the interviews related to the relationship between the themes *increased motivation to pursue further training* and *increased decision-making skills*, represented by ACC1:

“I’ve been chosen as part of one of the people that will participate in these training for the new software that were introduced meaning that I was one of the people that was chosen to become a decision maker when they have to do certain things, they will consult you, what do you think we should do in this sense.” (ACCI)

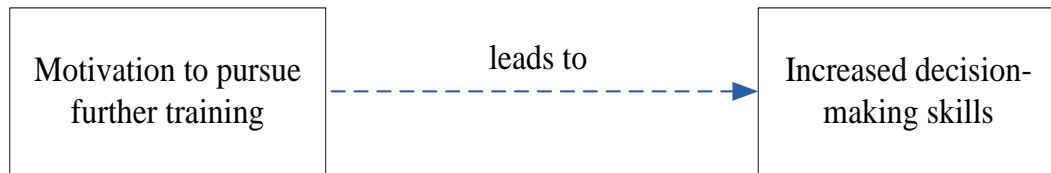


Figure 5-17 Motivation to Pursue Further Training and Increased Decision-Making Skills Relationship

Hence, the following relationship was noted:

Increased motivation to pursue further training leads to increased decision-making skills.

5.6.15 ERP Qualification is Not Appreciated in the Workplace – Increased Marketability and Employment Prospects Relationship

It was noted that since the ERP qualification was not appreciated in the workplace this had limited the students’ marketability and employment prospects. Therefore, there was a relationship noted between *ERP qualification is not appreciated in the workplace* and *increased marketability and employment prospects*. This relationship is depicted in Figure 5-18. The following quote is a sample quote from the interviews related to the relationship between the themes *ERP qualification is not appreciated in the workplace* and *increased marketability and employment prospects*, represented by ENG3:

“Yes, it has, though the industry there’re few who appreciate it.” (ENG3)

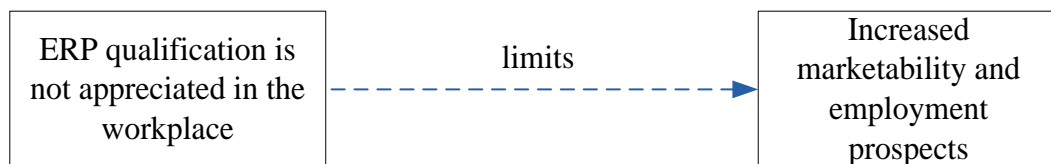


Figure 5-18 ERP Qualification is Not Appreciated in the Workplace and Increased Marketability and Employment Prospects Relationship

Hence the following relationship was noted:

Lack of appreciation of ERP qualification in the workplace limits marketability and employment prospects.

5.6.16 ERP Lab Exercises - Increased Self-Confidence in applying ERP knowledge

Relationship

It was noted that ERP lab exercises led to increased self-confidence in applying ERP knowledge. Hence, a relationship was noted between *ERP lab exercises* and *increased self-confidence in applying ERP knowledge*. This relationship is depicted in Figure 5-19. The following quote is a sample quote from the interviews related to the relationship between *ERP lab exercises* and *increased self-confidence in applying ERP knowledge*, represented by ENG4:

“The labs, that’s the part where we actually got to interact with the ERP software right? So, for the labs, I think again it gets back to the point of the practical side of it. Like I mentioned the slides were presented in a well-coordinated manner but without really doing the practicals, it wouldn’t really have been as beneficial and maybe it would have actually, going back to your point about confidence. I don’t think someone would come out very confident if they didn’t actually work with the software.” (ENG4)

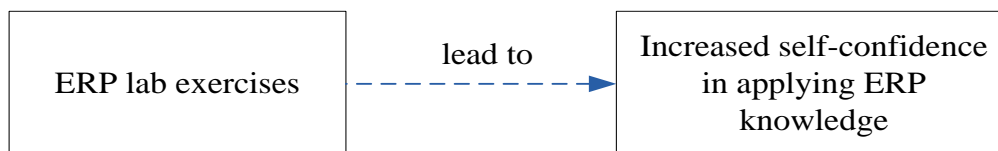


Figure 5-19 ERP Lab Exercises and Increased Self-Confidence in Applying ERP Knowledge Relationship

Hence, the following relationship was noted:

ERP lab exercises lead to increased self-confidence in applying ERP knowledge.

5.6.17 ERP Lab Exercises - Increased Capacity to Use Different Forms of ERP Systems

Relationship

It was noted that ERP lab exercises led to increased capacity to use different forms of ERP systems. Hence, a relationship was noted between *ERP lab exercises* and *increased capacity to use different forms of ERP systems*. This relationship is depicted in Figure 5-20. The following quote is a sample quote from the interviews related to the relationship between *ERP lab exercises* and *increased capacity to use different forms of ERP systems*, represented by ACC2:

“Since it was practical at least I’m able to, even if I work in an organisation where they use ERP I’ll be able to use that because the labs gave me hands-on experience with the ERP system.” (ACC2)

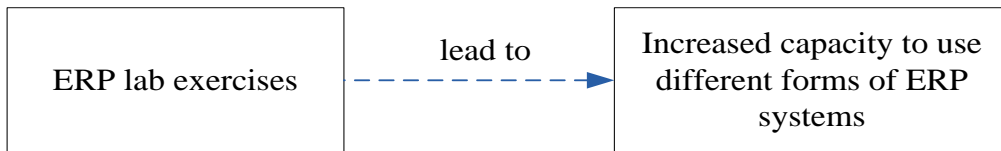


Figure 5-20 ERP Lab Exercises and Increased Capacity to Use Different Forms of ERP Systems Relationship

Hence, the following relationship was noted:

ERP lab exercises lead to increased capacity to use different forms of ERP systems.

5.6.18 Use of Case Study - Increased Ability to Map Business to Technology Relationship

It was noted that the Zambikes case study which was part of the ERP course led to increased ability to map business to technology. Hence, a relationship between *use of case study* and *increased ability to map business to technology* was noted. This relationship is depicted in Figure 5-21. The following quotes are sample quotes from the interviews related to the relationship between *use of case study* and *increased ability to map business to technology*, represented by CS3 and ACC1:

“Yeah, it did actually because it was very practical, the example they used, was that production, then there’s also the sales part. So, the whole process from production to things being stored and also being sold. It did actually, made a lot of sense on how a business is run.”
(CS3)

“The Zambikes video, yeah, it really did, that was, it was a classic example because it brought the study to life with an organisation that is local and you know, it made it so real and it wasn’t just theoretical anymore because when you looked at those guys it was practical and then, you know, that’s an organisation that is operating here in Zambia, in our environment in our economy yeah so it really gives me, that’s why I was saying the study itself gave me an idea of me being able to customise an information system to sell to the communities around because the study that we did itself was on an organisation that is local, the Zambikes.”(ACC1)

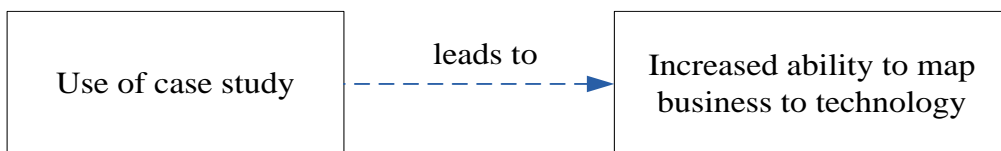


Figure 5-21 Use of Case Study and Increased Ability to Map Business to Technology Relationship

Hence, the following relationship was noted:

The use of case study leads to increased ability to map business to technology.

5.6.19 Use of Case Study - Increased ERP Knowledge and Skills Relationship

It was noted that the use of the Zambikes case study led to increased ERP knowledge and skills. Hence there was a relationship noted between *use of case study* and *increased ERP knowledge and skills*. This relationship is depicted in Figure 5-22. The following quote is a sample quote from the interviews related to the relationship between *use of case study* and *increased ERP knowledge and skills*, represented by CS4:

“The best part about the video was in as much as the organisation was quite small but then it showed how exactly we can apply an ERP and it gave us a holistic view of what they are. So, I was definitely able to, yeah my knowledge was enhanced from watching that video because then I was able to look at an organisation as a whole.” (CS4)

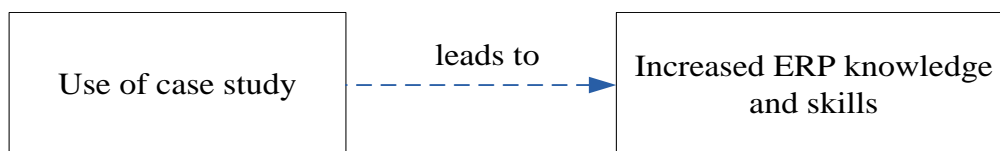


Figure 5-22 Use of Case Study and Increased ERP Knowledge and Skills Relationship

Hence, the following relationship was noted:

The use of case study leads to increased ERP knowledge and skills

5.6.20 Increased ERP Knowledge and Skills - Increased Self-Confidence in Applying ERP knowledge Relationship

It was noted that increased ERP knowledge and skills led to increased self-confidence in applying ERP knowledge. Hence a relationship was noted between *increased ERP knowledge and skills* and *increased self-confidence in applying ERP knowledge*. This relationship is depicted in Figure 5-23. The following quote is a sample quote from the interviews related to the relationship between the themes *increased ERP knowledge and skills* and *increased self-confidence in applying ERP knowledge*, represented by ACC1:

“It’s improved my confidence with the package we work with, and you know my knowledge has increased.” (ACC1)

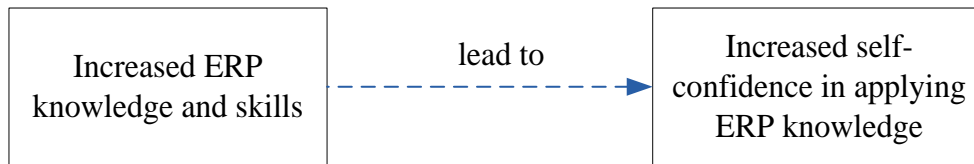


Figure 5-23 Increased ERP Knowledge and Skills and Increased Self-Confidence in Applying ERP Knowledge Relationship

Hence, the following relationship was noted:

Increased ERP knowledge and skills lead to increased self-confidence in applying ERP knowledge.

5.6.21 Increased ERP Knowledge and Skills - Increased Ability to Map Business to Technology Relationship

It was noted that increased ERP knowledge and skills led to increased ability to map business to technology. Hence a relationship between *increased ERP knowledge and skills* and *increased ability to map business to technology* was noted. This relationship is depicted in Figure 5-24. The following quote is a sample quote from the interviews related to the relationship between the themes *increased ERP knowledge and skills* and *increased ability to map business to technology*, represented by CS5:

“I had little knowledge in that, so it enhanced my knowledge in applying business processes.
(CS5)

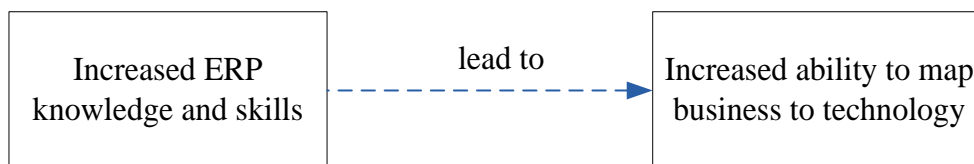


Figure 5-24 Increased ERP Knowledge and Skills and Increased Ability to Map Business to Technology Relationship

Hence, the following relationship was noted:

Increased ERP knowledge and skills lead to increased ability to map business to technology.

5.6.22 Increased ERP Knowledge and Skills – Increased Problem-Solving Skills

Relationship

It was noted that increased ERP knowledge and skills led to increased problem-solving skills. Hence a relationship was noted between *increased ERP knowledge and skills* and *increased problem-solving skills*. This relationship is depicted in Figure 5-25. The following quote is a sample quote from the interviews related to the relationship between the themes *increased ERP knowledge and skills* and *increased problem-solving skills*, represented by ACC1:

“We have a pool office where I work from and most of the times people call you for troubleshooting, when they have problems they ask you what do you think this would be and that has become common place presently because of the knowledge I have acquired so yeah that has really given me that enhanced feeling of being able to handle problems.” (ACC1)

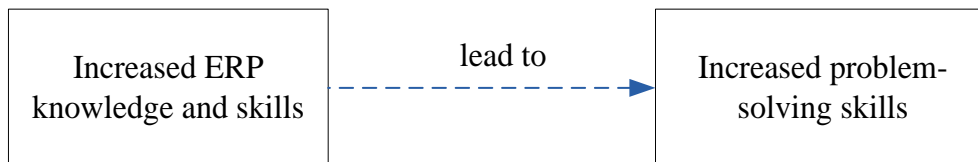


Figure 5-25 Increased ERP Knowledge and Skills and Increased Problem-Solving Skills Relationship

Hence, the following relationship was noted:

Increased ERP knowledge and skills lead to increased problem-solving skills.

5.7 Level 2 Relationships

Level 2 relationships show the relationships between the aggregated themes identified at second-order analysis. Second-order analysis uses researcher-centric themes. These relationships were identified from the analysis of data, and matrix coding supplemented the identification of relationships. The node matrix in Table 5-6 and the thematic diagram in Figure 5-26 show the relationships identified. These relationships will now be discussed.

Table 5-6 Level 2 Relationships Node Matrix

| | Course Outcomes | Course Limitations | Zambian Environmental Challenges | Personal Characteristics and Situation |
|--|-----------------|--------------------|----------------------------------|--|
| Course Outcomes | 3 | 1 | 1 | 1 |
| Course Limitations | 1 | 5 | 2 | 2 |
| Zambian Environmental Challenges | 1 | 2 | 3 | 0 |
| Personal Characteristics and Situation | 1 | 2 | 0 | 3 |

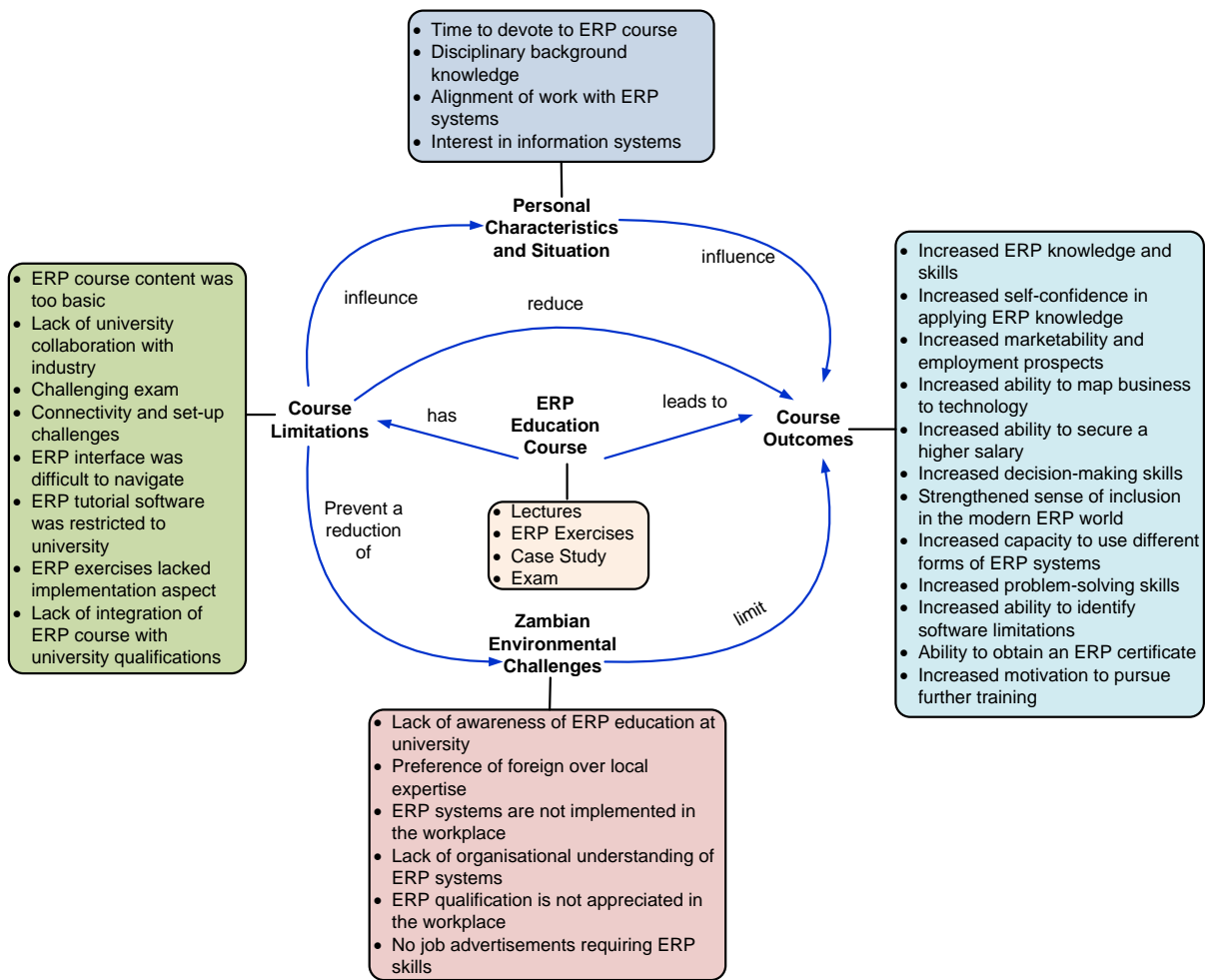


Figure 5-26 Level 2 Relationships

5.7.1 ERP Education Course Leads to Course Outcomes

It was noted that the ERP education course leads to course outcomes as several course outcomes were identified as having been enabled by ERP education. This relationship is depicted in Figure 5-27.

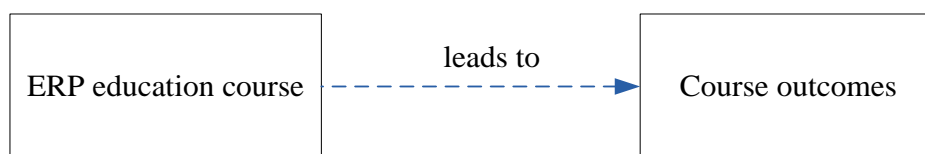


Figure 5-27 ERP Education Course and Course Outcomes Relationship

Hence the following relationship was noted:

ERP education course leads to course outcomes.

5.7.2 Course Limitations Prevent a Reduction of Zambian Environmental Challenges

It was noted that course limitations prevent a reduction of Zambian environmental challenges. This relationship is depicted in Figure 5-28. Two course limitations impacted Zambian environmental challenges. These were *lack of university collaboration with industry* which prevented a reduction of *lack of awareness of ERP education at university*, and *ERP course content was too basic* which prevented a reduction of *preference of foreign over local expertise*. The following quotes are sample quotes from the interviews related to the relationship between *course limitations* and *Zambian environmental challenges*, represented by ENG3 and ENG4:

“People still depend on consultants and what we do there at University of Zambia is still very basic.” (ENG3)

“I think one way they could incentivise this is by sponsoring the course and I think that would also help them know about the skill sets that’s available. So, I think that would be one of the things that I would say actually around that. Because I don’t really think they are involved.” (ENG 4)

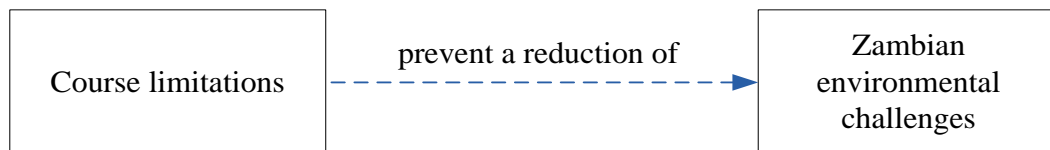


Figure 5-28 Course Limitations and Zambian Environmental Challenges Relationship

Hence, the following relationship was noted:

Course limitations prevent a reduction of Zambian environmental challenges.

5.7.3 Zambian Environmental Challenges Limit Course Outcomes

It was noted that Zambian environmental challenges limited course outcomes. This relationship is presented in Figure 5-29. Two environmental challenges, that is, *ERP systems are not implemented in the workplace* and *ERP qualification is not appreciated in the workplace* were identified as limiting course outcomes. Students felt that their ERP qualification was not appreciated in the workplace; hence, this limited their marketability and employment prospects and their chances of securing a higher salary in the workplace, thus limiting course outcomes. Students also felt that the lack of implementation of ERP systems in the workplace had limited their ability to secure a higher salary thus limiting course outcomes. The following quotes are sample quotes from the interviews related to the relationship between *Zambian environmental challenges* and *course outcomes*, represented by ACC1 and CS1:

“An increment? Well, that one not really unless probably if I went into another organisation that appreciated the kind of training I’ve received in terms of ERPs but otherwise in the current organisation where I am what increases my salary has to do with the other qualifications that I’ve been pursuing.” (ACC1)

“Well, if I was in an organisation where ERP is being used of course that was going to give me competitive advantage but now like it is.... it’s not being used.” (CS1)

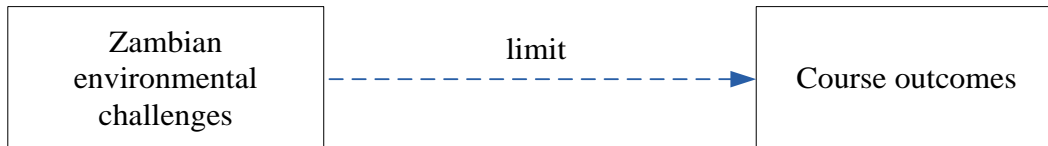


Figure 5-29 Zambian Environmental Challenges and Course Outcomes Relationship

Hence, the following relationship was noted:

Zambian environmental challenges limit course outcomes.

5.7.4 Course Limitations Reduce Course Outcomes

It was noted that course limitations reduce course outcomes. This relationship is depicted in Figure 5-30. Two course limitations, that is, *ERP tutorial software was restricted to university* and *lack of university collaboration with industry* were identified as having reduced course outcomes. The fact that the ERP tutorial software could only be accessed from the university restricted the capacity to use different forms of ERP systems as students were not able to practice when they were off campus, thus reducing course outcomes. The lack of university collaboration with industry limited the students’ ability to identify software limitations thus reducing course outcomes. The following quote is a sample quote from the interviews related to the relationship between *course limitations* and *course outcomes*, represented by CS6:

“I think it’s a good course when you get to implement, or you tend to practice because most of this software you need to practice what you learnt and then if you don’t practice then you tend to forget what you learnt and how to go about the processes. So, it needs a lot of practising, and the only thing is that the software well because it’s restricted to the university so you can’t practice elsewhere other than here.” (CS6)

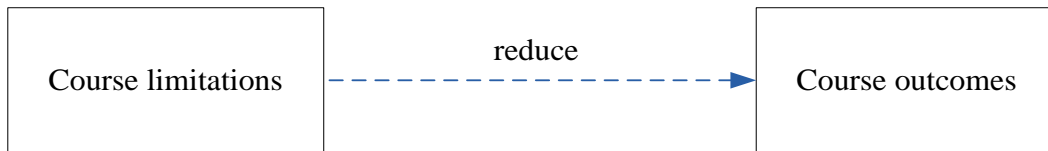


Figure 5-30 Course Limitations and Course Outcomes Relationship

Hence, the following relationship was noted:

Course limitations reduce course outcomes.

5.7.5 Personal Characteristics and Situation Influence Course Outcomes

It was noted that personal characteristics and situation influence course outcomes. Since some students had limited time to devote to the ERP course, this influenced their ability to obtain an ERP certificate, thus influencing course outcomes. This relationship is depicted in Figure 5-31. The following quote is a sample quote from the interviews related to the relationship between *personal characteristics and situation* and *course outcomes*, represented by ENG6:

“Yes, there are restrictions to benefit fully, education wise you know we need to pay to get certified, yes at that level and we missed the opportunity because of our busy schedules and the pressure from our school, to do our programme.” (ENG6)

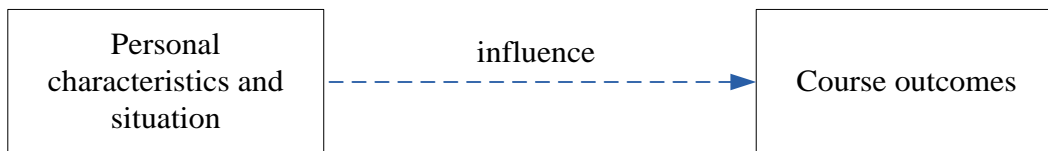


Figure 5-31 Personal Characteristics and Situation and Course Outcomes Relationship

Hence, the following relationship was noted:

Personal characteristics and situation influence course outcomes.

5.7.6 Course Limitations Influence Personal Characteristics and Situation

It was noted that course limitations influence personal characteristics and situation. This relationship is depicted in Figure 5-32. Two course limitations, that is, *connectivity and set-up challenges* and *lack of integration of ERP course with university qualifications* influenced the students’ personal characteristics and situation. Connectivity and set-up challenges and the lack of integration of the ERP course with university qualifications impacted the time the students had to devote to the course thus influencing their personal characteristics and situation.

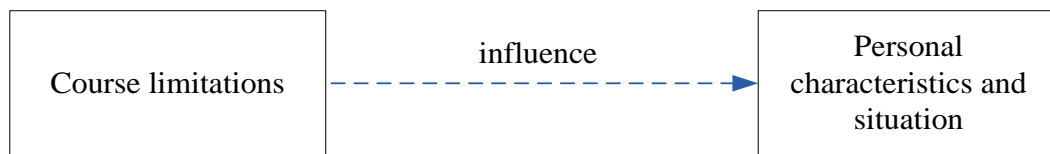


Figure 5-32 Course Limitations and Personal Characteristics and Situation Relationship

Hence, the following relationship was noted:

Course limitations influence personal characteristics and situation.

5.8 Chapter Summary

This chapter discussed how ERP education impacted students and the contextual factors that impacted ERP education from an inductive approach. Contextual factors were identified as personal characteristics and situation, course limitations, and Zambian environmental challenges. The contribution of this chapter is an explanatory model on ERP education. The model is more explanatory than the one in the deductive study in that it identifies course limitations and explains how the nature of the course had an impact on reducing course outcomes. The model also identifies Zambian environmental challenges and the students' personal characteristics and situation and explains how all these contextual factors impacted course outcomes. There was no evidence of course outcomes impacting Zambian environmental challenges hence the need to speak to industry. The next study will therefore look at the potential impact of ERP education on industry. The study will first begin by discussing ERP challenges experienced by Zambian organisations in the next chapter.

6 ERP CHALLENGES IN ZAMBIA

In Study 2, Zambian environmental challenges that impacted course outcomes were noted. This chapter seeks to confirm these Zambian environmental challenges and describes the ERP challenges experienced by organisations in Zambia. The chapter therefore seeks to answer the following research questions:

- Are student perceptions of Zambian environmental challenges the same as industry perceptions?
- What ERP challenges are experienced by organisations in Zambia?

6.1 Comparison of Industry Limitations from Study 2 and Study 3

In Study 2, Zambian environmental challenges were identified as having impacted ERP education course outcomes. These environmental challenges were identified as *ERP systems are not implemented in the workplace, lack of awareness of ERP education at university, preference of foreign over local expertise, lack of organisational understanding of ERP systems, ERP qualification is not appreciated in the workplace, and no job advertisements requiring ERP skills*. In Study 3, ERP challenges were categorised as *environmental challenges, organisational challenges, and project-related challenges*. This section looks at the comparison of student and industry perceptions of environmental challenges that impacted course outcomes. These perceptions are presented in Table 6-1 and will now be discussed.

Table 6-1 Student and Industry Perceptions

| Student Perception | Industry Perception |
|---|--|
| ERP qualification is not appreciated in the workplace | ERP qualification is of value to organisations. Hence, the students' perception was rejected. |
| Lack of awareness of ERP education at university | Five organisations were not aware of ERP education at university. Hence, the students' perception was confirmed. |
| No job advertisements requiring ERP skills | Five organisations had not advertised ERP jobs while others had. Hence, the students' perception was confirmed. |
| Preference of foreign over local expertise | Organisations turn to foreign expertise due to lack of local expertise. Hence, the students' perception was confirmed as this seemed like a preference of foreign over local expertise to the students. Dependence on outsourced ERP expertise was identified as a challenge. Hence, this challenge was confirmed as <i>dependence on outsourced ERP expertise</i> . |
| ERP systems are not implemented in the workplace | The students' perception was confirmed as it was noted that few organisations have implemented ERP systems due to high implementation costs. Hence, this challenge was confirmed as <i>few organisations have implemented ERP systems</i> . |
| Lack of organisational understanding of ERP systems | This challenge did not come up among ERP challenges identified by organisations; hence, this challenge was not confirmed. |

6.1.1 ERP Qualification Is Not Appreciated in the Workplace

In Study 2, students felt that organisations did not appreciate the ERP qualification they had. Eight out of nine respondents said that they would appreciate and value the ERP qualification in their organisations. Hence, the perception from industry is that the ERP qualification is of value to organisations. One respondent using Oracle ERP in their organisation felt that since the ERP certificate is based on a different ERP and Oracle requires specific expertise, they were not sure if the graduates would be able to work on Oracle ERP. The following quotes are sample quotes from the questionnaires and interviews on industry's perception on the value of the ERP qualification from Company B, Company G, and Company E:

“Certainly, it would, and we do actually take it as an added advantage for anyone with ERP knowledge.” (Company B)

“It would be of value for any organisation seeking to employ SAP certified staff.” (Company G)

“I wouldn't give an affirmative answer as certificate is based on a different ERP and what we know for Oracle is that it has its specific functional and implementation certification modules that are normally the basis for recognising ERP competence in Organisation. However, it could be nice to have a look at the module composition for ESEFA to ascertain its relevance.” (Company E)

6.1.2 Lack of Awareness of ERP Education at University

In Study 2, students felt that organisations were not aware of ERP education at UNZA or the presence of ERP graduates in the country as there was no collaboration between industry and UNZA; hence, this had disadvantaged the students. Six out of nine respondents said they were not aware of ERP education at UNZA and the presence of local ERP graduates. Two out of nine respondents said they were aware but had no clear details of the programme. Hence, the students' perception was confirmed as a higher number of respondents from industry were not aware of ERP education at UNZA. The following quotes are sample quotes from the questionnaires and interviews on industry's perception on the awareness of ERP education at UNZA from Company C and Company D:

“No, we are not aware.” (Company C)

“Aware but with no clear detail of the programme.” (Company D)

6.1.3 No Job Advertisements Requiring ERP Skills

In Study 2, students said they had not seen any ERP job advertisements; hence, they could not apply for ERP jobs. Five out of nine respondents said they had not advertised any ERP jobs, while four out of nine respondents said they had advertised ERP jobs. The students' perception was confirmed as a higher number of organisations had not advertised ERP jobs. The following quote is a sample quote from the questionnaires and interviews on industry's perception on the advertisement of ERP jobs from Company F:

"I would first say that the students were right because the way we are set up and I'm picking this up, this question from the government ERP implementation side. So, the way we are as government, when we implemented our SAP solutions, we picked people from within government with the view that we would train them and they would become experts, so we never advertised at any point outside government to ask for resources or skills. The only time we have advertised outside and asked for experts is when we are trying to engage a consulting firm." (Company F)

6.1.4 Preference of Foreign Over Local Expertise

In Study 1, students felt that organisations prefer foreign expertise to local expertise; hence, this had disadvantaged ERP graduates. Eight out of nine respondents said that they had outsourced ERP expertise outside Zambia for several reasons, which include implementation and data migration, enhancement and development of modules, system maintenance, and service re-engineering. The respondents mentioned that they required specialised ERP skills, which were not available locally. Hence, the students' perception was confirmed as *dependence on outsourced ERP expertise*, as almost all the organisations in the study had outsourced ERP expertise. The following quotes are sample quotes from the questionnaires and interviews on industry's perception on the preference of foreign over local expertise from Company D, Company G, Company C, and Company F:

"The required specialised skills needed were not available amongst the locals. The experts were responsible for system maintenance activities, and implementation of any policy changes." (Company D)

"ERP expertise is outsourced, and we use the same consultants for the entire Group in Africa." (Company G)

“Technical level support is outsourced, and the reason is the ERP is centralised and same platform is shared by many countries so offshore outsourced team can manage better than different team at country level.” (Company C)

“Yes. SAP ERP experts in comparison to local staff have vast experience and skills.” (Company F)

6.1.5 ERP Systems Are Not Implemented in the Workplace

In Study 2, some students felt that they had nowhere to apply their ERP knowledge as ERP systems were not implemented in the workplace. Two out of nine respondents identified high cost of ERP systems implementation as a challenge. One of the two respondents noted that few organisations had implemented ERP systems due to the high cost of implementation. Hence, the students’ perception was confirmed as *few organisations have implemented ERP systems*. The following quote is a sample quote from the questionnaires and interviews on industry’s perception on the implementation of ERP systems in the workplace from Company A:

“I don’t think the impact is that much as only few organisations have ERP systems because of the cost, however having this education in Zambia has helped to increase knowledge base locally and also make an available market for both graduates and organisations needing ERP experts.” (Company A)

6.1.6 Lack of Organisational Understanding of ERP systems

In Study 2, some students felt that organisations did not understand ERP systems and, hence, did not value the impact that ERP graduates could make. This perception was not confirmed by industry as it was not identified as a challenge by organisations. Hence, the students’ perception was rejected.

6.1.7 Summary of Comparison of Student and Industry Perceptions

Most of the students’ perceptions were confirmed by industry, while some were rejected. Those that were confirmed were *lack of awareness of ERP education at university, no job advertisements requiring ERP skills, preference of foreign over local expertise, which was confirmed as dependence on ERP expertise, and ERP systems are not implemented in the workplace*, which was confirmed as *few organisations have implemented ERP systems*. *ERP qualification is not appreciated in the workplace* was rejected by industry while *lack of organisational understanding of ERP systems* was not confirmed as a challenge by industry as it was not among the ERP challenges identified by industry.

6.2 ERP Challenges Encountered by Organisations in Zambia

Organisations in Zambia have encountered several challenges in the implementation and support of ERP systems. These challenges were classified as environmental challenges, organisational challenges, and project-related challenges. Environmental challenges were external challenges, while organisational challenges and project-related challenges were internal challenges. Thematic analysis was used to identify the challenges using the steps described in Chapter 3. The challenges identified are presented in Figure 6-1 and will now be discussed.

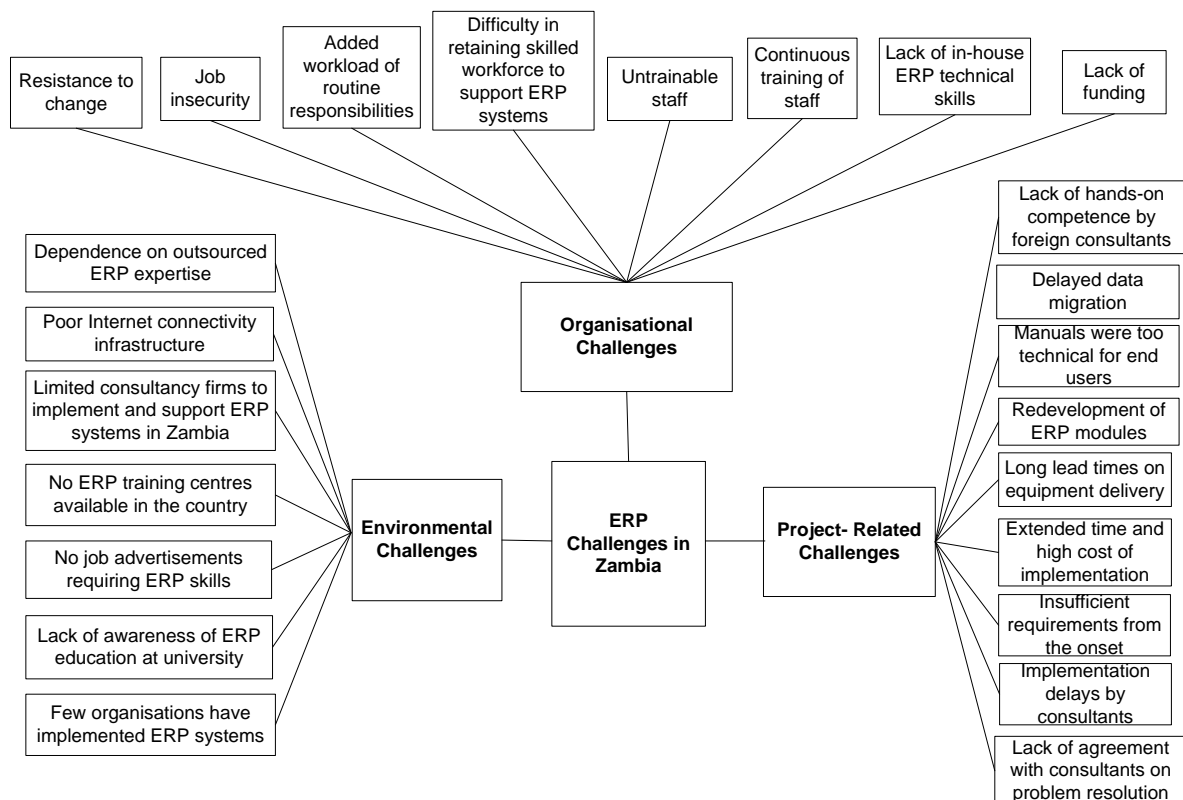


Figure 6-1 ERP Challenges Encountered by Organisations in Zambia

6.3 Environmental Challenges

Several environmental challenges were identified in this study, and these are presented in Table 6-2. In the table, number of respondents represents the number of organisations that mentioned a particular challenge while number of statements represents the frequency or number of times a challenge was mentioned by the respondents. Four environmental challenges namely *lack of awareness of ERP education at university*, *preference of foreign over local expertise*, *ERP systems are not implemented in the workplace*, and *no job advertisements requiring ERP skills* were identified as Zambian environmental challenges in Study 2 and confirmed as challenges in Study 3. The additional environmental challenges will now be discussed.

Table 6-2 Environmental Challenges

| Environmental Challenge | No. of Respondents | No. of Statements | Literature Comparison |
|---|---------------------------|--------------------------|------------------------------|
| Dependence on outsourced ERP expertise | 8 | 17 | Dominant |
| Limited consultant firms to implement and support ERP systems in Zambia | 4 | 5 | Dominant |
| Poor internet connectivity infrastructure | 1 | 1 | Similar |
| No ERP training centres available in the country | 1 | 1 | Similar |
| Lack of awareness of ERP education at university | 6 | 6 | New |
| Few organisations have implemented ERP systems | 1 | 1 | Similar |
| No job advertisements requiring ERP skills | 5 | 5 | New |

6.3.1 Dependence on Outsourced ERP Expertise

Eight out of nine respondents noted that one of the challenges they faced was a continuous dependence on outsourced ERP expertise due to challenges in building internal expertise. It has been noted in literature that organisations establish outsourcing relationships to take advantage of skills and knowledge of outsourcing partners and benefit from skills of vendors and consultants, as ERP implementation requires specialised skill sets, which may be difficult to develop internally (Sultana et al., 2018). In the Zambian context, it was noted that the dependence was on outsourced ERP expertise from outside the country as skills were lacking among the locals. The following quotes are sample quotes from the questionnaires and interviews on the theme *dependence on outsourced ERP expertise* from Company F and Company G:

“So, the strategy then becomes that while you can create a fall back in terms of internal skills, there are points where you become insufficient and therefore you continuously depend on third level support, which is basically a company whose core establishment is SAP solutions. So, you

will continuously need people to come in and help you when you require third level support because internally you cannot keep up this pace.” (Company F)

“ERP expertise is outsourced, and we use the same consultants for the entire group in Africa.” (Company G)

6.3.2 Limited Consultant Firms to Implement and Support ERP Systems in Zambia

Four out of nine respondents noted that one of the challenges they had experienced was the fact that there were limited consultant firms to implement and support ERP systems in Zambia. It has been noted in literature that non-availability of sales and support offices for Western based ERP vendors in developing countries has contributed to limited uptake of ERP systems (Rezaeian & Wynn, 2021). Lack of customer support and adequate maintenance of the ERP systems by providers was also identified as one of the challenges of ERP implementation (Amado & Belfo, 2021). This challenge appears to be more dominant in developing countries like Zambia. The following quotes are sample quotes from the questionnaires and interviews on the theme *limited consultant firms to implement and support ERP systems in Zambia* from Company H, Company C, and Company F:

“Limited skills or companies that support Oracle ERP in Zambia.” (Company H)

“There's no one who is using this here. We tried to find out, but we didn't find anybody or any company who supports JD Edwards or any company that is using JD Edwards.” (Company C)

“So, in country really, we did not have much capacity for local companies to tender if they could.” (Company F)

6.3.3 Poor Internet Connectivity Infrastructure

One out of nine respondents noted that there were technical infrastructure challenges that resulted in poor internet connectivity at the time of implementation of their ERP system. These connectivity challenges led to the project being extended as the organisation could not access remote servers for their ERP system. The bandwidth capacity on the fibre gateway in Zambia was low at the time. Poor telecommunications and internet connectivity have been identified as challenges in developing countries in Africa (Atiase et al., 2022). This challenge appears to be more dominant in developing countries like Zambia. The following quote is a sample quote from the questionnaires and interviews on the theme *poor internet connectivity infrastructure* from Company C:

“There was a technical infrastructure challenge in Zambia, our internet was poor at that time. So, the required bandwidth was not provided. The gateway, which is going outside the country, the fibre cables, pass through let’s say Botswana or Zimbabwe, capacity was low. We connect remotely to the data centre where the JD Edwards system servers are sitting. The speed was not that much, so we had to extend our project by almost two months. So, after the infrastructure was properly in place, then the training started and then the test environment was set up and we were able to access it.” (Company C)

6.3.4 No ERP Training Centres Available in the Country

One out of nine respondents noted that since there are no ERP training centres available in the country, most of the ERP training is undertaken outside the country and is very costly; hence, this was a challenge for organisations. Literature shows that ERP training offered by vendors is very costly and one of the expensive elements of ERP implementation (Motahar et al., 2018b). Lack of local training was identified as a challenge in countries in Southern Africa as training for SAP and Oracle is offered in South Africa; hence, many organisations in Southern Africa send their staff for training in South Africa, which is costly (Hasheela-Mufeti & Smolander, 2017). The findings in this study show that developing countries in Africa, like Zambia, lack facilities for local ERP training; hence, they have to rely on sending their staff for ERP training in South Africa. The following quote is a sample quote from the questionnaires and interviews on the theme *no ERP training centres available in the country* from Company D:

“Most of the training has been undertaken outside of the country, very short courses but very expensive.” (Company D)

6.4 Organisational Challenges

Several organisational challenges were identified, and these are presented in Table 6-3. In the table, number of respondents represents the number of organisations that mentioned a particular challenge while number of statements represents the frequency or number of times a challenge was mentioned by the respondents. These organisational challenges will now be discussed.

Table 6-3 Organisational Challenges

| Organisational challenge | No. of Respondents | No. of Statements | Literature Comparison |
|--|---------------------------|--------------------------|------------------------------|
| Resistance to change | 4 | 7 | Similar |
| Untrainable staff | 1 | 1 | Similar |
| Job insecurity | 1 | 2 | Similar |
| Difficulty in retaining skilled workforce to support ERP systems | 3 | 7 | Similar |
| Continuous training of staff | 1 | 2 | Similar |
| Lack of in-house ERP technical skills | 4 | 9 | Similar |
| Added workload of routine responsibilities | 1 | 1 | Similar |
| Lack of funding | 1 | 1 | Similar |

6.4.1 Resistance to Change

Four out of nine respondents identified resistance to change as one of the challenges that they have encountered in the implementation and support of the ERP system used in their organisation. Change management has been identified as one of the challenges in ERP implementation (Mahmood et al., 2019; Menon et al., 2019). Literature shows that middle managers and employees usually hesitate to adopt change in the organisation (Mahmood et al., 2019). When a new information system is implemented, it changes the work routine of users hence user resistance occurs (Alzahrani et al., 2021). If users feel that an information system may cause loss of power, they will resist it (Alzahrani et al., 2021). One of the reasons that triggers resistance to change is lack of education and training; hence, communication is key to help prevent misunderstandings (Azouri et al., 2022). Hence, the findings in this study are similar to what is recorded in literature. The following quotes are sample quotes from the questionnaires and interviews on the theme *resistance to change* from Company F, Company D, and Company B:

“One of the bigger challenges then was you know the change management, like I said, you are now telling people you are going to move from here, how you have done things all your life to a new way of doing things, so you get that, you know, inertia in terms of people adapting to the new issues and stuff.” (Company F)

“The core, the biggest problem really then was the change management aspect of it. Just to turn people to not see the coming change or the change as a threat, you know, I think that was the biggest issue.” (Company D)

“I think the other challenge had been you know, institutions where people were so used to manual operations and then you have to move into automated systems. So, there’s been that issue of change resistance. Where you find even after you’ve completed the modules and now you want to tell the users to stop doing the manual and go auto, they still prefer to use the manual way of doing things because that’s probably what they’re used to, and they think it’s maybe the best, and so on and so forth. That has been the bigger challenge.” (Company B)

6.4.2 Untrainable Staff

One out of nine respondents noted that some of the staff who had been long in the organisation were untrainable as they were technologically challenged and were accustomed to the manual processes in the organisation; hence, they struggled to switch to the automated processes using the ERP system. It has been noted in literature that older employees are considered untrainable, resistant to change and unable to cope with the changing technical environment (Ocharo, 2019). Hence, the findings in this study are similar to what is recorded in literature. The following quote is a sample quote from the questionnaires and interviews on the theme *untrainable staff* from Company F:

“At some point there were people who were just untrainable, guys who had been in government. They are in those positions whose function now requires to be automated or to use the system and basically you can't train them because they can't even hold the mouse or do what you insist, those were issues. So, you would find that such guys would drag you down a bit and yeah, so, it took some time until we came up with strategies where we completely started to make it impossible for somebody to do something outside the system.” (Company F)

6.4.3 Job Insecurity

One out of nine respondents noted that job insecurity was a challenge as staff felt insecure and thought that they would lose their jobs because of the implementation of an ERP system, as processes that were done manually were now automated. It has been noted in literature that

employees feel insecure when an ERP is implemented as they believe that the ERP system will replace them; hence, they may not be quick to adopt the change (Mukherjee, 2021). Hence, the findings in this study are similar to what is recorded in literature. The following quote is a sample quote from the questionnaires and interviews on the theme *job insecurity* from Company C:

“Any person who is used to his normal work knows...if we change the system, definitely he will feel insecure that now he has to learn things and if he cannot learn properly, maybe his job is at risk.....All those changes we have to coordinate properly and job insecurity, then resistance to change. All these things through HR we tried to manage.” (Company C)

6.4.4 Difficulty in Retaining Skilled Workforce to Support ERP Systems

Three out of nine respondents noted that retaining a skilled workforce to support ERP systems was a challenge as staff left the organisation for better-paying jobs after being trained or were moved to other roles where they did not need to use ERP systems. One of the respondents also noted that the creation of a structure within government to retain this skilled workforce was also a challenge. It has been noted in literature that retaining good IT professionals is a challenge as they are highly sought after by the market, leading to a high turnover (Bellini et al., 2019). It was further noted that organisations thought it was difficult to recruit and retain ERP experts due to costly pay rates (Kotadia, 2020). Hence, the findings in this study are similar to what is found in literature. The following quotes are sample quotes from the questionnaires and interviews on the theme *difficulty in retaining skilled workforce to support ERP systems* from Company D, Company I, and Company F:

“To maintain a skilled workforce to support systems, and the creation of a structure within government to maintain the skilled personnel.” (Company D)

“Sometimes staff who have been trained have left” (Company I)

“The other challenge is that if you train me and I become very good in the job or in SAP, OK, you know, I become very marketable....and then you get this expert drain where people go out to look for jobs where the pay is better than what government would give at a particular time. So, you have that as a huge challenge.” (Company F)

6.4.5 Continuous Training of Staff

One out of nine respondents noted that since trained staff were either leaving or moving to other departments, they continuously had to train staff, which created a challenge for the

organisation as it was difficult to build capacity in-house. When a key ERP individual leaves the organisation, this creates a massive knowledge gap; hence, organisations are encouraged to focus on employee development and training (Mahmood et al., 2019). Hence, the findings in this study are similar to what is recorded in literature. The following quote is a sample quote from the questionnaires and interviews on the theme *continuous training of Staff* from Company F:

“The challenge is that then you continuously have people that you need to continuously train, and you never basically get to, for instance, what you would term a consultant skill in house.... So, we have this need for continuous training all the time because people are moving in and out.” (Company F)

6.4.6 Lack of In-house ERP Technical Skills

Four out of nine respondents mentioned that lack of in-house technical expertise was a challenge for them. Literature identifies lack of trained and skilled employees capable of operating ERP systems as one of the main problems of ERP implementation (Kulikov et al., 2020). Literature shows that lack of internal ERP expertise has been identified as one of the critical challenges in ERP implementation (Menon et al., 2019). Hence, the findings in this study are similar to what is recorded in literature. The following quote is a sample quote from the questionnaires and interviews on the theme *lack of in-house ERP technical skills* from Company G:

Lack of in-house technical personnel makes it a challenge. It was a challenge because it meant the company spending more by outsourcing, and had this been done internally, if the in-house trained technical personnel were available, we would have spent less. So obviously that on its own now was a cost.” (Company G)

6.4.7 Added Workload of Routine Responsibilities

The added workload of routine responsibilities was identified as a challenge by one out of nine respondents as the users in the organisation had to carry out their routine responsibilities and support the ERP project. It has been noted in literature that causes of users’ resistance to change when implementing an ERP system are related to the change in routines in the organisation which could lead to a higher workload (Johansson & Svensson, 2020). In another study, it was noted that after implementing an ERP system, some users felt frustrated due to the unexpected addition of IT-related tasks to their routine workload (Chadhar & Daneshgar, 2018). Hence, results in this study are similar to what is recorded in literature. The following quote is a sample

quote from the questionnaires and interviews on the theme *added workload of routine responsibilities* from Company C:

“Workload of routine responsibilities..... For workload management, if suppose there are 10 people in Accounts, they have to do their routine work and they have to participate in the project. So that work balance, the culture that we have to introduce, and the challenges initially were there because like month end, closing is going on, Auditors are on site they cannot spend much time on the project then it will delay the implementation go live date.” (Company C)

6.4.8 Lack of Funding

One out of nine respondents mentioned that lack of funding was a challenge for their organisation as it led to an extended time frame for project completion. Lack of funding for ERP implementation has been identified as one of the challenges of ERP implementation (Kulikov et al., 2020). Hence, the results in this study are similar to what is recorded in literature. The following quote is a sample quote from the questionnaires and interviews on the theme *lack of funding* from Company B:

“Yeah, I think one challenge we've had I think is the time frame. We were supposed to have completed the full implementation, I think by 2021, 2022, but we have not completed, maybe for one or two reasons. One of the reasons made was funding.” (Company B)

6.5 Project-Related Challenges

This section discusses the project-related challenges that were identified. These are presented in Table 6-4 and will now be discussed. In the table, number of respondents represents the number of organisations that mentioned a particular challenge while number of statements represents the frequency or number of times a challenge was mentioned by the respondents.

Table 6-4 Project-Related Challenges

| Project-Related Challenge | No. of Respondents | No. of Statements | Literature Comparison |
|--|---------------------------|--------------------------|------------------------------|
| Extended time and high cost of implementation | 5 | 5 | Similar |
| Delayed data migration | 2 | 3 | Similar |
| Manuals were too technical for end users | 1 | 2 | Similar |
| Redevelopment of ERP modules | 1 | 1 | Similar |
| Insufficient requirements from the onset | 1 | 1 | Similar |
| Lack of hands-on competence by foreign consultants | 1 | 1 | Similar |
| Long lead times on imported equipment | 1 | 1 | New |
| Implementation delays by consultants | 1 | 1 | Similar |
| Lack of agreement with consultants on problem resolution | 1 | 1 | Similar |

6.5.1 Extended Time and High Cost of Implementation

Five out of nine respondents noted that the extended time and high cost of ERP implementation was a challenge for Zambian organisations; hence, few organisations are using ERP systems in Zambia. ERP implementation costs a significant amount of time and money (Menon et al., 2019). ERP implementation costs include ERP software, consultants and trainers, installation, and maintenance (Kenge & Khan, 2020) . Literature shows that high implementation costs are one of the reasons why some organisations have not implemented ERP systems (ElFarmawi, 2019). Hence, the findings in this study are similar to what is recorded in literature. The following quotes are sample quotes from the questionnaires and interviews on the theme

extended time and high cost of implementation from Company A, Company E, and Company B:

“I don’t think the impact is that much as only few organisations have ERP systems because of the cost.” (Company A)

“Time and cost of implementation.” (Company E)

“One challenge we’ve had I think is the time frame. We were supposed to have completed the full implementation, I think by 2021-2022, but we have not completed.” (Company B)

6.5.2 Delayed Data Migration

It was noted by two out of nine respondents that data migration from the old system to the new ERP system was a tedious process and a challenge. Data migration is a complex process and literature identifies it as one of the challenges in ERP implementation (Mahmood et al., 2019). Hence, the findings in this study are similar to what is recorded in literature. The following quotes are sample quotes from the questionnaires and interviews on the theme *delayed data migration* from Company E and Company B:

“Data Migration” (Company E)

“Issues where we have backlog, you have this data in manual documents which you need to move into the new system. So that also has been a part of the challenge, but I think it was managed eventually..... It’s been a tedious journey which, even as at now, I wouldn’t say we’ve fully managed, I would say probably we are at somewhere 80/70% because there are still certain modules that are not fully utilised up to now, and that has ended up us having serious backlog on data still in manual form.” (Company B)

6.5.3 Manuals Were Too Technical for End Users

One out of nine respondents noted that manuals for the ERP system they were using in their organisation were too technical; hence, the end users found them too detailed and difficult to use. Users may avoid using manuals that are not concise as too many details are likely to hinder learning, causing frustration due to information overload (Scott, 2008). Hence, the findings in this study are similar to what is recorded in literature. The following quote is a sample quote from the questionnaires and interviews on the theme *manuals were too technical for end users* from Company A:

“Manuals showing you how the system works, I wish there was a simpler version. What I'm saying is, for example, I should be able to just go to the menu and be able to get what I want in case I'm new in the organisation and they just tell me about this system. I should be able to go to the manual and try to understand and maybe try to find my way around it. But it looks too advanced, it's not really for an end user you have to, you know, look around a lot for you to know exactly what you need. So, I think it's too detailed or maybe let me may say too technical.” (Company A)

6.5.4 Redevelopment of ERP Modules

One out of nine respondents said that they had to go through redevelopment of ERP modules due to users not being available during user test acceptance, which created a challenge. Literature shows that additional redevelopment of user interfaces, changing user requirements and initial user testing can delay an ERP project (Ali et al., 2023). Hence, the findings in this study are similar to what is recorded in literature. The following quote is a sample quote from the questionnaires and interviews on the theme *redevelopment of ERP modules* from Company F:

From the technical side, obviously we had challenges in terms of our processes. We had some components that we had taken into production, based on the user requirements and system requirements, and agreeably into production. Later we find that some users, because of not being available, maybe during our user test acceptance they later on come and say no, no, no, this process is not working as we wanted it to work. You understand so meaning you have to do the redevelopment and stuff like that.” (Company F)

6.5.5 Insufficient Requirements from the Onset

Insufficient requirements from the onset was a challenge that was identified by one out of nine respondents. In the planning phase of an ERP project, the project team should select an ERP package that meets the current and future needs of the organisation (Thangamani, 2018). In the planning phase, user requirements, business process re-engineering requirements, best practices requirements, and hardware and infrastructure requirements are to be laid out (Thangamani, 2018). It has been noted that lack of involvement of stakeholders during ERP projects leads to inadequate or insufficient gathering of requirements (Kundur, 2023). Inadequate requirements definition was identified as one of the factors that lead to failure of ERP projects (Kiran & Reddy, 2019). Hence, the findings in this study are similar to what is

recorded in literature. The following quote is a sample quote from the questionnaires and interviews on the theme *insufficient requirements from the onset* from Company E:

“Insufficient requirements from the onset.” (Company E)

6.5.6 Lack of Hands-on Competence by Foreign Consultants

One out of nine respondents noted that some outsourced foreign consultants lacked the required hands-on experience to work on the ERP project. Literature identifies challenges with consultants as one of the reasons for ERP implementation failure (Kohansal, 2019). These challenges include consultant ability and consultant experience (Kohansal, 2019). Challenges with consultants have been recorded in both developing and developed countries. However, challenges with foreign consultants would be more dominant in developing countries lacking local ERP expertise where foreign consultants would need to be hired. The following quote is a sample quote from the questionnaires and interviews on the theme *lack of hands-on competence by foreign consultants* from Company E:

“There is normally an issue of hands-on competence by some of the external consultants put on the project.” (Company E)

6.5.7 Long Lead Times on Imported Equipment

One out of nine respondents mentioned that they had logistics challenges related to long lead times on the delivery of a server for the ERP project, that was being imported from outside the country, which led to the project being delayed. Literature shows that long lead times are associated with schedule delays and extra costs (Luo et al., 2020). This ERP challenge appears to be new in comparison to literature. The following quote is a sample quote from the questionnaires and interviews on the theme *long lead times on imported equipment* from Company G:

“At the time there were issues of logistics in terms of rather, logistics challenges in terms of lead times on hardware. ok, you know, to be delivered. So yeah, there was a bit of a delay because that obviously had to be imported.” (Company G)

6.5.8 Implementation Delays by Consultants

One out of nine respondents noted that implementation delays by consultants had extended the time frame of project completion as the consultants were not available when needed due to other engagements. Therefore, the consultants were not working according to agreed schedules. Consultants becoming unavailable has been identified as a challenge in cloud ERP

implementation (Tongsuksai et al., 2021). The implementation delays therefore, resulted in poor consultant effectiveness, which has also been identified as a challenge in ERP projects (Akrong et al., 2022). Hence, the findings in this study are similar to what is recorded in literature. The following quote is a sample quote from the questionnaires and interviews on the theme *implementation delays by consultants* from Company B:

“The other reason was also consultants’ delays in making implementations. Like when you agree we should complete this assignment by today or so, then you find it's still not done because they have other engagements so to say, and that normally brings challenges.”
(Company B)

6.5.9 Lack of Agreement with Consultants on Problem Resolution

One out of nine respondents noted that they had challenges with consultants when it came to upgrading one of the modules in the ERP system, as there was lack of clarity on who was supposed to resolve issues being experienced. The organisation expected the consultant to resolve certain issues with the vendor, while the consultant expected the organisation to resolve the issues themselves; hence, there was lack of agreement on who was supposed to resolve the issues being experienced. Conflict between the organisation and consultants has been identified as one of the challenges in ERP projects (Akrong et al., 2022). Hence the need for contracts to manage client-consultant relationships, detailing the roles and responsibilities of the consultant and the client (Bawack & Kala Kamdjoug, 2023). The findings in this study are therefore similar to the findings in literature. The following quote is a sample quote from the questionnaires and interviews on the theme *lack of agreement with consultants on problem resolution* from Company B:

“In fact, even as we speak now, we've got one or two issues that we are still trying to resolve and at some point it gets to a point where you tell them there is this matter to be resolved, then they tell you no, you have to do this yourself. No, this has to be done by, Sage, South Africa and so on and so forth, so there are those matters that we normally have.” (Company B)

6.6 Chapter Summary

This chapter discussed student and industry perceptions of Zambian environmental challenges that were identified in Study 2. The chapter also discussed the ERP challenges faced by organisations in Zambia. These challenges were identified as environmental challenges, project- related challenges, and organisational challenges. The contribution of this chapter was the identification of environmental ERP challenges which are dominant in the Zambian

context. A previous study conducted on ERP challenges in Zambia identified lack of local ERP expertise and poor internet connectivity (Mkokweza & Phiri, 2016) among the ERP challenges identified in this study. The results in our study provide more insight as the study identifies interrelationships between the categories of challenges identified and also looks at how ERP graduates can potentially influence ERP challenges, which are addressed in the next chapters.

Lack of awareness of ERP education at university and no job advertisements requiring ERP skills under environmental challenges were identified as new challenges in comparison to literature. *Long lead times on imported equipment* under project-related challenges was identified as a new challenge in comparison to literature. This study contributes to the call for research on ERP adoption challenges in developing countries with proposed solutions (Akrong et al., 2022). The next chapter will look at the potential impact that ERP education could have on organisations in Zambia.

7 POTENTIAL IMPACT OF ERP EDUCATION ON ORGANISATIONS

This chapter begins by discussing course outcomes enabled by ERP education and their applicability to organisations. The course outcomes discussed in this chapter are those that were initially identified in the research. It then proceeds to discuss the potential benefits of ERP education on organisations. The chapter concludes by linking course outcomes to the potential benefits of ERP education.

The chapter therefore looks at the following aspect:

- What impact could ERP education have on ERP challenges experienced by organisations in Zambia?

Hence, the chapter looks at the following research question:

- What is the potential impact of ERP education on organisations and outsourcing of ERP expertise?

7.1 Course Outcomes Desired by Organisations

Organisations were asked about the course outcomes that were applicable to their organisations and how these could impact their organisations. The course outcomes that were considered were the initial ones that were identified during the research. The responses from the respondents will now be discussed.

7.1.1 Self-Confidence in Applying ERP Knowledge

Eight out of nine respondents felt that self-confidence in applying ERP knowledge due to hands-on experience with ERP systems was a desirable capability in their organisations. One of the eight respondents also noted that other than self-confidence, competence was also desirable. It was noted by one other respondent that increased self-confidence in applying ERP knowledge from ERP graduates would lead to less time spent on training as ERP graduates had the basic knowledge. Therefore, ERP graduates would be more comfortable working on an ERP system in the workplace as they have experience with ERP systems and the technical know-how. The following quotes are sample quotes from the questionnaires and interviews on the desirability of *self-confidence in applying ERP knowledge* from Company A, Company C, and Company G:

“Less time for training..... When you have the confidence you learn faster. So, it means anything that one has to do is done at a faster rate unlike if you don't have the confidence, you are afraid you're going to make a mistake. But if you have the confidence you're able to find your way around the system, and even if it's something new, because you have that confidence, it's easy for you to pick up and do it faster.” (Company A)

“Self-confidence and competence, competence is also equally required.” (Company C)

“It would be of benefit to the organisation because you've got people who got the technical know-how and are confident in the system they are working with.” (Company G)

7.1.2 Increased ERP Knowledge and Skills

Eight out of nine respondents felt that increased ERP business process knowledge was a desirable capability in their organisations. One respondent noted that this would lead to good turnaround times for processes in the organisation as the ERP graduates have the basic knowledge required. The following quotes are sample quotes from the questionnaires and interviews on the desirability of *increased ERP knowledge and skills* from Company A and Company C:

“Good turnaround times for processes.” (Company A)

“Yeah, it's really applicable, but they should be open that theoretical knowledge and then technical knowledge, when they come to the organisation, they go to the physical work, or physical documents and they can see how the documents are moving from one department to another, one table to another.....So at least there will be some learning process, but since the basic foundation is there it will be faster to learn.” (Company C)

7.1.3 Increased Problem-Solving Skills

Six out of nine respondents felt that problem-solving was a desirable student capability in their organisations. One of the six respondents noted that this capability would lead to faster problem resolution in the organisation. One other respondent felt that problem identification was more desirable than problem-solving. The following quotes are sample quotes from the questionnaires and interviews on the desirability of *increased problem-solving skills* from Company A and Company E:

“Will save time as we will have experts that will quickly resolve any issues” (Company A)

“Problem identification, not solving.” (Company E)

7.1.4 Decision-Making Skills

Four out of nine respondents felt that decision making was a desirable student capability in their organisations. Two other respondents felt that the ERP graduates would make limited decisions in the organisation. The following quotes are sample quotes from the questionnaires and interviews on the desirability of *decision-making skills* from Company A, Company C, and Company B:

“It is applicable at least we're going to have other people we can consult and unlike relying on one particular resource. So, it would be good to have another person who's able to give you maybe a different perspective of what you need, and sometimes what happens is that you find maybe one person is exposed to only one particular ERP system, but if you have another person who's been trained, maybe they are exposed to a different system, so they're able to advise on the advantages and disadvantages of particular software that you want to buy.” (Company A)

“Decision making, normally comes at some higher level, but definitely the contribution will be there based on the opinion that in my view this is what I think if it's a collective decision. One person cannot decide, but yes, where there's collective decision they can contribute. (Company C)

“Yes, it is, and I think like they rightly said, there's a lot of boundaries to which they can go in decision-making. You know, there's a lot of financial implications to some of those decisions, so they can only make decisions up to a certain level, because certain levels of decisions will involve huge finances, so they need to basically like make suggestions, not really like 100% decisions. It will be like they make a suggestion which will need further approval by somebody who is higher in terms of decision-making hierarchy. It is critical, but they may not make those decisions 100% up to implementation of those decisions because of mainly the financial aspects and also sensitivity of certain decisions.” (Company B)

7.1.5 Increased Ability to Map Business to Technology

There were mixed reactions from organisations on whether increased ability to map business to technology was a desirable capability to them or not. Five out of nine respondents felt that this student capability was applicable in their organisations. However, three out of nine respondents felt that this capability would have minimal impact on their organisations or may not be that prominent in their organisations. The following quotes are sample quotes from the questionnaires and interviews on the desirability of *increased ability to map business to technology* from Company C, Company B, and Company E:

“This is a very key thing because they have to understand the business processes, without that, they cannot support properly.” (Company C)

“Absolutely, because I think not just to our institution but to any other institution, because when the students are doing that, they will learn quite a lot in terms of business, because most of the IT staff, I remember even when we were doing our, you know, bachelor’s years back, there was no business subject on it. So, you find you finish, when you go in the business, now you start understanding, oh so accounting this is, what is this now, what is this. Then you even go into this, now they start telling you no, first of all you need to understand what a ledger does, you need to understand there is, you know, this side of the business, this side there's income, there's expenditure. So before now you fully understand what you need to do. You find you get lost because you don't fully understand certain things. So, it is critically important.” (Company B)

“Minimal impact.” (Company E)

7.2 Potential Benefits of ERP Education on Organisations

Several potential benefits of having ERP graduates in organisations were identified and are presented in Table 7-1 and Figure 7-1 and will now be discussed. In the table, number of respondents represents the number of organisations that mentioned a particular potential benefit while number of statements represents the frequency or number of times a potential benefit was mentioned by the respondents.

Table 7-1 Potential Benefits of ERP Education on Organisations

| Potential Benefit | No. of Respondents | No. of Statements |
|--|--------------------|-------------------|
| ERP graduates can shorten the time for results of ERP performance improvements | 8 | 8 |
| ERP graduates will require less time and resources on training | 6 | 6 |
| ERP graduates can lower consultation costs | 4 | 4 |
| ERP graduates can resolve problems faster | 3 | 4 |
| ERP graduates can retain skills within Zambia | 1 | 1 |
| ERP graduates can gather additional requirements for enhancements to ERP modules | 1 | 1 |
| ERP graduates can increase knowledge transfer | 2 | 2 |

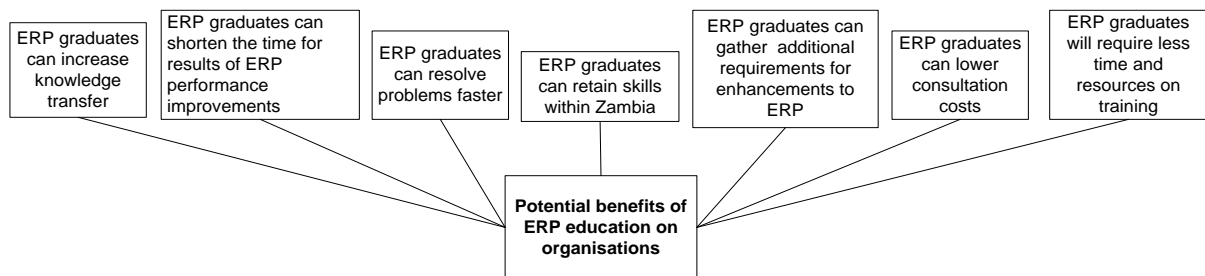


Figure 7-1 Potential Benefits of ERP Education

7.2.1 ERP Graduates Can Shorten the Time for Results of ERP Performance Improvements

Eight out of nine respondents felt that having ERP graduates in an organisation would assist in shortening the time for ERP performance improvements in the organisation. A lack of training can delay ERP performance improvements in an organisation (Hepner & Dickson, 2013). Literature shows that ERP training and education are among the critical success factors for management performance (Liu, 2011). Effective training is positively associated with organisational performance (Ram et al., 2014). The performance outcomes can be measured in terms of financial performance, business performance, and organisational performance (Ram et al., 2014). Therefore, having ERP graduates in the organisation would aid in performance

improvements in the organisation. The following quotes are sample quotes from the questionnaires and interviews on the potential benefit *ERP graduates can shorten the time for results of ERP performance improvements* from Company C and Company B:

“Yes, it would definitely help.” (Company C)

“Absolutely, yes.” (Company B)

7.2.2 ERP Graduates Will Require Less Time and Resources on Training

Six out of nine respondents felt that having ERP graduates in the organisation would assist in reducing the time and resources required for training as the graduates already have some background knowledge. Literature shows that well trained users reach the required skill level in less time and spend less time correcting errors (Scott, 2005). Therefore, having ERP graduates in an organisation would require less time and resources on training. The following quotes are sample quotes from the questionnaires and interviews on the potential benefit *ERP graduates will require less time and resources on training* from Company D and Company B:

“Yes, less time and resources would be used for training with ERP Education.” (Company D)

“Absolutely correct. Any ERP training will be beneficial as they look at similar processes.” (Company B)

7.2.3 ERP Graduates Can Lower Consultation Costs

Five out of nine respondents felt that if the ERP graduates can support ERP systems and participate in implementation of new features, they would impact outsourcing of ERP expertise by significantly lowering consultation fees, which are often quoted in foreign currency, mostly American dollars. This would, therefore, lead to organisations saving on consultation costs. If an organisation relies heavily on consultants, this will consume a significant amount of the organisational budget; hence, the need for knowledge transfer from external consultants to internal employees to retain knowledge within the organisation (Wijaya & Utomo, 2021). This will reduce the cost of external consultants and build capacity for internal staff to manage and support ERP systems (Wijaya & Utomo, 2021). Therefore, having ERP graduates who can support ERP systems and participate in implementation of new features in an organisation can help to lower costs of hiring external consultants. The following quotes are sample quotes from the questionnaires and interviews on the potential benefit *ERP graduates can lower consultation costs* from Company H, Company D, Company B, Company A, and Company G:

“If they are able to support the application and participate in implementation of new features it would drastically reduce the cost of consultancy services which are usually outsourced and paid in USD.” (Company H)

“Use of local experts will lower the cost of consultation fees charged by external consultants, who are very competitive and have high fee structures.” (Company D)

“These can assist in reducing the engagement of foreign and even local consultants thereby reducing the costs to the organisation.” (Company B)

“It would reduce outsourcing of ERP expertise from outside Zambia.” (Company A)

“Reduction on consultation costs.” (Company G)

7.2.4 ERP Graduates Can Resolve Problems Faster

Three out of nine respondents felt that having ERP graduates in the organisation would lead to faster problem resolution as the graduates will be on hand to assist. Having in-house ERP expertise reduces dependence on vendors, increases users’ involvement and assists in resolving technical problems (Sancar Gozukara et al., 2022). Having ERP graduates in an organisation would, therefore, lead to faster problem resolution as they would be on hand to assist. The following quotes are sample quotes from the questionnaires and interviews on the potential benefit *ERP graduates can resolve problems faster* from Company D, Company E, and Company A:

“The Key for most ERP is the skill sets available to attend to the user needs and requirements, the integrated system is a complex system which requires different specialised skills in specific areas. The graduates can impact the system with regards to functional support, and second level support addressing any system problems that arise as systems are used. Upgrades of systems due to the fast-changing technological platforms requires skill sets that can be at hand in the patching processes.” (Company D)

“They would cost the organisation less time to get to the level of problem-solving.” (Company E)

“I think they'll add a lot of value because the ERP basically handles all our processes. Everything we do relies on ERP. When it's down, we can't do any work. So, if we have those skills, it would greatly benefit the organisation in terms of efficiency, getting better reports.

You have less downtime if you have people who are qualified. So, it would be very, very beneficial to the organisation.” (Company A)

7.2.5 ERP Graduates Can Retain Skills Within Zambia

One out of nine respondents felt that having ERP graduates would help to retain ERP skills within Zambia. Knowledge is a strategic resource which should be managed well (Alomari et al., 2021). It has been noted that knowledge is leaving organisations at a rapid rate due to knowledgeable employees leaving an organisation; hence, the need for knowledge sharing (Alomari et al., 2021). When personal knowledge is transformed into organisational knowledge, it has a higher chance of being retained (Alomari et al., 2021). Therefore, to create capacity and retain ERP skills within an organisation, knowledge must be shared thus transforming it from personal ERP knowledge to organisational ERP knowledge as more people in the organisation will have ERP knowledge. Hence, having ERP graduates in the organisation will aid in retaining ERP skills within Zambia. The following quote is a sample quote from the questionnaires and interviews on the potential benefit *ERP graduates can retain skills within Zambia* from Company C:

“It will help in upgrading know-how and create more opportunity through local graduates in future, retaining skills within Zambia.” (Company C)

7.2.6 ERP Graduates Can Gather Additional Requirements for Enhancements to ERP Modules

One out of nine respondents felt that having ERP graduates would assist in gathering of additional requirements for enhancements to ERP modules. The lack of in-house skills has resulted in consultants specifying requirements in ERP implementations which they may not understand (Hasheela-Mufeti & Smolander, 2017). Having in-house ERP skills through ERP graduates would therefore assist in gathering additional requirements in ERP implementation through the change management process. The following quote is a sample quote from the questionnaires and interviews on the potential benefit *ERP graduates can gather additional requirements for enhancements to ERP modules* from Company E:

“They would be useful in the gathering of additional requirements for enhancement to the ERP in the areas covered by the certificate.” (Company E)

7.2.7 ERP Graduates Can Increase Knowledge Transfer

Two out of nine respondents felt that ERP graduates can increase knowledge transfer in the organisation as they would be able to train others. Tacit knowledge, that is, know-how, skills, and contextual knowledge is difficult and costly to transfer, while explicit knowledge can be easily transferred (Serenko, 2023). When people realise the value of knowledge, they will commit to successfully transferring the knowledge (Natu & Aparicio, 2022). Hence, having ERP graduates in the organisation can increase knowledge transfer. The following quotes are sample quotes from the questionnaires and interviews on the potential benefit *ERP graduates can increase knowledge transfer* from Company G and Company I:

“If you have them in-house, definitely you would see some knowledge transfer as well coming in from those trained staff to the rest of the members of staff. So, it would bring in some knowledge transfer and, in that way, you would see a lot of efficiency because you get to utilise the application to, you know, to the fullest.” (Company G)

“Increased efficiency in conducting work and also can provide training to other staff.” (Company I)

7.3 Linking Course Outcomes to Potential Benefits of ERP Education

This section links ERP education course outcomes to the potential benefits of ERP education and presents several propositions on the potential impact of course outcomes on organisations. The links between course outcomes and potential benefits of ERP education are presented in Figure 7-2 and will now be discussed.

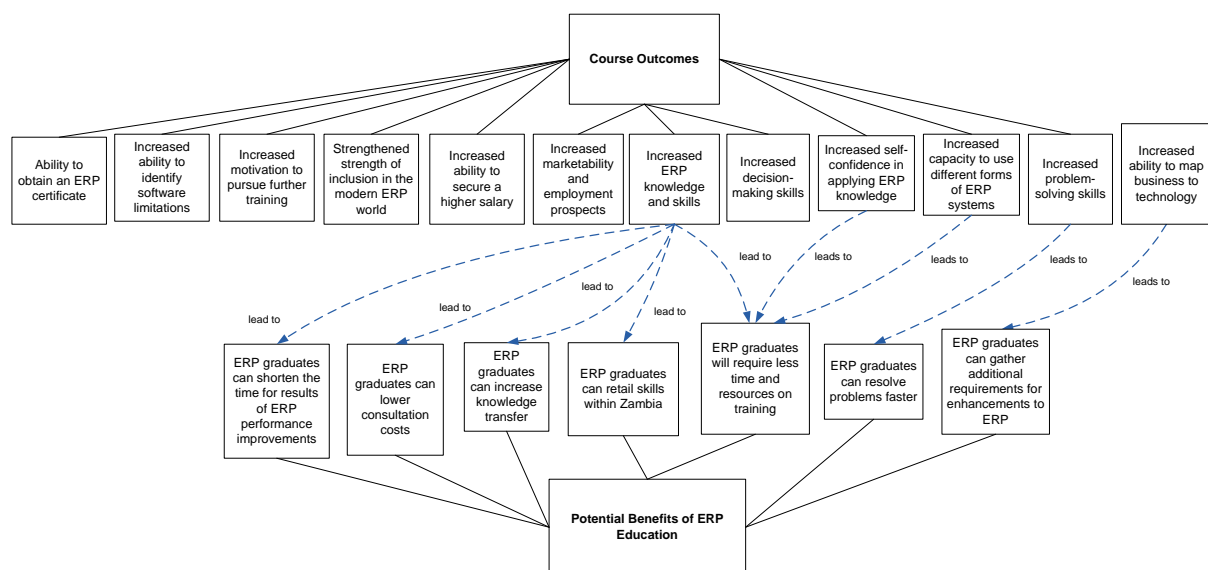


Figure 7-2 Linking Course Outcomes to Potential Benefits of ERP Education

7.3.1 Increased Self-Confidence in Applying ERP Knowledge – ERP Graduates Will Require Less Time and Resources on Training Relationship

It was noted that since ERP graduates had increased self-confidence in applying ERP knowledge, organisations would therefore spend less time and resources on training ERP graduates as they had basic ERP knowledge. Hence, there was a relationship noted between *increased self-confidence in applying ERP knowledge* and *ERP graduates will require less time and resources on training*. This relationship is depicted in Figure 7-3. The following quote is a sample quote from the questionnaires and interviews on the relationship between *increased self-confidence in applying ERP knowledge* and *ERP graduates will require less time and resources on training* from Company A:

“Less time for training..... When you have the confidence, you learn faster. So, it means anything that one has to do is done at a faster rate unlike if you don't have the confidence, you are afraid, you're going to make a mistake. But if you have the confidence, you're able to find your way around the system, and even if it's something new, because you have that confidence, it's easy for you to pick up and do it faster.” (Company A)

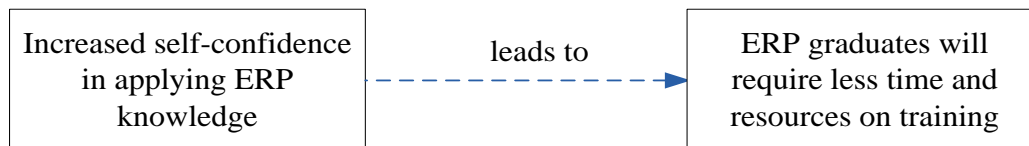


Figure 7-3 Increased Self-Confidence in Applying ERP Knowledge and ERP Graduates Will Require Less Time and Resources on Training Relationship

Hence, the following proposition is made:

Increased self-confidence in applying ERP knowledge leads to ERP graduates requiring less time and resources on training.

7.3.2 Increased Problem-Solving Skills – ERP Graduates Can Resolve Problems Faster Relationship

It was noted that having ERP graduates with increased problem-solving skills would lead to faster problem resolution in organisations. Hence, a relationship between *increased problem-solving skills* and *ERP graduates can resolve problems faster* was noted. This relationship is depicted in Figure 7-4. The following quotes are sample quotes from the questionnaires and

interviews on the relationship between *increased problem-solving skills* and *ERP graduates can resolve problems faster* from Company A and Company D:

“Will save time as we will have experts that will quickly resolve any issues.” (Company A)

“The graduates can impact the system with regards to functional support, and second level support addressing any system problems that arise as systems are used. Upgrades of systems due to the fast-changing technological platforms requires skill sets that can be at hand in the patching processes.” (Company D)

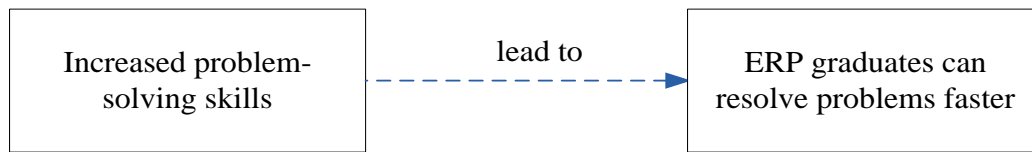


Figure 7-4 Increased Problem-Solving Skills and ERP Graduates Can Resolve Problems Faster Relationship

Hence, the following proposition is made:

Increased problem-solving skills lead to ERP graduates resolving problems faster.

7.3.3 Increased ERP Knowledge and Skills– ERP Graduates Can Lower Consultation Costs Relationship

It was noted that if ERP graduates can support ERP systems and participate in the implementation of new features, then they could assist in lowering ERP consultancy costs, which are usually in foreign currency. Hence, there was a relationship noted between *increased ERP knowledge and skills* and *ERP graduates can lower consultation costs*. This relationship is depicted in Figure 7-5. The following quote is a sample quote from the questionnaires and interviews on the relationship between *increased ERP knowledge and skills* and *ERP graduates can lower consultation costs* from Company H:

“If they are able to support the application and participate in implementation of new features it would drastically reduce the cost of consultancy services which are usually outsourced and paid in USD.” (Company H)

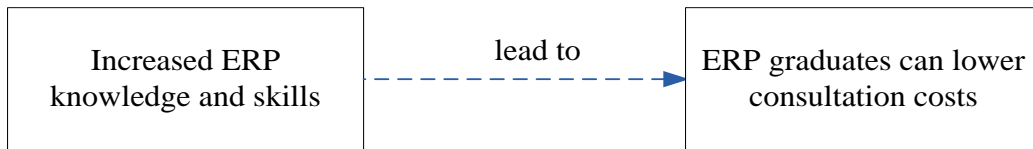


Figure 7-5 Increased ERP Knowledge and Skills and ERP Graduates Can Lower Consultation Costs

Hence, the following proposition is made:

Increased ERP knowledge and skills lead to ERP graduates lowering consultation costs.

7.3.4 Increased ERP Knowledge and Skills – ERP Graduates Can Shorten the Time for Results of ERP Performance Improvements Relationship

It was noted that increased ERP knowledge and skills could help to improve efficiency and reduce system downtime thus providing ERP performance improvements. Hence, there was a relationship noted between *increased ERP knowledge and skills* and *ERP graduates can shorten the time for results of ERP performance improvements*. This relationship is depicted in Figure 7-6. The following quote is a sample quote from the questionnaires and interviews on the relationship between *increased ERP knowledge and skills* and *ERP graduates can shorten the time for results of ERP performance improvements* from Company A:

“I think they'll add a lot of value because the ERP basically handles all our processes. Everything we do relies on ERP. When it's down, we can't do any work. So, if we have those skills, it would greatly benefit the organisation in terms of efficiency, getting better reports. You have less downtime if you have people who are qualified. So, it would be very, very beneficial to the organisation.” (Company A)

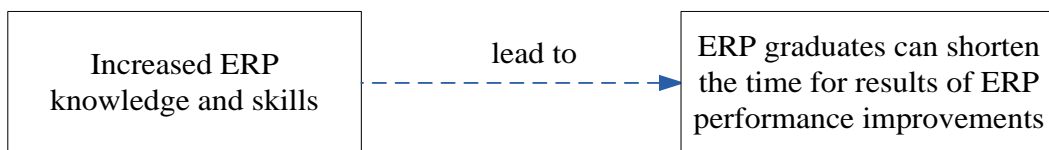


Figure 7-6 Increased ERP Knowledge and Skills and ERP Graduates Can Shorten the Time for Results of ERP Performance Improvements Relationship

Hence, the following proposition is made:

Increased ERP knowledge and skills lead to ERP graduates shortening the time for results of ERP performance improvements.

7.3.5 Increased ERP Knowledge and Skills – ERP Graduates Can Retain Skills Within Zambia Relationship

It was noted that since ERP graduates have increased ERP knowledge and skills, this would assist organisations in increasing ERP knowledge in the organisation and create more opportunities for local graduates thus retaining skills within Zambia. Therefore, a relationship between *increased ERP knowledge and skills*, and *ERP graduates can retain skills within Zambia* was noted. This relationship is depicted in Figure 7-7. The following quote is a sample quote from the questionnaires and interviews on the relationship between *increased ERP knowledge and skills*, and *ERP graduates can retain skills within Zambia* from Company C:

“It will help in upgrading know-how and create more opportunity through local graduates in future retaining skills within Zambia.” (Company C)

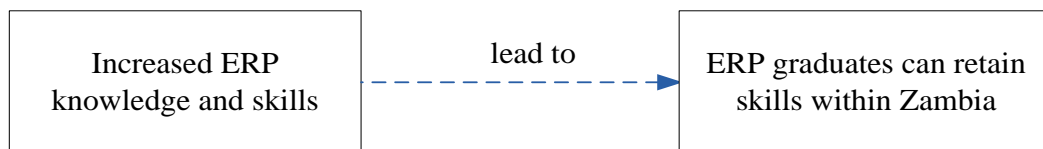


Figure 7-7 Increased ERP Knowledge and Skills and ERP Graduates Can Retain Skills Within Zambia Relationship

Hence, the following proposition is made:

Increased ERP knowledge and skills lead to ERP graduates retaining skills within Zambia.

7.3.6 Increased Ability to Map Business to Technology – ERP Graduates Can Gather Additional Requirements for Enhancements to ERP Modules Relationship

Since ERP graduates understand the business processes involved in running a business, they would be able to assist in gathering additional requirements for enhancement of ERP modules for various business processes. Hence, there was a relationship noted between *increased ability to map business to technology* and *ERP graduates can gather additional requirements for enhancements to ERP modules*. This relationship is depicted in Figure 7.8. The following quote is a sample quote from the questionnaires and interviews on the relationship between *increased ability to map business to technology* and *ERP graduates can gather additional requirements for enhancements to ERP modules* from Company G:

“ERP is at the core of every business. So, you'll find that each and every business process is, you know, written on paper. And it has to be understood by the same technical staff in IT. And

then put that into a program. So that gives them, you know, a very good understanding of all the processes that take place within a business.” (Company G)

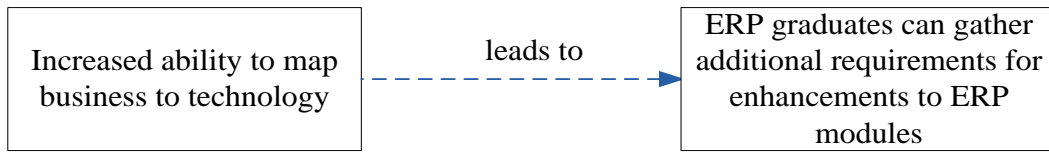


Figure 7-8 Increased Ability to Map Business to Technology and ERP Graduates Can Gather Additional Requirements for Enhancements to ERP Modules Relationship

Hence, the following proposition is made:

Increased ability to map business to technology leads to ERP graduates gathering additional requirements for enhancements to ERP modules.

7.3.7 Increased ERP Knowledge and Skills – ERP Graduates Will Require Less Time and Resources on Training Relationship

It was noted that due to increased ERP knowledge and skills, ERP graduates would become marketable as hiring organisations would spend less on training since the ERP graduates already have ERP background knowledge. Hence, there was a relationship noted between *increased ERP knowledge and skills* and *ERP graduates will require less time and resources on training*. This relationship is depicted in Figure 7-9. The following quote is a sample quote from the questionnaires and interviews on the relationship between *increased ERP knowledge and skills* and *ERP graduates will require less time and resources on training* from Company G:

“For the staff yes, they become marketable because the next company that's going to employ them doesn't need to spend on training them because they've already done the training.” (Company G)

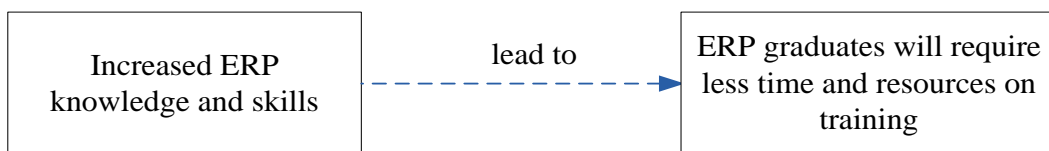


Figure 7-9 Increased ERP Knowledge and Skills and ERP Graduates Will Require Less Time and Resources on Training Relationship

Hence, the following proposition is made:

Increased ERP knowledge and skills lead to ERP graduates requiring less time and resources on training.

7.3.8 Increased ERP Knowledge and Skills – ERP Graduates Can Increase Knowledge Transfer Relationship

It was noted that since ERP graduates have increased ERP knowledge and skills, they can assist with knowledge transfer in organisations as they would be able to train others. Hence there was a relationship noted between *increased ERP knowledge and skills* and *ERP graduates can increase knowledge transfer*. This relationship is depicted in Figure 7-10. The following quotes are sample quotes from the questionnaires and interviews on the relationship between *increased ERP knowledge and skills* and *ERP graduates can increase knowledge transfer* from Company G and Company I:

“If you have them in-house definitely you would see some knowledge transfer as well coming in from those trained staff to the rest of the members of staff. So, it would bring in some knowledge transfer and, in that way, you would see a lot of efficiency because you get to utilise the application to, you know, to the fullest.” (Company G)

“Increased efficiency in conducting work and also can provide training to other staff.” (Company I)

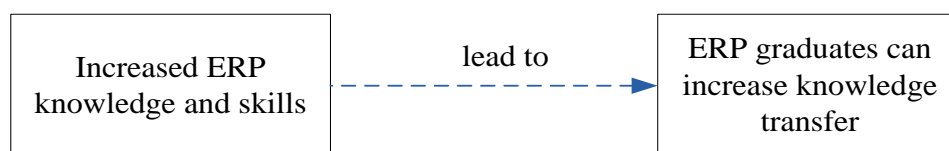


Figure 7-10 Increased ERP Knowledge and Skills and ERP Graduates Can Increase Knowledge Transfer Relationship

Hence, the following proposition is made:

Increased ERP knowledge and skills lead to ERP graduates increasing knowledge transfer.

7.3.9 Increased Capacity to Use Different Forms of ERP Systems - ERP Graduates Will Require Less Time and Resources on Training Relationship

It was noted that since ERP graduates have increased capacity to use different forms of ERP systems, they will therefore require less time and resources on training as they already have hands-on experience with ERP systems. Hence, there was a relationship noted between

increased capacity to use different forms of ERP systems and ERP graduates will require less time and resources on training. This relationship is depicted in Figure 7-11. The following quote is a sample quote from the questionnaires and interviews on the relationship between *increased capacity to use different forms of ERP systems and ERP graduates will require less time and resources on training* from Company G:

“For the staff yes, they become marketable because the next company that's going to employ them doesn't need to spend on training them because they've already done the training.”
(Company G)

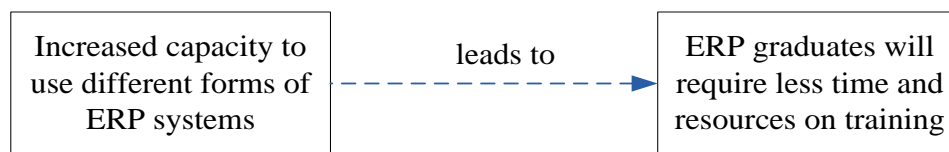


Figure 7-11 Increased Capacity to Use Different Forms of ERP Systems and ERP Graduates Will Require Less Time and Resources on Training Relationship

Hence, the following proposition is made:

Increased capacity to use different forms of ERP systems leads to ERP graduates requiring less time and resources on training.

7.4 Chapter Summary

This chapter discussed the applicability of course outcomes to organisations and the potential benefit of ERP education to organisations. It was noted that if ERP graduates can support ERP systems and participate in the implementation of new features, they could impact outsourcing of ERP expertise by potentially reducing consultation costs, which are usually quoted in foreign currency. The main contribution of this chapter is propositions on how ERP education outcomes can lead to potential organisational benefits in the Zambian context. The next chapter will discuss the relationships between ERP challenges faced by organisations in Zambia and how ERP education has the potential to impact these challenges.

8 FINAL EXPLANATORY MODEL

This chapter discusses the relationships between the potential benefits of ERP education and ERP challenges in Zambia and the propositions that were formulated from the relationships. The relationships were determined using the Thematic analysis steps that were described in Chapter 3. The chapter concludes by integrating Study 2 and Study 3 and presents an explanatory model on how ERP education impacts students and the potential impact on organisations.

8.1 Level 1 Relationships in the Data

This section discusses the first-order relationships between the potential benefits of ERP education and Zambian ERP challenges. The relationships between the different challenges are also presented. The relationships were determined from the analysis of the data supplemented by matrix coding. These relationships are presented in Figure 8-1 and are denoted by dotted lines. Table 8-1 shows the node matrix for relationships between the ERP challenges. The relationships identified will now be discussed.

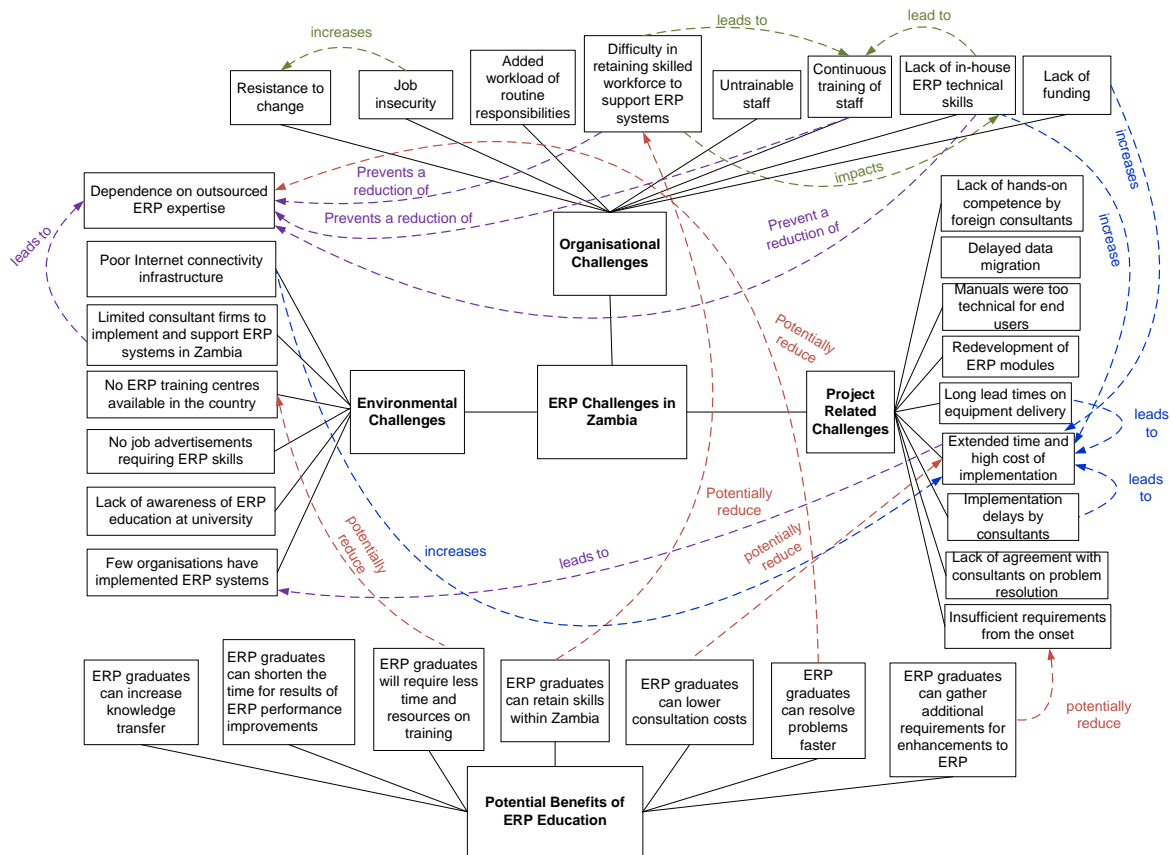


Figure 8-1 Level 1 Relationships for Potential Benefits of ERP Education and ERP Challenges

Table 8-1 Node Matrix for Level 1 Relationships for ERP Challenges

| | Dependence on outsourced ERP expertise | Few organisations are using ERP systems due to cost | Limited consultant firms to implement and support ERP systems in Zambia | Poor Internet connectivity infrastructure | Continuous training of staff | Difficulty in retaining skilled workforce to support ERP systems | Job insecurity | Lack of funding | Lack of in-house ERP technical skills | Resistance to change | Extended time and cost of implementation | Implementation delays by consultants | Long lead times on equipment delivery |
|---|--|---|---|---|------------------------------|--|----------------|-----------------|---------------------------------------|----------------------|--|--------------------------------------|---------------------------------------|
| Dependence on outsourced ERP expertise | 15 | 0 | 1 | 0 | 2 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 |
| Few organisations are using ERP systems due to cost | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Limited consultant firms to implement and support ERP systems in Zambia | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Poor Internet connectivity infrastructure | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Continuous training of staff | 2 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Difficulty in retaining skilled workforce to support ERP systems | 3 | 0 | 0 | 0 | 1 | 8 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Job insecurity | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| Lack of funding | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| Lack of in-house ERP technical skills | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 7 | 0 | 0 | 0 | 0 |
| Resistance to change | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 |
| Extended time and cost of implementation | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 5 | 1 | 1 |
| Implementation delays by consultants | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| Long lead times on equipment delivery | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |

8.1.1 ERP Graduates Can Retain ERP Skills Within Zambia – Difficulty in Retaining Skills to Support ERP Systems Relationship

It was noted that ERP graduates can retain ERP skills within Zambia, thus potentially reducing the challenge of retaining skills to support ERP systems in Zambian organisations. Hence there was a relationship noted between *ERP graduates can retain ERP skills within Zambia* and *difficulty in retaining skills to support ERP systems*. This relationship is depicted in Figure 8-2. The following quote is a sample quote from the questionnaires and interviews on the relationship between *ERP graduates can retain ERP skills within Zambia* and *difficulty in retaining skills to support ERP systems* from Company C:

“It will help in upgrading know-how and create more opportunity through local graduates in future retaining skills within Zambia.” (Company C)

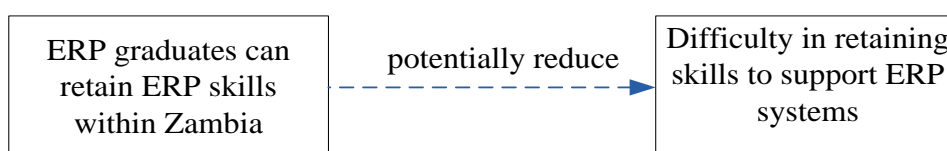


Figure 8-2 ERP Graduates Can Retain ERP Skills Within Zambia and Difficulty in Retaining Skills to Support ERP Systems Relationship

Hence, the following proposition is made:

ERP graduates can retain ERP skills within Zambia, potentially reducing the difficulty in retaining skills to support ERP systems.

8.1.2 ERP Graduates Can Resolve Problems Faster – Dependence on Outsourced ERP Expertise Relationship

It was noted that the availability of ERP graduates would assist with faster problem resolution in the organisation, thus potentially reducing dependence on outsourced ERP expertise. Hence, there was a relationship noted between *ERP graduates can resolve problems faster* and *dependence on outsourced ERP expertise*. This relationship is depicted in Figure 8-3. The following quote is a sample quote from the questionnaires and interviews on the relationship between *ERP graduates can resolve problems faster* and *dependence on outsourced ERP expertise* from Company D:

“The graduates can impact the system with regards to functional support, and second level support addressing any system problems that arise as systems are used. Upgrades of systems due to the fast-changing technological platforms requires skill sets that can be at hand in the patching processes.” (Company D)

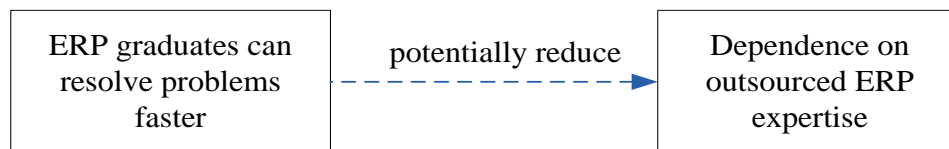


Figure 8-3 ERP Graduates Can Resolve Problems Faster and Dependence on Outsourced ERP Expertise Relationship

Hence the following proposition is made:

“ERP graduates can resolve problems faster, potentially reducing dependence on outsourced ERP expertise.”

8.1.3 ERP Graduates Will Require Less Time and Resources on Training – High Costs on Training Undertaken Outside the Country Relationship

It was noted that less time and resources would be spent on training ERP graduates as they already had the basic knowledge. This would, therefore, potentially reduce the high costs on training that is undertaken outside the country. Hence, there was a relationship noted between *ERP graduates will require less time and resources on training* and *high costs on training*

undertaken outside the country. This relationship is depicted in Figure 8-4. The following quote is a sample quote from the questionnaires and interviews on the relationship between *ERP graduates will require less time and resources on training* and *high costs on training undertaken outside the country* from Company D:

“Yes, less time and resources would be used for training with ERP Education, most of the training have been undertaken outside of the country, very short courses but very expensive.”
(Company D)

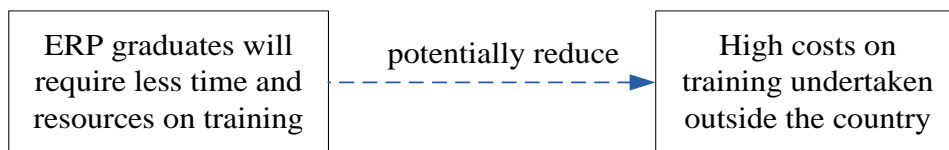


Figure 8-4 ERP Graduates Will Require Less Time and Resources on Training and High Costs on Training Undertaken Outside the Country Relationship

Hence, the following proposition is made:

ERP graduates will require less time and resources on training, potentially reducing high costs on training undertaken outside the country.

8.1.4 ERP Graduates Can Lower Consultation Costs– Extended Time and High Cost of Implementation Relationship

It was noted that having ERP graduates who can implement enhancement to modules would lead to a lowering of consultation costs, thus potentially reducing the cost of implementation as consultation costs are part of implementation costs. Hence, there was a relationship noted between *ERP graduates can lower consultation costs* and *extended time and high cost of implementation*. This relationship is depicted in Figure 8-5. The following quote is a sample quote from the questionnaires and interviews on the relationship between *ERP graduates can lower consultation costs* and *extended time and high cost of implementation* from Company H:

“If they are able to support the application and participate in implementation of new features it would drastically reduce the cost of consultancy services which are usually outsourced and paid in USD.” (Company H)

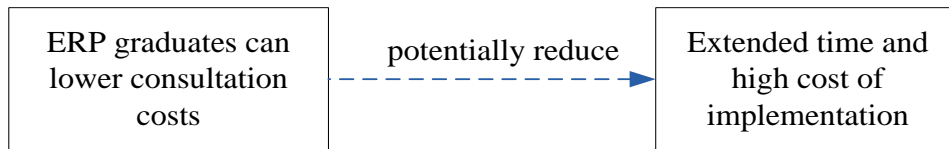


Figure 8-5 ERP Graduates Can Lower Consultation Costs and Extended Time and High Cost of Implementation Relationship

Hence, the following proposition is made:

ERP graduates can lower consultation costs, potentially reducing extended time and high cost of implementation.

8.1.5 ERP Graduates Can Gather Additional Requirements for Enhancements to ERP Modules - Insufficient Requirements from the Onset Relationship

It was noted that ERP graduates can assist in gathering additional requirements for ERP system enhancements, potentially reducing insufficient requirements from the initial phase of ERP implementation. Hence, there was a relationship noted between *ERP graduates can gather additional requirements for enhancements to ERP modules* and *insufficient requirements from the onset*. This relationship is depicted in Figure 8-6. The following quote is a sample quote from the questionnaires and interviews on the relationship between *ERP graduates can gather additional requirements for enhancements to ERP modules* and *insufficient requirements from the onset* from Company E:

“They would be useful in the gathering of additional requirements for enhancement to the ERP in the areas covered by the certificate.” (Company E)

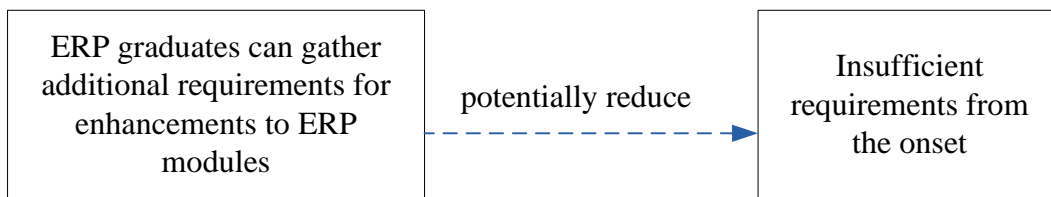


Figure 8-6 ERP Graduates Can Gather Additional Requirements for Enhancements to ERP Modules and Insufficient Requirements from the Onset Relationship

Hence, the following proposition is made:

ERP graduates can gather additional requirements for enhancements to ERP modules, potentially reducing insufficient requirements from the onset.

8.1.6 Job Insecurity – Resistance to Change Relationship

It was noted that there was a relationship between *job insecurity* and *resistance to change*. This relationship is depicted in Figure 8-7. Employees thought they were being replaced when ERP systems were introduced in their organisations, thus creating job insecurity among the employees, which led to resistance to change. The following quote is a sample quote from the questionnaires and interviews on the relationship between *job insecurity* and *resistance to change* from Company C:

“So, all those changes we have to coordinate properly and job insecurity, then resistance to change. All these things through HR we tried to manage.” (Company C)

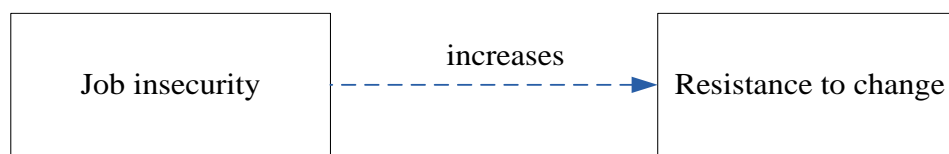


Figure 8-7 Job Insecurity and Resistance to Change Relationship

Hence, the following relationship was noted:

Job insecurity increases resistance to change.

8.1.7 Difficulty in Retaining Skilled Workforce to Support ERP Systems – Dependence on Outsourced ERP Expertise Relationship

It was noted that since organisations were experiencing challenges in retaining skilled workforce to support ERP systems, this led to dependence on outsourced ERP expertise. Those who were trained were leaving the organisation for better paying jobs. Hence, a relationship between *difficulty in retaining skilled workforce to support ERP systems* and *dependence on outsourced ERP expertise* was noted. This relationship is depicted in Figure 8-8. The following quote is a sample quote from the questionnaires and interviews on the relationship between *difficulty in retaining skilled workforce to support ERP systems* and *dependence on outsourced ERP expertise* from Company F:

“The other challenge is that, if you train me and I become very good in the job or in SAP, ok, you know, I become very marketable then you get this expert drain where people go out to look for jobs where the pay is better than what government would give at a particular time. So, you have that as a huge challenge. So still, we wallow into that issue where we don't have the expert's kind of skill.” (Company F)

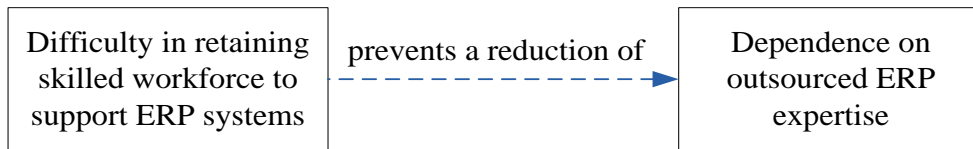


Figure 8-8 Difficulty in Retaining Skilled Workforce to Support ERP Systems and Dependence on Outsourced ERP Expertise Relationship

Hence, the following relationship was noted:

Difficulty in retaining skilled workforce to support ERP systems prevents a reduction of dependence on outsourced ERP expertise.

8.1.8 Difficulty In Retaining Skilled Workforce to Support ERP Systems – Continuous Training of Staff Relationship

It was noted that since organisations were not able to retain skilled workforce to support ERP systems, this led to continuous training of staff working on ERP systems. Hence, there was a relationship noted between *difficulty in retaining skilled workforce to support ERP systems* and *continuous training of staff*. This relationship is depicted in Figure 8-9. The following quote is a sample quote from the questionnaires and interviews on the relationship between *difficulty in retaining skilled workforce to support ERP systems* and *continuous training of staff* from Company F:

“So, we have this need for continuous training all the time because people are moving in and out.” (Company F)

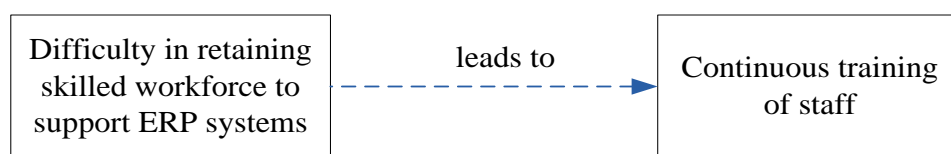


Figure 8-9 Difficulty in Retaining Skilled Workforce to Support ERP Systems and Continuous Training of Staff Relationship

Hence, the following relationship was noted:

Difficulty in retaining skilled workforce to support ERP systems leads to continuous training of staff.

8.1.9 Lack of In-house ERP Technical Skills – Extended Time and High Cost of Implementation Relationship

It was noted that lack of in-house ERP technical skills had led to outsourcing of ERP skills which had increased the cost of implementation. Hence, there was a relationship noted between *lack of in-house ERP technical skills* and *extended time and high cost of implementation*. This relationship is depicted in Figure 8-10. The following quote is a sample quote from the questionnaires and interviews on the relationship between *lack of in-house ERP technical skills* and *extended time and high cost of implementation* from Company G:

“It was a challenge because it meant the company spending more by outsourcing, and had this been done internally, if the in-house trained technical personnel were available, we would have spent less. So obviously that on its own was a cost.” (Company G)

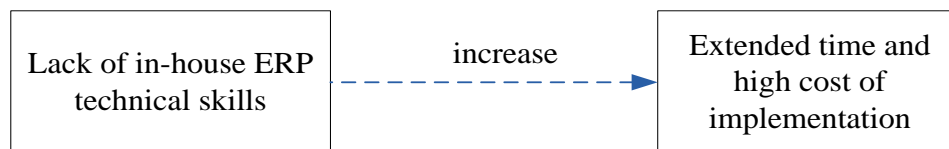


Figure 8-10 Lack of In-house ERP Technical Skills and Extended Time and High Cost of Implementation Relationship

Hence, the following relationship was noted:

Lack of in-house ERP technical skills increase extended time and high cost of implementation.

8.1.10 Limited Consultant Firms to Implement and Support ERP Systems in Zambia – Dependence on Outsourced ERP Expertise Relationship

It was noted that since Zambia has limited consultant firms to implement and support ERP systems, this has led to dependence on outsourced ERP expertise from outside the country. Hence, there was a relationship noted between *limited consultant firms to implement and support ERP systems in Zambia* and *dependence on outsourced ERP expertise*. This relationship is depicted in Figure 8-11. The following quote is a sample quote from the questionnaires and interviews on the relationship between *limited consultant firms to implement and support ERP systems in Zambia* and *dependence on outsourced ERP expertise* from Company D:

“At that time, looking at the magnitude of the project itself, the tendering process was followed and opened up, so if there were Zambians who could have probably lodged in or they could have been considered, but I think we didn't have, So the ones who won it were foreigners.” (Company D)

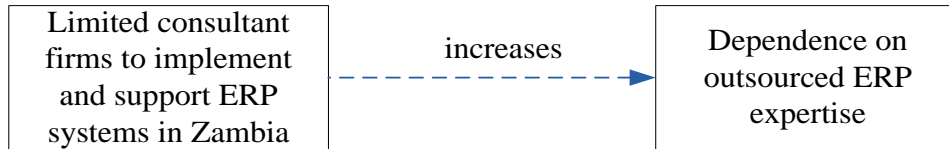


Figure 8-11 Limited Consultant Firms to Implement and Support ERP Systems in Zambia and Dependence on Outsourced ERP Expertise Relationship

Hence, the following relationship was noted:

Limited consultant firms to implement and support ERP systems in Zambia increases dependence on outsourced ERP expertise.

8.1.11 Lack of In-house ERP Technical Skills – Dependence on Outsourced ERP Expertise Relationship

It was noted that lack of in-house ERP technical skills led to dependence on outsourced ERP expertise. Hence, there was a relationship noted between *lack of in-house ERP technical skills* and *dependence on outsourced ERP expertise*. This relationship is depicted in Figure 8-12. The following quote is a sample quote from the questionnaires and interviews on the relationship between *lack of in-house ERP technical skills* and *dependence on outsourced ERP expertise* from Company G:

“So obviously it was a challenge because it meant the company spending more by outsourcing, and had this been done internally, if the in-house trained technical personnel were available, we would have spent less.” (Company G)

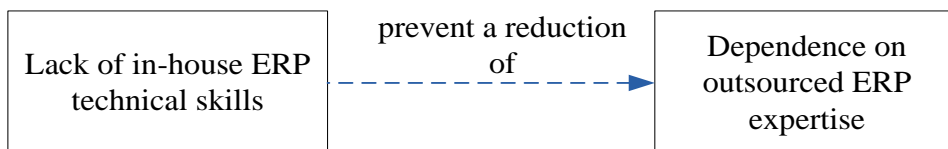


Figure 8-12 Lack of In-house ERP Technical Skills and Dependence on Outsourced ERP Expertise Relationship

Hence, the following relationship was noted:

Lack of in-house ERP technical skills prevent a reduction of dependence on outsourced ERP expertise.

8.1.12 Continuous Training of Staff – Dependence on Outsourced ERP Expertise Relationship

It was noted by organisations that there was continuous training of staff due to employees leaving the organisation and new staff coming in, which made it difficult to build ERP skills internally; hence, there was continual dependence on outsourced ERP expertise. A relationship between *continuous training of staff* and *dependence on outsourced ERP expertise* was therefore noted. This relationship is depicted in Figure 8-13. The following quote is a sample quote from the questionnaires and interviews on the relationship between *continuous training of staff* and *dependence on outsourced ERP expertise* from Company F:

“So, we have this need for continuous training all the time because people are moving in and out. So, the strategy then becomes that while you can create a fall back in terms of internal skills, there are points where you become insufficient and, therefore, you continuously depend on third level support, which is basically a company whose core establishment is SAP solutions. I hope you get what I'm trying to drive at here. So, you will continuously need people to come in and help you when you require third level support because internally you cannot keep up this pace.” (Company F)

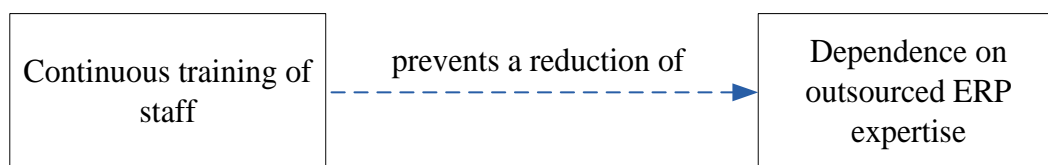


Figure 8-13 Continuous Training of Staff and Dependence on Outsourced ERP Expertise Relationship

Hence, the following relationship was noted:

Continuous training of staff prevents a reduction of dependence on outsourced ERP expertise.

8.1.13 Poor Internet Connectivity Infrastructure – Extended Time and High Cost of Implementation Relationship

It was noted that poor internet connectivity infrastructure led to extended time on ERP projects. Hence, there was a relationship noted between *poor internet connectivity infrastructure* and

extended time and high cost of implementation. This relationship is depicted in Figure 8-14. The following quote is a sample quote from the questionnaires and interviews on the relationship between *poor internet connectivity infrastructure* and *extended time and high cost of implementation* from Company C:

“There was a technical infrastructure challenge in Zambia, our internet was poor at that time. So, the required bandwidth was not provided. The gateway, which is going outside the country, the fibre cables, pass through let’s say Botswana or Zimbabwe, capacity was low. We connect remotely to the data centre where the JD Edwards system servers are sitting. The speed was not that much, so we had to extend our project by almost two months. So, after the infrastructure was properly in place, then the training started and then the test environment was set up and we were able to access it.” (Company C)

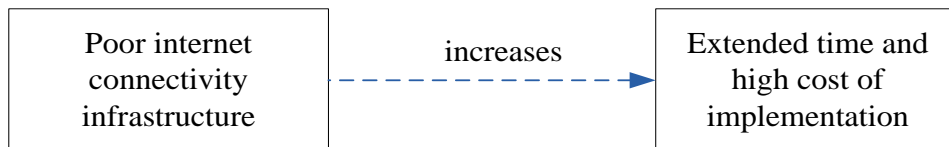


Figure 8-14 Poor Internet Connectivity Infrastructure and Extended Time and High Cost of Implementation Relationship

Hence, the following relationship was noted:

Poor internet connectivity infrastructure increases extended time and high cost of implementation.

8.1.14 Long Lead Times on Equipment Delivery – Extended Time and High Cost of Implementation Relationship

It was noted that long lead times on imported equipment delivery led to delays on ERP projects, thereby extending the time on ERP projects. Hence, a relationship was noted between *long lead times on equipment delivery* and *extended time and high cost of implementation*. This relationship is depicted in Figure 8-15. The following quote is a sample quote from the questionnaires and interviews on the relationship between *long lead times on equipment delivery* and *extended time and high cost of implementation* from Company G:

“At the time there were issues of logistics in terms of rather, logistics challenges in terms of lead times on hardware, ok, you know, to be delivered. So yeah, there was a bit of a delay because that obviously had to be imported.” (Company G)

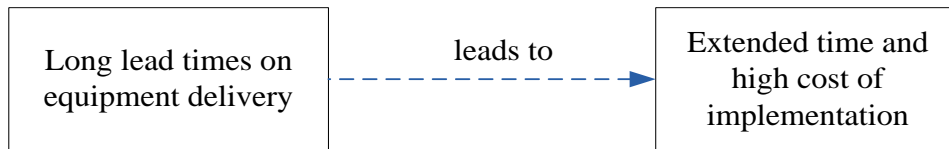


Figure 8-15 Long Lead Times on Equipment Delivery and Extended Time and High Cost of Implementation Relationship

Hence, the following relationship was noted:

Long lead times on equipment delivery leads to extended time and high cost of Implementation.

8.1.15 Extended Time and High Cost of Implementation - Few Organisations Have Implemented ERP Systems Relationship

It was noted that few organisations have implemented ERP systems due to high implementation costs. Hence, a relationship between *extended time and high cost of implementation* and *few organisations have implemented ERP systems* was noted. This relationship is depicted in Figure 8-16. The following quote is a sample quote from the questionnaires and interviews on the relationship between *extended time and high cost of implementation* and *few organisations have implemented ERP systems* from Company A:

“I don’t think the impact is that much as only few organisations have ERP systems because of the cost. However, having this education in Zambia has helped to increase knowledge base locally and also make an available market for both graduates and organisations needing ERP experts.” (Company A)

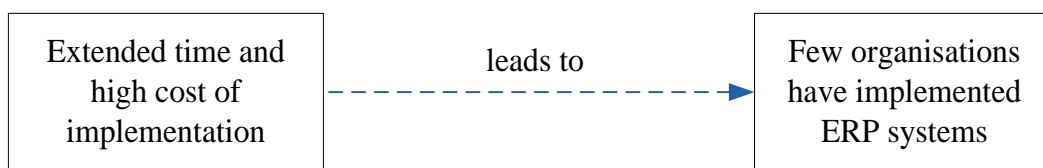


Figure 8-16 Extended Time and High Cost of Implementation and Few Organisations Have Implemented ERP Systems Relationship

Hence, the following relationship was noted:

Extended time and high cost of implementation leads to few organisations implementing ERP systems.

8.1.16 Lack of In-house ERP Technical Skills – Continuous Training of Staff

Relationship

It was noted that since in-house ERP technical skills were lacking in the organisation, consultants had to be brought in whenever there was development of modules required. The consultants would provide training to staff who would afterwards be transferred to other departments or leave the organisation, creating a knowledge gap in the organisation. Thus, when these ERP skills were required, the organisation had to bring in consultants again, and new employees would be trained, which created a continuous cycle of training employees working on ERP systems. A relationship between *lack of in-house ERP technical skills* and *continuous training of staff* was therefore noted. This relationship is depicted in Figure 8-17. The following quote is a sample quote from the questionnaires and interviews on the relationship between *lack of in-house ERP technical skills* and *continuous training of staff* from Company F:

“Then the cycle goes back when you bring in a new requirement, you need to do redevelopment. You don't have the skill; you have to go to a consultant. The consultant comes in. They have to train the guys. The guys get trained, they get transferred. You have to bring in other guys and so on. (Company F)

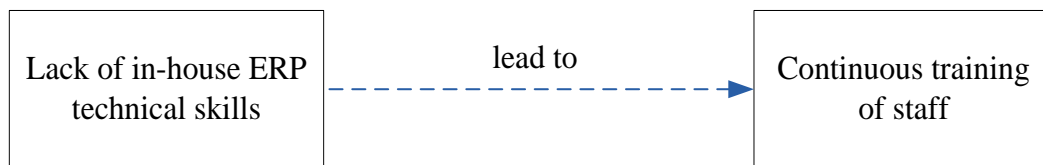


Figure 8-17 Lack of In-house ERP Technical Skills and Continuous Training of Staff Relationship

Hence, the following relationship was noted:

Lack of in-house ERP technical skills lead to continuous training of staff.

8.1.17 Lack of Funding – Extended Time and High Cost of Implementation Relationship

It was noted that lack of funding led to an extended time frame for ERP implementation; hence, a relationship between *lack of funding* and *extended time and high cost of implementation* was noted. This relationship is depicted in Figure 8-18. The following quote is a sample quote from the questionnaires and interviews on the relationship *lack of funding* and *extended time and high cost of implementation* from Company B:

“Yeah, I think one challenge we've had I think is the time frame, we were supposed to have completed the full implementation I think by 2021/2022, but we have not completed, maybe for one or two reasons. One of the reasons made was funding.” (Company B)

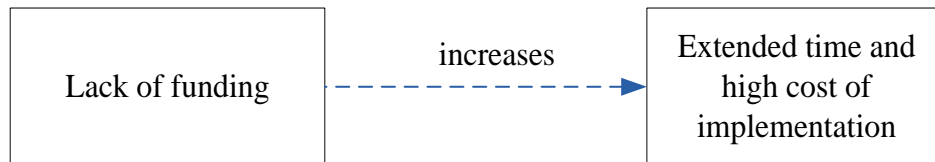


Figure 8-18 Lack of Funding and Extended Time and High cost of Implementation Relationship

Hence, the following relationship was noted:

Lack of funding increases extended time and high cost of implementation.

8.1.18 Implementation Delays by Consultants – Extended Time and High Cost of Implementation Relationship

It was noted that implementation delays by consultants had extended the time frame for project completion; hence, a relationship between *implementation delays by consultants* and *extended time and high cost of implementation* was noted. This relationship is depicted in Figure 8-19. The following quote is a sample quote from the questionnaires and interviews on the relationship *implementation delays by consultants* and *extended time and high cost of implementation* from Company B:

“I think one challenge we've had I think is the time frame. We were supposed to have completed the full implementation I think 2021/2022, but we have not completed maybe for one or two reasons. One of the reasons made was funding and the other reason was also consultants’ delays in making implementations. Like when you agree we should complete this assignment by today or so, then you find it's still not done because they have other engagements so to say, and that normally brings challenges.” (Company B)

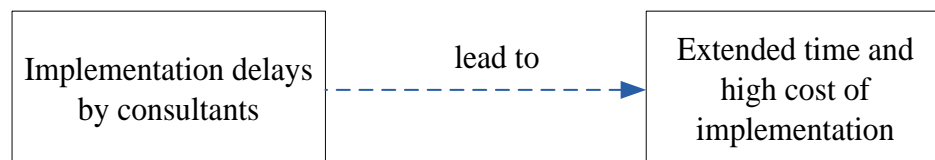


Figure 8-19 Implementation Delays by Consultants and Extended Time and High Cost of Implementation Relationship

Hence, the following relationship was noted:

Implementation delays by consultants lead to extended time and high cost of implementation.

8.2 Level 2 Relationships

The level 2 relationships show the second-order relationships on how potential benefits of ERP education to organisations could potentially impact ERP challenges, and how the different categories of ERP challenges impact each other. These relationships are presented in Figure 8-20 and will now be discussed.

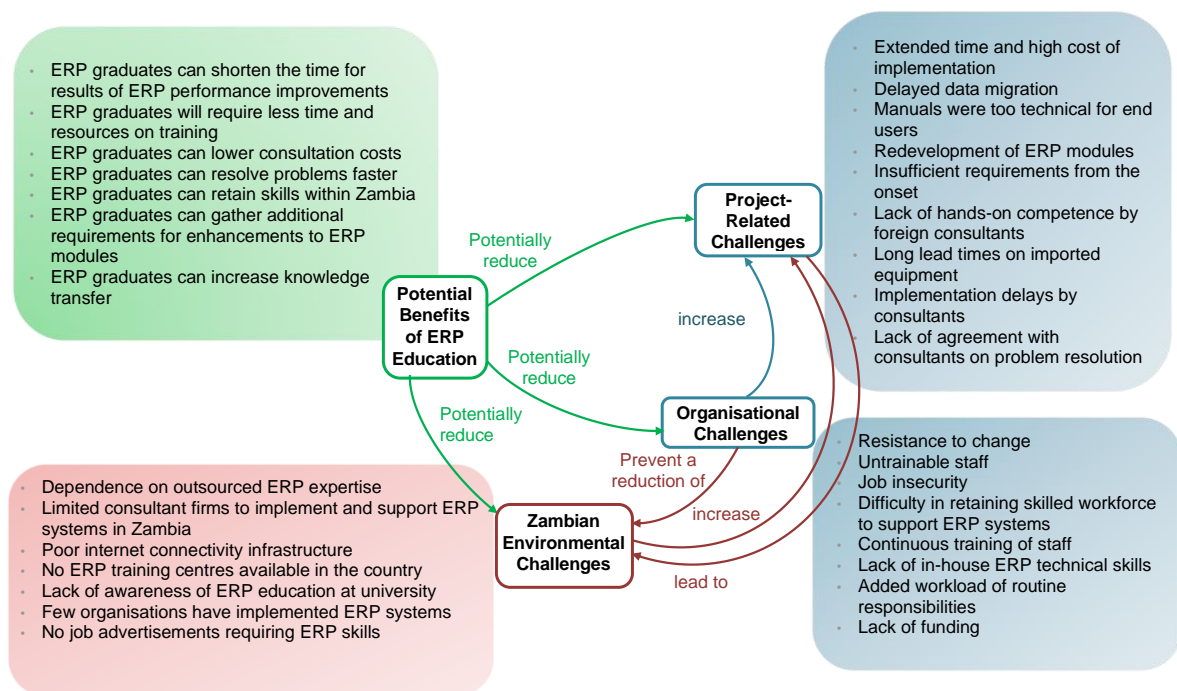


Figure 8-20 ERP Challenges and Potential Benefits Level 2 Relationships

8.2.1 Organisational Challenges and Environmental Challenges Relationship

It was noted that there was a relationship between organisational challenges and environmental challenges. This relationship is depicted in Figure 8-21. Three organisational challenges, namely, *difficulty in retaining skilled workforce to support ERP systems*, *continuous training of staff*, and *lack of in-house ERP technical skills*, were found to prevent a reduction of environmental challenges. It has been noted in literature that lack of in-house ERP skills leads to dependence on ERP vendors and consultants, resulting in vendor lock-in (Sancar Gozukara et al., 2022). In this study lack of in-house ERP technical skills was classified as an organisational challenge, while dependence on outsourced ERP expertise was classified as an environmental challenge. Hence, the findings in this study are similar to what is recorded in

literature, showing that organisational challenges prevent a reduction of environmental challenges.

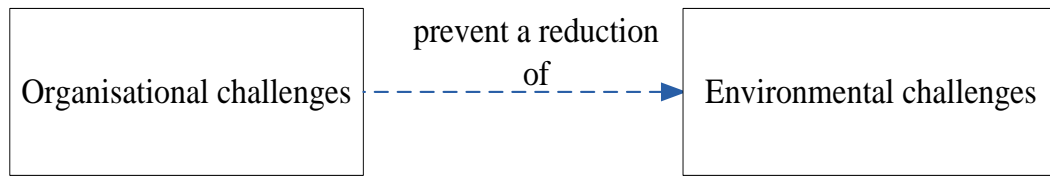


Figure 8-21 Organisational Challenges and Environmental Challenges Relationship

Hence, the following relationship was noted:

Organisational challenges prevent a reduction of environmental challenges.

8.2.2 Environmental Challenges and Project-Related Challenges Relationship

It was noted that there were two relationships between environmental challenges and project-related challenges. These relationships are depicted in Figure 8-22. One environmental challenge, *poor internet connectivity infrastructure*, was found to impact project-related challenges. One project-related challenge, *extended time, and high cost of implementation* was noted as leading to environmental challenges. A study on ERP integration challenges showed that environmental challenges of a political nature affected licensing issues on an ERP project which made the organisation change ERP service providers, thus causing financial loss to the organisation (Banaeianjahromi et al., 2016). Hence, the findings in this study are similar to what is recorded in literature, showing that environmental factors can impact project-related challenges. It has been noted that high cost of ERP implementation is one of the barriers to ERP adoption by many organisations in developing countries (Amade et al., 2022). In this study, high cost of ERP implementation was classified as a project-related challenge, and it led to few organisations adopting or implementing ERP systems. Hence, this shows that project-related challenges can lead to environmental challenges, which in turn can also increase project-related challenges.

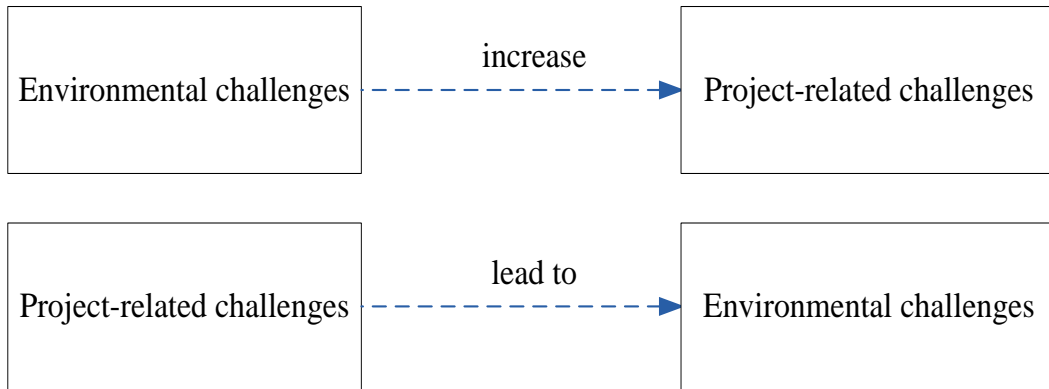


Figure 8-22 Environmental Challenges and Project-Related Challenges Relationships

Hence, the following relationships were noted:

Environmental challenges increase project-related challenges.

Project-related challenges lead to environmental challenges.

8.2.3 Potential Benefits of ERP Education and Environmental Challenges

Relationship

It was noted that there was a relationship between potential benefits of ERP education and environmental challenges. This relationship is depicted in Figure 8-23. Two potential benefits, *ERP graduates will require less time and resources on training* and *ERP graduates can resolve problems faster*, were found to potentially impact environmental challenges. It has been noted in literature that having in-house ERP skills and educated ERP system users reduces dependence on vendors and consultants and helps in resolving technical problems (Sancar Gozukara et al., 2022). In this study, dependence on outsourced ERP expertise was identified as an environmental challenge; hence, having graduates with ERP education in the organisation could potentially reduce this challenge. Hence, results in this study are similar to what is recorded in literature showing that ERP education has the potential to reduce environmental challenges.

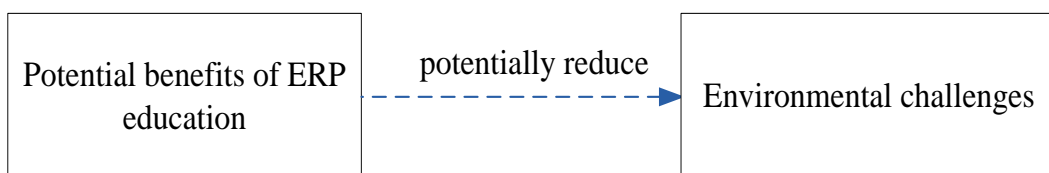


Figure 8-23 Potential Benefits of ERP Education and Environmental Challenges Relationship

Hence, the following proposition is made:

Potential benefits of ERP education potentially reduce environmental challenges.

8.2.4 Organisational Challenges and Project-Related Challenges Relationship

It was noted that there was a relationship between organisational challenges and project-related challenges. This relationship is depicted in Figure 8-24. A research conducted on interrelationships of ERP challenges found that challenges categorised under organisation risk had a low positive correlation with challenges categorised under project performance risk (Garg & Khurana, 2017). In this research, two organisational challenges, *lack of in-house ERP technical skills* and *lack of funding* were found to impact project-related challenges. In another study, project management challenges were classified under operational challenges (Kähkönen et al., 2017), and these operational challenges were found to be impacted by organisation wide challenges (Singh et al., 2023). Hence, the findings in this study are similar to what is recorded in literature, showing that organisational challenges impact project-related challenges.

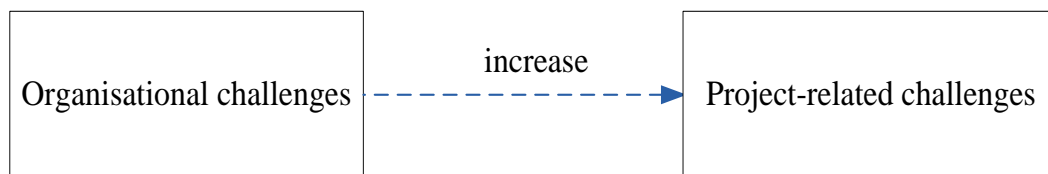


Figure 8-24 Organisational Challenges and Project-Related Challenges Relationship

Hence, the following relationship was noted:

Organisational challenges increase project-related challenges.

8.2.5 Potential Benefits of ERP Education and Organisational Challenges Relationship

It was noted that there was a relationship between potential benefits of ERP education and organisational challenges. This relationship is depicted in Figure 8-25. One potential benefit, *ERP graduates can retain skills within Zambia*, was found to potentially reduce organisational challenges. Education and training were identified as a critical success factor under organisational factors in ERP implementation, which exerted the greatest influence (Abu Madi et al., 2022). Therefore, education and training could lead to skills being retained within the organisation, potentially reducing organisational challenges in ERP projects. Hence, graduates who have gone through ERP education have the potential to reduce organisational challenges in ERP projects.

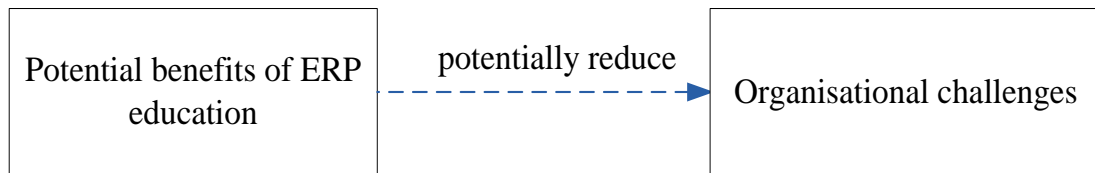


Figure 8-25 Potential Benefits of ERP Education and Organisational Challenges Relationship

Hence, the following proposition is made:

Potential benefits of ERP education potentially reduce organisational challenges.

8.2.6 Potential Benefits of ERP Education and Project-Related Challenges Relationship

It was noted that there was a relationship between potential benefits of ERP education and project-related challenges. This relationship is depicted in Figure 8-26. Two potential benefits, *ERP graduates can lower consultation costs* and *ERP graduates can gather additional requirements for enhancements to ERP modules*, were found to potentially reduce project-related challenges. Consultancy costs make up a considerable portion of ERP implementation costs; hence, it is recommended that ERP consultants should transfer their knowledge to in-house staff who will be able to retain this knowledge and assist with system maintenance, thus reducing cost (Abu Madi et al., 2022; Bawack & Kala Kamdjoug, 2023). Hence, graduates with ERP education can assist with this knowledge transfer, which will eventually reduce the cost of hiring external consultants as they will have acquired the knowledge from the consultants. Hence, ERP graduates have the potential to reduce project-related challenges.

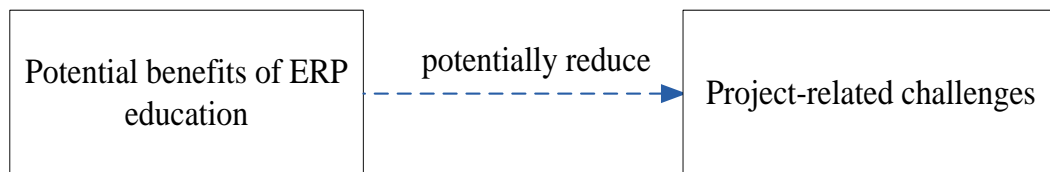


Figure 8-26 Potential Benefits of ERP Education and Project-Related Challenges Relationship

Hence, the following proposition is made:

Potential benefits of ERP education potentially reduce project-related challenges.

8.3 Integration of Study 2 and Study 3

In Study 2, course outcomes of ERP education and contextual factors that impacted ERP education were identified. Contextual factors that impacted ERP education were identified as personal characteristics and situation, course limitations, and Zambian environmental challenges. In Study 3, ERP challenges were identified as environmental challenges, organisational challenges, and project-related challenges. The findings of Studies 2 and 3 were combined into one resultant explanatory model presented in Figure 8-27. The resultant model shows the relationships between ERP education, course outcomes, contextual factors, ERP challenges, and potential benefits of ERP education. The resultant model shows that ERP education leads to course outcomes, which in turn lead to potential benefits of ERP education, and potential benefits of ERP education have the potential to reduce ERP challenges in Zambia. The model also shows that contextual factors reduce course outcomes; hence, the importance of considering contextual factors when integrating ERP courses into university curricula.

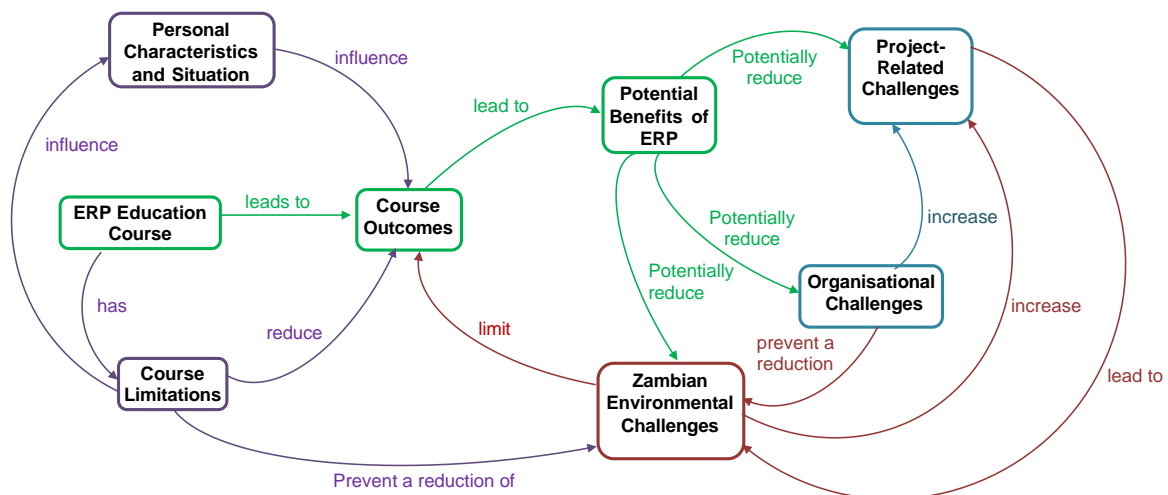


Figure 8-27 Integration of Study 2 and Study 3

8.4 Chapter Summary

This chapter discussed the relationships between the potential benefits of ERP education and ERP challenges faced by organisations in Zambia. Propositions were formulated from these relationships. Relationships between the different ERP challenges were also discussed. The contribution of this chapter is a novel explanatory model resulting from the integration of Studies 2 and 3. The resultant model shows that ERP education leads to course outcomes, which in turn lead to potential benefits to organisations. The potential benefits of ERP education have the potential to reduce environmental, organisational, and project-related ERP

challenges. The model also shows that course limitations and Zambian environmental factors prevented many benefits from being achieved. Hence, the importance of local context and well-designed courses when deciding on ERP education. Identifying ERP failure factors and their relationships was identified as an area for future research (Coşkun et al., 2022); hence, our study contributes to this area of ERP research.

9 CONCLUSION

This chapter concludes the research and provides the research contribution, limitations of the study, and future research. The ten basic claims of information systems research (Ngwenyama, 2019) are also presented and how each claim was addressed in the research. The research questions are revisited and a summary of how the research questions were answered is also provided.

9.1 The Ten Basic Claims of Information Systems Research

Ngwenyama (2019) proposed ten basic claims for conducting information systems research as a way of providing validity in scientific argument. We will now discuss how these ten basic claims were addressed in this study.

1. ***The question that the researcher proposes to investigate is relevant and persisting in the field of study***

The research sought to understand the impact of ERP education on students and organisations, and the contextual factors that impact ERP education. Understanding the added value or benefits of ERP education to students and organisations is relevant in the Zambian context where it has been noted that ICT skills are inadequate, and there is a dependence on foreign providers for outsourcing of technology solutions and ICT expertise. It was also noted that no previous study on ERP education has been conducted in Zambia, and there are limited studies that have been conducted that link ERP education to organisations and the ERP challenges they face.

2. ***The researcher has demonstrated a command of the literature of the field of study in which she is attempting to contribute***

In the literature review, the trend in ERP education research in Africa was provided and the research gap showed that there were limited studies that had tried to identify the contextual factors that impact ERP education and the potential impact of ERP education on organisations. A call for more studies in ERP education in developing countries was made; hence, this study is a contribution to this call for research.

3. ***The theoretical approach/perspective that the researcher has selected for the inquiry is appropriate for investigating the research question***

The research was divided into three studies and used both deductive and inductive approaches in investigating the research question. Study 1 used a deductive approach and Studies 2 and 3 used an inductive approach. The deductive study used Sen's

Capability Approach as the theoretical framework and assisted in identifying the student capabilities and functionings enabled by ERP education. Gigler's AEF supplemented Sen's Capability Approach and assisted in identifying the human dimensions impacted by ERP education. Sen's Capability Approach also assisted in identifying the personal, social, and environmental conversion factors as well as student choices that impacted student capabilities and functionings. However, Sen's Capability Approach was limited in that some themes could not be coded as they could not fit into the theoretical framework. Hence, an inductive approach was used, and it provided broader themes than the deductive study, which assisted in a deeper understanding of the phenomenon under investigation in the Zambian context. An inductive approach assisted in the development of an explanatory model on ERP education.

4. ***The researcher has demonstrated a command of the paradigmatic assumptions upon which the theoretical approach/perspective of research is based***

The paradigm used in this research was interpretivism, which seeks to understand a phenomenon of study through the meanings assigned by human actors (Klein & Myers, 1999). An understanding of the underlying assumptions in interpretivist research was demonstrated by following Walsham's recommendations for interpretive case studies (Walsham, 1995b) and Klein and Myers' principles of interpretive field research (Klein & Myers, 1999). The trustworthiness of the research was also demonstrated by ensuring credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985) in developing the explanatory model provided in this research.

5. ***The methodology that the researcher has selected is appropriate for investigating the research question given the theoretical approach and empirical situation***

A case study was used for Studies 1 and 2, while Study 3 was a qualitative study. The research used both deductive and inductive approaches as they were both deemed appropriate in investigating the phenomenon of study in the Zambian context. In the deductive study, we thought it best to use Sen's Capability Approach as a theoretical framework supplemented by Gigler's AEF. A code book was developed for use with thematic analysis to identify initial themes. Thematic analysis was also used in the inductive study to identify first-order and second-order themes to determine the relationships identified, which assisted in the development of a novel explanatory model on ERP education in the Zambian context.

For the case study, we interviewed postgraduate students as most of them were already working; hence, they provided rich insight into how ERP education had impacted them

in the workplace. For the qualitative study, the organisations chosen were those that were known to have implemented ERP systems; hence, they also provided rich insight on the challenges they had encountered with ERP projects through qualitative questionnaires and follow-up interviews.

6. ***The empirical situation selected for the inquiry is appropriate for observing the phenomenon or phenomenal behaviour that the researcher is investigating***

A case study of UNZA was selected for Studies 1 and 2. ERP education was introduced at UNZA in 2014, and Zambia was one of the first universities in Africa to join the ESEFA programme. For Study 3 which was a qualitative study, organisations that were known to have implemented ERP systems were selected as they would be able to share their experience with ERP systems and the challenges encountered. Zambia has inadequate ERP expertise and relies on outsourced ERP expertise for their ERP projects. It was noted from literature that no previous study on ERP education had been conducted in Zambia. Hence, the context was appropriate for understanding the impact that ERP education has on ERP graduates and its potential impact on organisations that rely on outsourcing ERP expertise.

7. ***The methodology has been applied in a systematic manner and carefully documented to allow for replication or corroboration by other researchers***

The methodology applied in this research has been clearly documented through detailed description of all three studies conducted in this research. The research approach taken and reasons for the choices made have also been duly provided. The data collection and analysis process have also been explained in detail. The findings in this research were also corroborated with literature. The relationships identified between the different themes in the inductive studies were also presented and explained, and how these led to the development of the explanatory models provided, and the final explanatory model as an outcome of this research. Copies of the student interview questions, and questionnaire are also provided in Appendices 6,7, and 11.

8. ***The results of the research make a contribution to the researcher's field of study***

The contribution of this research is a novel explanatory model on the impact of ERP education on students and its potential impact on organisations in the Zambian context. The study makes a contribution by identifying Zambian environmental challenges and ERP course limitations that prevented many benefits from being achieved. The study also found that contrary to what is recorded in literature, ERP education does not always lead to higher salaries and better employment prospects as was the case in the Zambian

context where students were not able to get jobs, nor did they receive higher salaries. Hence, the study shows the importance of context when deciding on ERP courses. The study on ERP education has also not previously been done in the Zambian context. We only found one study that looked at ERP challenges faced by organisations in Zambia. Our study goes further by identifying the relationships between ERP challenges faced by organisations in Zambia and presents the potential impact that ERP education could have on these ERP challenges.

9. *The research has been conducted in an ethical manner: respondent autonomy and confidentiality is maintained; ethical data collection protocols are observed; no part of the work has been plagiarised and all sources have been acknowledged.*

Ethics clearance from UCT as well as UNZA was obtained prior to data collection. Organisational approval was also obtained before any data was collected from the organisations. The respondents willingly took part in the study and their identities have not been revealed. Consent was also obtained from the respondents before the recording of interviews. All sources have been duly cited and the study was checked for plagiarism in Turnitin. A copy of the ethics letters, student consent form, interview protocols, and questionnaire are attached as appendices to this research.

10. *The paper reflects communicative competence: it is carefully argued and written in a manner that is understandable to the scientific community.*

The empirical context has been provided and the research problem and research question under investigation were clearly stated. The literature review provided the research gap noted and the research method was also explained. The data collection and analysis process were also clearly explained and how the final results were obtained. The claims made in this research were also corroborated with findings from literature. Hence, we believe that this research is clearly argued and written coherently.

9.2 Problem Statement and Research Questions

The research in this thesis is entitled “The Impact of ERP Education in Zambia.” The study focused on the Zambian context, where ERP education was introduced at UNZA through the ESEFA programme in 2014. The research gap identified was that limited studies had been conducted on how contextual factors impact ERP education and the potential impact of ERP education on organisations. The thesis focused on one main question which was subdivided into four research questions:

- **RQ:** What is the impact of ERP education on students and organisations and what contextual factors impact ERP education?
 - **RQ1:** How do conversion factors and choices influence the impact of ERP education on student capabilities and functionings?
 - **RQ2:** What are the course outcomes of ERP education and what contextual factors impact these course outcomes?
 - **RQ3:** What ERP challenges are experienced by organisations in Zambia?
 - **RQ4:** What is the potential impact of ERP education on organisations and outsourcing of ERP expertise?

9.3 Summary of Findings

In answering the research questions, the research was divided into three stages, that is, Studies 1, 2 and 3. The outcome of this research is an explanatory model on ERP education and its impact on students and organisations. The model describes and explains the impact of ERP education on students and the contextual factors that impact ERP education. The model also describes and explains the potential benefits of ERP education on organisations, and how these potential benefits could impact ERP challenges encountered by organisations. The model therefore describes and explains the impact of ERP education on students and the potential impact on organisations.

9.4 Study 1

Study 1 looked at the impact of ERP education on students using a deductive approach and addressed the following research question:

RQ1: How do conversion factors and choices influence the impact of ERP education on student capabilities and functionings?

In Study 1, a deductive approach was used to answer the research question using Sen's Capability Approach as a theoretical framework. Sen's Capability Approach was used to assist in identifying the student capabilities and functionings enabled by ERP education, student choices and the conversion factors that impacted student capabilities and functionings. Giger's AEF was used to determine the human dimensions impacted by ERP education. The findings in Study 1 are summarised in Figure 9-1. The findings showed that some capabilities were not converted to functionings due to contextual factors and some student choices made. The contribution of Study 1 is that contrary to what is recorded in literature, ERP education does

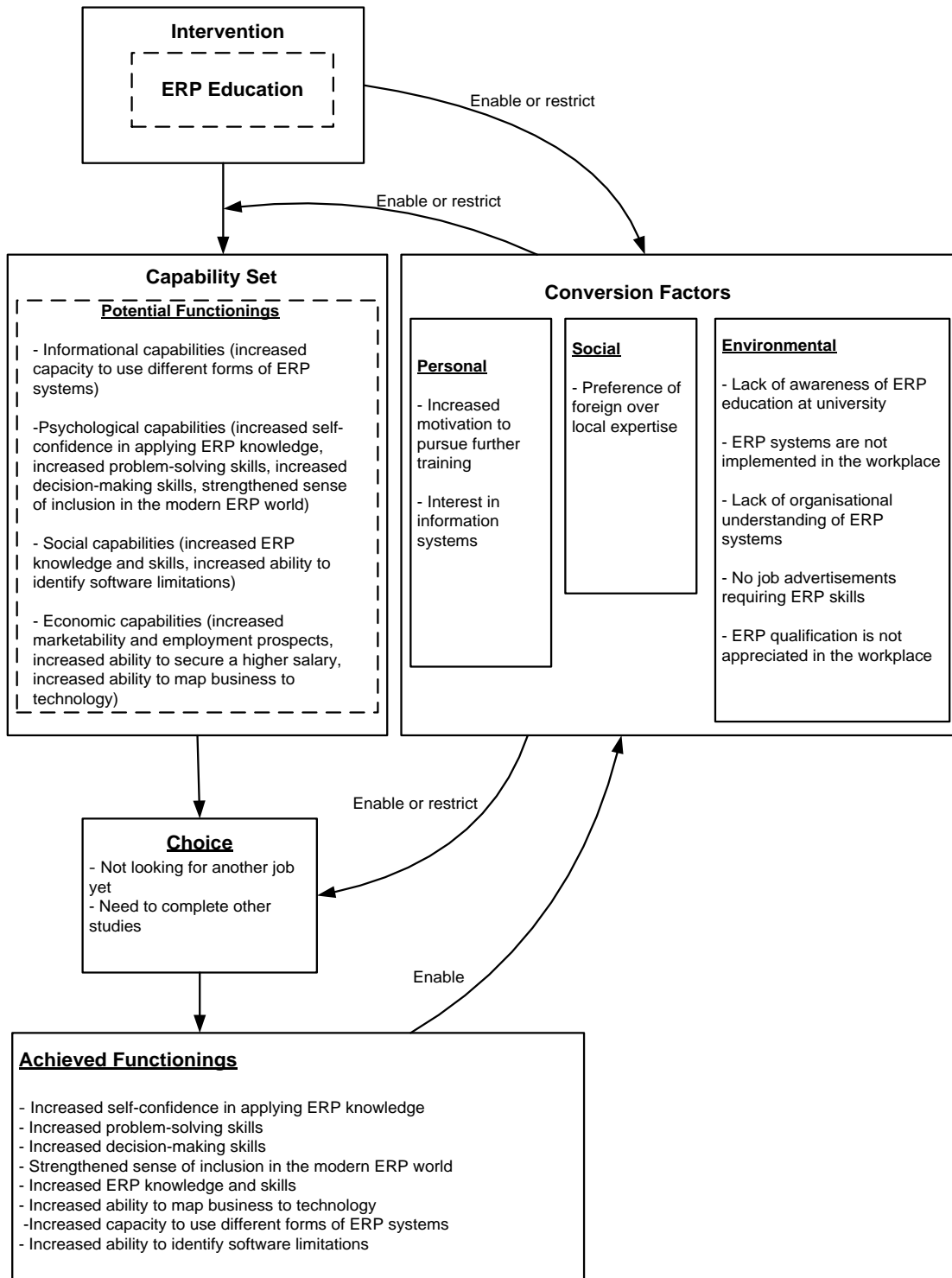


Figure 9-1 Study 1 Summary of Findings

not always lead to higher salaries and increased employment prospects as was the case in the Zambian context where ERP graduates were not able to get jobs nor did they receive higher salaries; hence, the benefits of ERP education are not applicable to all contexts. Therefore, context should be considered when incorporating ERP courses in university curricula.

9.5 Study 2

Study 2 looked at the impact of ERP education on students using an inductive approach and addressed the following research question:

RQ2: What are the course outcomes of ERP education and what contextual factors impact these course outcomes?

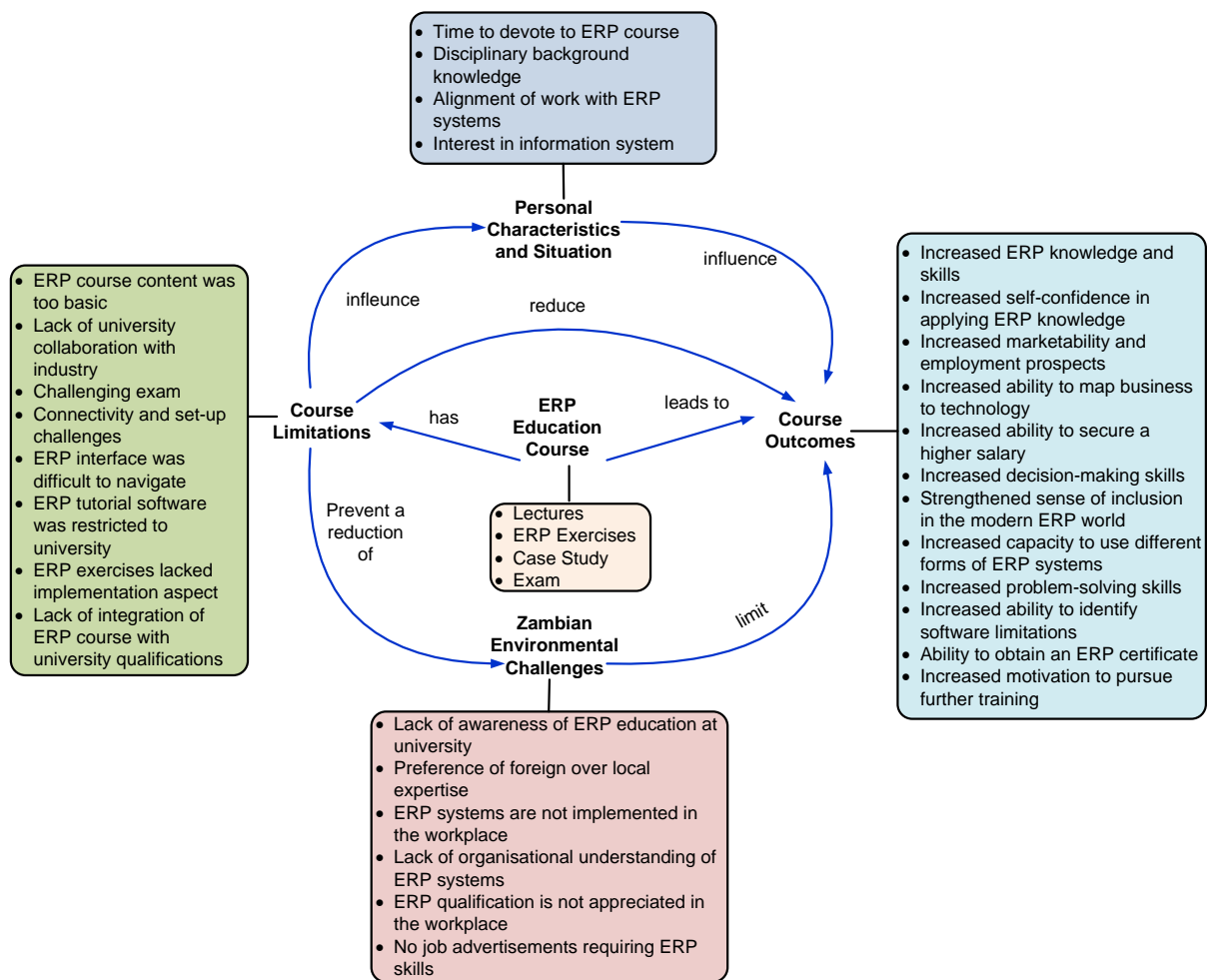


Figure 9-2 Study 2 Summary of Findings

In study 2, an inductive approach using thematic analysis was used to answer the research question. An inductive approach was used because the findings in the deductive study were limited to what Sen’s Capability Approach could explain; hence, other themes that were not

part of the framework could not be coded. The contribution of the inductive study is the identification of course limitations and Zambian environmental challenges which limited course outcomes achieved. The outcome is an explanatory model on ERP education presented in Figure 9-2, that describes and explains the course outcomes of ERP education and the contextual factors that impacted course outcomes. Contextual factors were identified as personal characteristics and situation, course limitations, and Zambian environmental challenges. The categories in the inductive study were broader than the categories in the deductive study.

9.6 Study 3

Study 3 looked at the impact of ERP education on organisations using an inductive approach and addressed the following research questions:

RQ3: What ERP challenges are experienced by organisations in Zambia?

RQ4: What is the potential impact of ERP education on organisations and outsourcing of ERP expertise?

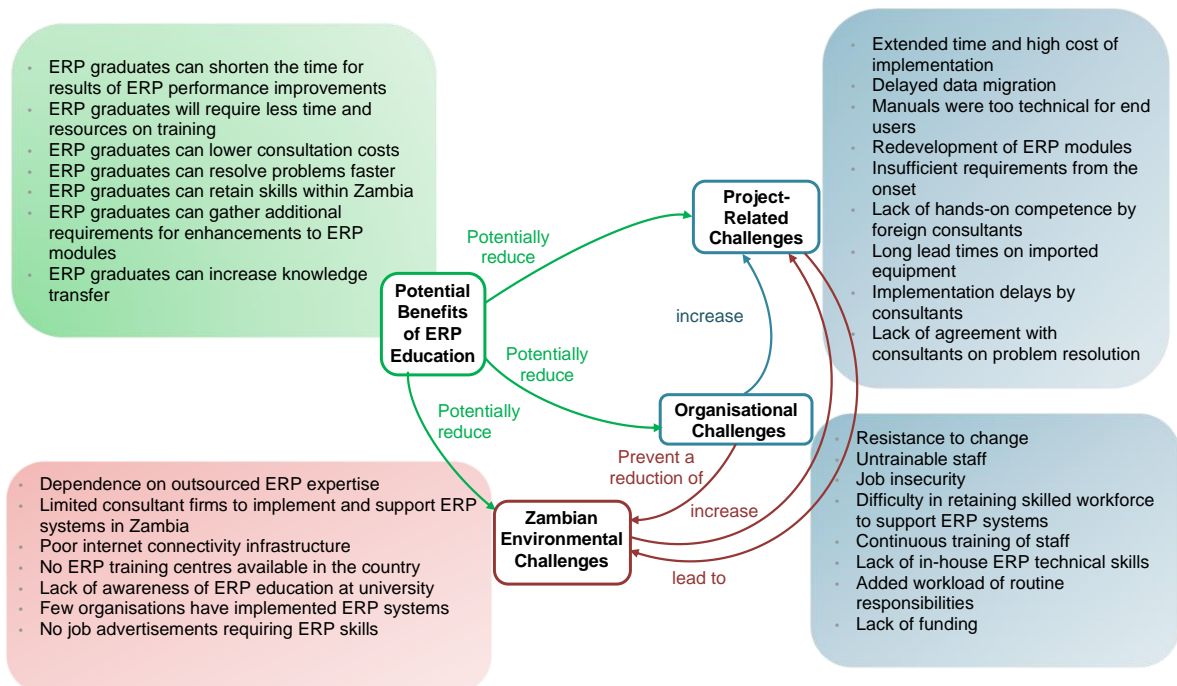


Figure 9-3 Study 3 Summary of Findings

Study 3 looked at the ERP challenges experienced by organisations in Zambia and the potential impact of ERP education on organisations using an inductive approach. ERP challenges in Zambia were categorised as environmental, organisational, and project-related challenges. There were several contributions to this study. The first contribution was the identification of

Zambian ERP environmental challenges which were dominant in the Zambian context such as *limited companies implementing and supporting ERP systems in Zambia, lack of awareness of ERP education at university, dependence on outsourced ERP expertise, and no job advertisements requiring ERP skills*. The second contribution were propositions on the potential benefits of ERP education to organisations. The third contribution is an explanatory model presented in Figure 9-3 on the potential impact of ERP education on ERP challenges experienced by organisations in Zambia. The model also shows how the different categories of ERP challenges impact each other. The final contribution is an explanatory model that integrates Studies 2 and 3. This explanatory model is presented in Figure 9-4 and explains the impact of ERP education on students and potentially on organisations. It was noted that if ERP graduates can support ERP systems and participate in the implementation of new features, they would impact outsourcing of ERP expertise by potentially lowering the consultation costs, which are usually quoted in foreign currency.

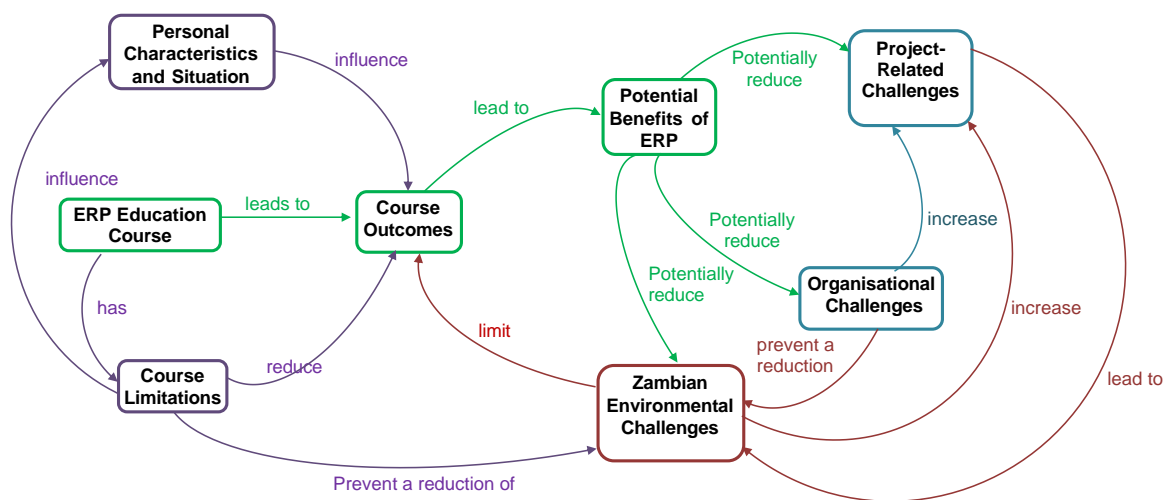


Figure 9-4 Study 3 Final Explanatory Model

9.7 Research Contribution

The contribution of this research is descriptive and explanatory. The study presents a novel explanatory model that describes and explains the impact of ERP education on students and potentially on organisations in the Zambian context. Universities that have implemented ERP education and those seeking to implement ERP education would benefit from these results. Organisations seeking to hire ERP graduates would also benefit from these results. The results of this study show the importance of contextual factors in ERP education and how they impact ERP education. The study also shows how ERP education has the potential to impact organisations in reducing ERP challenges. It has been noted in literature that research is needed

to identify ERP adoption challenges in developing countries and that there is also need for an industry standard model for characterising ERP challenges and providing solutions (Akrong et al., 2022). This study therefore contributes to this call for ERP research.

Many studies have identified ERP challenges and some of these studies have categorised these ERP challenges, but fewer studies have determined the interrelationships between ERP challenges. This was identified as an area needing further research (Akrong et al., 2022). In our study, not only were ERP challenges identified and categorised, but relationships were determined, as well as the potential influence that ERP education could have on these challenges. It has also been noted in literature that most previous ERP education studies have looked at how ERP systems are used to teach ERP system integration (Wijaya, 2023). In comparison to literature, this study discussed how course outcomes have the potential to influence organisations by linking ERP challenges to ERP education course outcomes. The study shows the importance of considering contextual factors when incorporating new ERP courses into university curricula.

The contribution to practice is an ERP education explanatory model that can be used to foster collaboration between industry and academia, to assist universities in appropriately integrating ERP systems into university curricula, and to assist organisations in maximising their benefits from graduates with ERP education. The contribution to theory is a description of the Zambian ERP context and a holistic explanation of how contextual factors impact and are impacted by ERP education.

9.8 Limitations of the Research

The limitations of this research were that the organisations were initially not comfortable with recorded interviews and instead requested questionnaires which limited the responses from the organisations. Some of the questions on the questionnaires were not completed despite some follow-ups for the questions to be completed. Follow-up interviews were held with six of the nine respondents from organisations, while no responses were received from three respondents for follow-up interviews. There was only one respondent per organisation, which also limited the responses from each organisation. Some organisations were also not willing to take part in the study thus limiting the data collected from organisations. The impact of ERP education on organisations in this study is based on potential impact and not actual impact from ERP graduates working on ERP projects.

Not many organisations have implemented ERP systems in Zambia which limited the number of organisations that could take part in the research. The majority of the students who took the ERP course were from Engineering with an IT background and from Computer Science. Only two students were from Economics with an accounting background. The students were also from one university.

The limitations of the methodology used were with regard to the limitations of interpretive research which include the issue of subjectivity and generalisability (Mwita, 2022). The role of the researcher was that of a subjective reporter; hence, the researcher's biases could have influenced the research. Therefore, to mitigate this, the findings were corroborated with literature. It has been argued that interpretive research cannot be generalisable to larger samples (Mwita, 2022). Hence, to mitigate this, transferability was established through thick description to ensure trustworthiness and validity of the research.

9.9 Future Research

Future research can consider using different methodologies such as action research and conducting a longitudinal study. Longitudinal studies can assist in enhancing validity and generalisability of research (Wang et al., 2017). Hence, a longitudinal study would enhance the validity and generalisability of the findings in this research. Action research is based on practical action, which is aimed at resolving an immediate problem while informing theory (Baskerville, 1999). Action research assists in problem-solving by providing interventions observed in the problem setting (Baskerville, 1999). An action research study would assist in contributing to theory and practice by coming up with interventions to overcome challenges of ERP education and challenges faced by organisations in ERP projects, thus enhancing collaboration between industry and academia.

Future research can look at interviewing students from another university in a different context and more students from a business background. Future research can also look at actual impact of ERP education on organisations that have employed ERP graduates working on ERP projects. More organisations that have implemented ERP systems could also be included in the study. The explanatory model developed in this research can also be tested in other contexts to see if similar results will be obtained. This research highlighted some of the issues Zambian organisations face when working with consultants on ERP projects such as, lack of hands-on competence by foreign consultants, implementation delays by consultants, and lack of

agreement with consultants on problem resolution. Future research could explore the outsourcing of consultants on ERP projects in Zambia and the quality of service provided.

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11 APPENDICES

11.1 Appendix 1: UCT First 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

05 September 2016

Ms Mampi Nakutoma Lubasi
Department of Information Systems
University of Cape Town

Dear Ms Lubasi

Project: Impact of Enterprise Resource Planning (ERP) Education in Zambia

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

Kind Regards
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/>>


11.2 Appendix 2: UCT Ethics Approval Signatures



UNIVERSITY OF CAPE TOWN


FACULTY OF COMMERCE

Igniting Knowledge and Opportunity

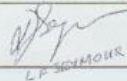


Ethics Approval Request for the Study entitled: **IMPACT OF ENTERPRISE RESOURCE PLANNING (ERP) EDUCATION IN ZAMBIA**


Signed by:

| Principal Researcher/Student: | Full name and signature | Date |
|---|-------------------------|------------|
|  MAMPI NAKUTOMA LUBASI | | 26/07/2016 |

This application is approved by:

| | | |
|----------------|--|------------|
| Supervisor |  L. SEYMOUR | 26/07/2016 |
| Co- Supervisor | | |

Approved.
 Chair, Ethics in Research Committee
 Faculty of Commerce
 University of Cape Town


 Prof U Rivett

26.08.2016

The approval of this application is based on the researcher ensuring that all requirements regarding the permission to interview participants at the various organizations have been fulfilled prior to any surveys being conducted.

Com Ethics_V4

11.3 Appendix 3: UCT Second Ethics Approval



Faculty of Commerce

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@Commerce UCT



UCT Commerce Faculty Office

30 January 2019

Ms Mampi Lubasi
Department of Information
Systems
University of Cape Town

Dear Mampi Lubasi,

REF: REC 2018/012/173

THE IMPACT OF ENTERPRISE RESOURCE PLANNING (ERP) EDUCATION IN ZAMBIA

We are pleased to inform you that your ethics application has been approved. Unless otherwise specified this ethical clearance is valid for 1 year and may be renewed upon application.

Please be aware that you need to notify the Ethics Committee immediately should any aspect of your study regarding the engagement with participants as approved in this application, change. This may include aspects such as changes to the research design, questionnaires, or choice of participants.

The ongoing ethical conduct throughout the duration of the study remains the responsibility of the principal investigator.

We wish you well for your research.

Shandre Swain
Administrative Assistant
University of Cape Town
Commerce Faculty Office
Room 2.26 | Leslie Commerce Building

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11.4 Appendix 4: UNZA First Ethics Clearance



THE UNIVERSITY OF ZAMBIA
DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

Telephone: +260 -1- 290258/291777 Ext. 2208
Fax: +260-1-290258/253952
E-mail: drgs@unza.zm

P O Box 32379
Lusaka, Zambia

3rd November, 2016

Ms. Mampi Nakutoma Lubasi
House No. 50 Mpulungu Road
Olympia Park
LUSAKA

Dear Ms. Lubasi,

RE: FULL ETHICAL CLEARANCE

With reference to your research proposal entitled: "**Impact of Enterprise Resource Planning (ERP) Education in Zambia.**" You are hereby given full ethical clearance to proceed with your research.

ACTION: APPROVED
DECISION: 3rd November, 2016
EXPIRATION DATE: 2nd November, 2017

However, it is recommended that all data to be collected should be kept confidential and that if there are plans for publication or dissemination of results, the names of the participants should not be linked with the research in order to ensure confidentiality.

Please note that you are expected to submit to the Secretariat a Progress Report and a copy of the full report on completion of the project.

Finally, and more importantly, take note that notwithstanding ethical clearance given by the HSSREC, you must also obtain authority from the Permanent Secretary of the appropriate Ministry before conducting your research.

Yours sincerely,

Dr. J. Simwinga, PhD
ASSISTANT DIRECTOR
DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

cc: Director, Directorate of Research and Graduate Studies
Acting Chairperson, Humanities and Social Sciences Research Ethics Committee
Assistant Registrar (Research), Directorate of Research and Graduate Studies

11.5 Appendix 5: UNZA Second Ethics Approval



THE UNIVERSITY OF ZAMBIA

DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

Great East Road | P.O. Box 32379 | Lusaka 10101 | Tel: +260-211-290 258/291 777
Fax: +260-1-290 258/253 952 | Email: director@drgs.unza.zm | Website: www.unza.zm

Approval of Study

17th October, 2018

REF. No. HSSREC: 2016-NOV-002

The Principal Investigator

Dear Ms. Mampi Nakutoma Lubasi,

RE: "IMPACT OF ENTERPRISE RESOURCE PLANNING (ERP) EDUCATION IN ZAMBIA"

Reference is made to your submission. The University Of Zambia Humanities And Social Sciences Research Ethics Committee IRB resolved to approve this study and your participation as Principal Investigator for a period of one year.

| Review Type | Expedited/Ordinary Review | Approval No. 2016-NOV-002 |
|--|--|--|
| Approval and Expiry Date | Approval Date: 17 th October, 2018 | Expiry Date: 16 th October, 2019 |
| Protocol Version and Date | Version-Nil | - |
| Information Sheet, Consent Forms and Dates | <ul style="list-style-type: none">English. | To be provided |
| Consent form ID and Date | Version | To be provided |
| Recruitment Materials | Nil | Nil |

There are specific conditions that will apply to this approval. As Principal Investigator it is your responsibility to ensure that the contents of this letter are adhered to. If these are not adhered

to, the approval may be suspended. Should the study be suspended, study sponsors and other regulatory authorities will be informed.

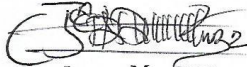
Conditions of Approval

- Provide information sheets and consent letters as these were not attached. The information sheets should have had the essential features included. Please use the WHO templates which you could download at www.who.int/rpc/research_ethics/informed_consent/en/. REC would appreciate if the PI could customise the WHO templates and include the domains of what the submitted protocol is positing on tools and the sampling units (people who have been or shall be participating in this study).
- No participant may be involved in any study procedure prior to the study approval or after the expiration date.
- All unanticipated or Serious Adverse Events (SAEs) must be reported to the IRB within 5 days.
- All protocol modifications must be IRB approved by an application for an amendment prior to implementation unless they are intended to reduce risk (but must still be reported for approval). Modifications will include any change of investigator/s or site address or methodology and methods. Many modifications entail minimal risk adjustments to a protocol and/or consent form and can be made on an Expedited basis (via the IRB Chair). Some examples are: format changes, correcting spelling errors, adding key personnel, minor changes to questionnaires, recruiting and changes, and so forth. Other, more substantive changes, especially those that may alter the risk-benefit ratio, may require Full Board review and approval. In all cases, except where noted above regarding subject safety, any changes to any protocol document or procedure must first be approved by the IRB before they can be implemented.
- All protocol deviations must be reported to the IRB within 5 working days.
- All recruitment materials must be approved by the IRB prior to being used.
- Principal investigators are responsible for initiating Continuing Review proceedings. Documents must be received by the IRB at least 30 days before the expiry date. This is for the purpose of facilitating the review process. Any documents received less than 30 days before expiry will be labelled "late submissions" and will incur a penalty.
- Every 6 (six) months a progress report form supplied by The University of Zambia Humanities And Social Sciences Research Ethics Committee IRB must be filled in and submitted to us. There is a penalty of K500.00 for failure to submit the report.
- The University Of Zambia Humanities And Social Sciences Research Ethics Committee IRB does not "stamp" approval letters, consent forms or study documents unless requested for in writing. This is because the approval letter clearly indicates the documents approved by the IRB as well as other elements and conditions of approval.

Should you have any questions regarding anything indicated in this letter, please do not hesitate to get in touch with us at the above indicated address.

On behalf of The University of Zambia Humanities and Social Sciences Research Ethics Committee IRB, we would like to wish you all the success as you carry out your study.

Yours faithfully,



Dr. Jason Mwanza
BA, MSoc, Sc., PhD

CHAIRPERSON

The University Of Zambia Humanities and Social Sciences Research Ethics
Committee IRB

Cc Director, Directorate of Research and Graduate Studies
Assistant Director – Research, Directorate of Research and Graduate Studies
Vice Chairperson, Humanities and Social Sciences Research Ethics Committee
Assistant Registrar- Research, Directorate of Research and Graduate Studies
Senior Administrative Officer – Research Affiliation, Directorate of Research and Graduate Studies

11.6 Appendix 6: Student Interview Protocol

Semi-structured Interview Protocol

The following are initial guideline questions. As the interviews and the study proceeds the questions will be adapted based on previous interview findings.

Programme of Study: Undergraduate/Postgraduate

Year of Study

Semi-structured Interview Protocol.

The following are initial guideline questions. As the interviews and the study proceeds the questions will be adapted based on previous interview findings.

- Did you have any prior knowledge of ERP, or did you have any experience with ERP before taking the ERP course?
- How has your knowledge of ERP changed after taking the course?
- What motivated you to take the ERP course?
- What are you hoping to achieve by taking the ERP course?
- How has your learning experience been on the course?
- Are there any benefits that you have seen by taking the ERP course?
- How have you been empowered through the ERP course?
- Which of the capabilities below have you developed through the ERP course and how?

| Dimension | Objective | Outcome Indicator | Capability Enhanced |
|----------------------------|---|---|----------------------------|
| Informational Capabilities | To improve the access to informational and informational capabilities | Improved capacity to use different forms of ICTs Enhanced information literacy Enhanced capacity to produce and publish local content | |

| | | | |
|------------------------|---|--|--|
| | | Improved ability to communicate with family members and friends abroad | |
| Psychological | To support a process of self-reflection (critical conscientisation) and problems solving capacity | Strengthened self-esteem Improved ability to analyse own situation and solve problems Strengthened ability to influence strategic life choices Sense of inclusion in the 'modern' world | |
| Social (Human Capital) | To strengthen people's human capital (skills, knowledge, ability to work and good health) | Enhanced ICT literacy and technology skills Enhanced leadership skills Improved program management skills | |
| Economic | To enhance people's capacity to interact with the market | Improved access to markets Enhanced entrepreneurial skills Alternative sources of income Productive assets strengthened Improved Employment opportunities Improved income through a) lower transaction costs (less time constraints). b) reduced transport needs; and c) increased timeliness of sales | |
| Political | To improve people's participation in decision-making processes at | Improved access to government Information/services (e-government) | |

| | | | |
|----------|--|---|--|
| | the community-level and the political system | Improved awareness about political issues Improved capabilities to interact with local governments | |
| Cultural | To strengthen people's cultural identity | Use of ICTs as a form of cultural expression (e.g., design of computer graphics, websites) increased awareness of own cultural identity | |

- How did the following course components impact the capabilities that you developed through the ERP course?
 - Zambikes video
 - Workshops (Labs)
 - Revision Questions
 - Class Discussions
 - Lectures
 - Exam
 - Others (Please specify)

- What challenges did you encounter in understanding the ERP course?

- What made it easier to understand the ERP course?

- How has your knowledge of business processes been enhanced?

- What competencies, skills and knowledge listed below did you acquire through the course?
 - Business Process Knowledge
 - ERP technical skills
 - Technology Management Knowledge
 - Interpersonal Skills
 - Team Skills
 - Project management
 - Systems analysis and Integration
 - Change Management

- Others (Please specify)
- What ERP related tasks in the workplace do you think you will be able to perform after taking the Enterprise systems course?
- How do you think you will influence ERP projects in the workplace with the knowledge and skills acquired through the ERP course?
- What do you think will be your economic value to organisations hiring you?
- Would you say the ERP course has made you more marketable?
- Do you think the ERP course will increase your likelihood of getting a higher salary?
- What incentives should organisations implement in order to retain ERP graduates in the workplace so that they can contribute effectively to ERP projects?
- Are there other modules that are important to organisations that you feel should have been included in the course?

11.7 Appendix 7: Revised Student Interview Protocol

Semi-structured Interview Protocol

The following are initial guideline questions. As the interviews and the study proceeds the questions will be adapted based on previous interview findings.

Programme of Study: Undergraduate/Postgraduate

Year of Study

Semi-structured Interview Protocol.

The following are initial guideline questions. As the interviews and the study proceeds the questions will be adapted based on previous interview findings.

1. Did you have any prior knowledge of ERP, or did you have any experience with ERP before taking the ERP course?
2. How has your knowledge of ERP changed after taking the course?
3. What motivated you to take the ERP course?
4. What were you hoping to achieve by taking the ERP course?
5. How has your learning experience been on the course?
6. Are there any benefits that you have seen by taking the ERP course?
7. What has restricted you from benefiting from the ERP course and what has enabled you benefit from the ERP course?
8. How has the course impacted your day-to-day tasks in the workplace?
9. Which of the capabilities below have you developed through the ERP course and how?

| Dimension | Objective | Outcome Indicator | Capability Enhanced |
|----------------------------|---|---|----------------------------|
| Informational Capabilities | To improve the access to informational and informational capabilities | Improved capacity to use different forms of ICTs Enhanced information literacy Enhanced capacity to produce and | |

| | | | |
|------------------------|---|--|--|
| | | publish local content Improved ability to communicate with family members and friends abroad | |
| Psychological | To support a process of self-reflection (critical conscientisation) and problems solving capacity | Strengthened self-esteem Improved ability to analyse own situation and solve problems Strengthened ability to influence strategic life choices Sense of inclusion in the 'modern' world | |
| Social (Human Capital) | To strengthen people's human capital (skills, knowledge, ability to work and good health) | Enhanced ICT literacy and technology skills Enhanced leadership skills Improved program management skills | |
| Economic | To enhance people's capacity to interact with the market | Improved access to markets Enhanced entrepreneurial skills Alternative sources of income Productive assets strengthened Improved Employment opportunities Improved income through a) lower transaction costs (less time constraints). b) reduced transport needs; and c) increased timeliness of sales | |

10. How did the following course components impact the capabilities that you developed through the ERP course?

- a. Zambikes video
- b. Workshops (Labs)

11. What challenges did you encounter in understanding the ERP course?
12. What made it easier to understand the ERP course?
13. How has your knowledge of business processes been enhanced?
14. How do you think you will influence ERP projects in the workplace with the knowledge and skills acquired through the ERP course?
15. What do you think will be your economic value to organisations hiring you?
16. Would you say the ERP course has made you more marketable?
17. Do you think the ERP course will increase your likelihood of getting a higher salary?
18. What incentives should organisations implement in order to retain ERP graduates in the workplace so that they can contribute effectively to ERP projects?
19. Are there other modules that are important to organisations that you feel should have been included in the course?

11.8 Appendix 8: Student Interview Consent Form

UNZAREC FORM 1b



THE UNIVERSITY OF ZAMBIA
DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE

Telephone: +260-211-290258/293937
Fax: +260-211-290258/293937
E-mail: drgs@unza.zm

P. O. Box 32379
Lusaka, Zambia

HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE

CONSENT FORM

(Translated into vernacular if necessary)

TITLE OF RESEARCH: Impact of ERP Education in Zambia

REFERENCE TO PARTICIPANT INFORMATION SHEET:

1. Make sure that you read the Information Sheet carefully, or that it has been explained to you to your satisfaction.
2. Your permission is required if tape or audio recording is being used.
3. Your participation in this research is entirely voluntary, i.e., you do not have to participate if you do not wish to.
4. Refusal to take part will involve no penalty or loss of services to which you are otherwise entitled.
5. If you decide to take part, you are still free to withdraw at any time without penalty or loss of services and without giving a reason for your withdrawal.
6. You may choose not to answer particular questions that are asked in the study. If there is anything that you would prefer not to discuss, please feel free to say so.
7. The information collected in this interview will be kept strictly confidential.
8. If you choose to participate in this research study, your signed consent is required below before I proceed with the interview with you.

VOLUNTARY CONSENT

I have read (or have had explained to me) the information about this research as contained in the Participant Information Sheet. I have had the opportunity to ask questions about it and any questions I have asked have been answered to my satisfaction.

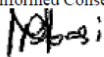
I now consent voluntarily to be a participant in this project and understand that I have the right to end the interview at any time, and to choose not to answer particular questions that are asked in the study.

My signature below says that I am willing to participate in this research:

Participant's name (Printed):

Participant's signature: Consent Date:

Researcher Conducting Informed Consent (Printed) MAMPI NAKUTOMA LUBASI

Signature of Researcher:  Date:
Signature of parent/guardian: Date:

11.9 Appendix 9: Participant Information Sheet



HSSREC FORM 1a

THE UNIVERSITY OF ZAMBIA

DIRECTORATE OF RESEARCH AND GRADUATE STUDIES

HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE

Telephone: +260-211-290258/293937

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Lusaka, Zambia

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HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE

PARTICIPANT INFORMATION SHEET

TITLE OF RESEARCH: Impact of Enterprise Resource Planning (ERP) Education in Zambia

PURPOSE OF THE STUDY:

- To determine the capabilities that are developed through ERP education and the impact that ERP education has on these capabilities.
- To determine how capabilities developed through ERP Education align with industry requirements.
- To determine the economic value of ERP graduates in the workplace and how they impact ERP performance and outsourcing of ERP expertise.

DESCRIPTION OF THE STUDY AND YOUR INVOLVEMENT:

ERP education was introduced at UNZA in October 2014 through the enterprise systems education for Africa programme (ESEFA). The University of Zambia was one of the first

universities in Africa to join the ESEFA programme and the first in Zambia to introduce ERP Education. The ERP course at the University of Zambia is run by the Department of Computer Science and currently offered to four groupings of students. These student groupings are Computer Science undergraduate students, Computer Science postgraduate students, Engineering postgraduate students and Economics postgraduate students. You have been selected to participate in the study because you belong to one of the four student groupings mentioned above.

CONFIDENTIALITY:

The researcher will not attempt to identify you with the responses to your interview, or to name you as a participant in the study, nor will she facilitate anyone else's doing so. You will not be requested to supply any identifiable information, ensuring anonymity of your responses. All information will be treated in a confidential manner and used exclusively for the purpose of this study.

VOLUNTARY PARTICIPATION AND WITHDRAWAL:

Your participation in this research is voluntary. You can choose to withdraw from the research at any time.

RISKS AND BENEFITS:

- There are no known risks or dangers to you associated with this research.
- The research will provide insights on the benefits of ERP Education thereby helping to justify investments in ERP education and foster strong bonds between academia and industry.
- The research will provide insights on the individual capabilities that are enabled through ERP Education and how they align with industry requirements.
- The research will provide insights on the marketability and employability of ERP graduates.
- The research will provide insights on the economic value of ERP graduates to hiring organisations.
- The research will provide insights on the firm-level conditions or organising strategies that will enable effective utilisation of capabilities of ERP graduates in hiring organisations.

CONTACTS FOR QUESTIONS (Names, addresses and phone numbers of the following):

1. **Principal Investigator**
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+27791749370/+27710974437

2. **Dr. M. Nkolola Wakumelo**
Chairperson, Humanities and Social Sciences, Research Ethics Committee,
University of Zambia
P O Box 32379
LUSAKA

3. **Prof. I.A. Nyambe**
Director, Directorate of Research and Graduate Studies
University of Zambia
P O Box 32379
LUSAKA

11.10 Appendix 10: Letter Requesting Approval for Data Collection in Organisations in Zambia



JOINT RESEARCH BY
THE UNIVERSITY OF ZAMBIA, DEPARTMENT OF COMPUTER
SCIENCE
AND
THE UNIVERSITY OF CAPE TOWN, DEPARTMENT OF INFORMATION
SYSTEMS



Department of Computer Science
Email: computer.studies@unza.zm
P. O. Box 32379
Lusaka Zambia

Department of Information Systems
Leslie Commerce Building
Engineering Mall, Upper Campus
Private Bag X3, Rondebosch, 7701

To Whom it May Concern

Thursday, August 8, 2019

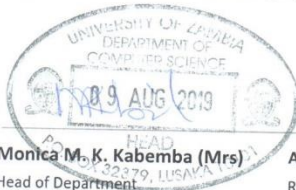
RE: PERMISSION TO COLLECT DATA FOR THE RESEARCH CONDUCTED BY
UNIVERSITY OF ZAMBIA AND UNIVERSITY OF CAPE TOWN

The above subject refers.

The Department of Computer Science at the University of Zambia and the Department of Information Systems at the University of Cape Town, in South Africa are conducting a joint research project entitled *Impact of Enterprise Resource Planning (ERP) Education in Zambia*. The objective of this research is to determine the economic value of ERP graduates to organisations that have implemented ERP systems. The study also seeks to determine the impact that the ERP graduates will have on ERP performance and outsourcing of ERP expertise.

This research conducted by the PhD candidate Mampi Lubasi, has been approved by the University of Cape Town, Commerce Faculty Ethics in Research Committee and the University of Zambia Directorate of Research and Graduate Studies ethical research committee (See Attached Letters of Approval). All information will be treated in a confidential manner and used exclusively for the purpose of this study

Your positive response will be highly appreciated.



Signed by candidate

Monica M. K. Kabemba (Mrs)
Head of Department
University of Zambia

Assoc. Prof Lisa Seymour
Research Supervisor
Department of Information Systems

Jackson Phiri (PhD)
Research Co-Supervisor
University of Zambia

11.11 Appendix 11: Questionnaire Questions

IMPACT OF ENTERPRISE RESOURCE PLANNING (ERP) EDUCATION IN ZAMBIA

Semi-structured Interview Protocol/Questionnaire

The following are initial guideline questions. As the interviews and the study proceeds the questions will be adapted based on previous interview findings.

| | | | | |
|---|----------------|-------------------------------|---------------------------|-------------|
| Firm Size (Number of Employees) | Less than 1000 | 1000-5000 | 5000-10000 | Over 10,000 |
| Industry Type | Manufacturing | Financial Services | Engineering | ICT |
| | Mining | Government Ministry/Agency | Other (Please specify) | |
| Position in organisation (Job Title) | | | | |
| Department | | | | |

- What ERP system have you implemented in your organisation?
- What business processes are accomplished with this ERP?
- Do you have in-house ERP skills/expertise within the organisation?
- Has any training been provided to the local staff? Was this once off-training or is its ongoing training?
- Have you outsourced any ERP expertise or skills or consultants from outside the country? If yes, why did you outsource and what is the role of these foreign experts/consultants?
- What challenges have you encountered in the implementation and support of this ERP system implemented in your organisation?

- Are you aware about UNZA graduates that have gone through ERP education through a course facilitated by the Enterprise Systems Education for Africa Programme (ESEFA) and SAP University Alliances? The course was run by the Computer Science department from 2014 and is on Enterprise Systems Fundamentals with SAP that covered the following topics:
 - Business Processes
 - Enterprise Systems Knowledge
 - SAP ERP Navigation and Reporting
 - Procure to Pay
 - Sales to Cash
 - Inventory Management

- The UNZA graduates that wrote and passed the exam received a Certificate of Proficiency from SAP University Alliances and Enterprise systems Education for Africa (ESEFA). Would this certificate be recognised and be of value to your organisation?

- How would these graduates impact ERP systems and outsourcing of ERP expertise/consultants from outside Zambia in your organisation?

- Do you think less time and resources would be spent on training employees with ERP education like those that have gone through ERP education at UNZA compared to those without ERP education?

- Do you think the time for results of ERP performance improvements can be shortened by having employees with ERP education?

- Students that went through the course reported that the following capabilities were strengthened, how would these capabilities align with your ERP requirements?
 - Increased self-confidence due to hands on experience with SAP ERP
 - Increased ERP and business process knowledge
 - Increased problem-solving skills
 - Ability to make ERP related decisions/Increased decision-making skills

- Increased entrepreneurial skills/Understanding of how a business is run
- Increased marketability
- Increased likelihood of getting a higher salary
 - Would an UNZA graduate with this ERP knowledge and experience be marketable to your organisation and would they have a chance of being employed in your organisation?
 - Would an UNZA graduate with ERP skills be offered a higher salary in your organisation because of these ERP skills?
 - What would be the economic value of these UNZA graduates with ERP education and how do you think they would impact ERP performance in your organisation?
 - Which ERP skills are the most important for ERP graduates to have for them to contribute effectively to ERP implementation and support in your organisation?
 - Which ERP modules would you require ERP graduates to know for them to contribute effectively to ERP performance in your organisation?
 - Have you advertised any jobs requiring ERP skills?
 - What incentives would you implement to retain graduates with ERP skills and how best would you effectively make use of their expertise?
 - Are there any other comments you would like to make about the impact of ERP education in Zambia?