

**A MULTIPLE-CASE STUDY OF HIGH SCHOOL STUDENTS' BIOLOGY TEST-  
PREPARATION: AN EXPLORATION OF WHAT STUDENTS DO AND WHY THEY  
DO IT**

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## **Abbreviations used in this study**

AGT: Achievement Goal Theory

APS: Admission Points Score

CAPS: Curriculum and Assessment Policy Statement

CAQDAS: Computer-assisted qualitative data analysis software

CBLE: Computer-based learning environment

FET: Further Education and Training

GET: General Education and Training

IEB: Independent Examinations Board

LO: Life Orientation

OCAC: Out-of-class academic collaboration

OECD: Organisation for Economic Cooperation and Development

NBT: National Benchmarking Test

NSC: National Senior Certificate

SCT: Social Cognitive Theory

SDT: Self-Determination Theory

SHSA: Study habits, skills and attitudes

SRL: Self-regulated learning

## Abstract

The South African schooling system is criticised for having low pass rates and marks inflated by low standards, and is seen as partially accountable for the high drop-out rates among the ‘academically successful’ students who make it to university. Remediation attempts have been made through curriculum changes but achievement in the schooling system continues to rely heavily on marks in tests and examinations, yet test-preparation in South Africa is poorly researched. This study regarded test-preparation as an overlooked area of possible remediation and aimed to explore test-preparation practices by asking what students do as they prepare for tests, what the thinking is behind their actions, and what leads them to prepare as they do. Self-regulated learning (SRL)(Zimmerman, 1989) was selected as the appropriate conceptual lens, which saw this research guided by the field’s principal dimensions, namely, behaviour, metacognition, and motivation. The research methodology was influenced by calls from the SRL field for naturalistic research of test-preparation that takes students views into account; hence an exploratory, multiple-case study approach was adopted.

Cases comprised six male and five female, Grade 11 students from four private and state schools writing the state examination in the Western Cape of South Africa, a top-performing province in national educational rankings. Schools placing strong emphasis on providing access to university were chosen as a ‘best-case’ scenario of test-preparation. Students’ ‘typical’ test-preparation for Biology was explored in light of a standardised target test. Diaries, supported by study artefacts, were used to collect data about students’ preparation over the seven days before the test. This was supplemented by semi-structured, post-test interviews conducted with individual students, and their teachers and parents.

Besides each source offering a unique perspective on test-preparation, accounts from the various sources demonstrated high internal agreement and contributed to the data’s overall trustworthiness. Verbatim transcriptions of the data were divided into segments of coherent meaning. Segments were labelled with codes derived from theory (e.g., Hadwin, Winne, Stockley, Nesbit, & Woszczyna, 2001), theoretical models (e.g., Broekkamp & Hout-Wolters, 2007), empirical studies, and the data themselves. The code set was modified during analysis to minimise overlap and redundancy. Codes were finally subjected to cross-case analysis and reported on as themes. Students sought privacy, and freedom from distraction, and mostly prepared in a surface manner (i.e., sticking to prescribed texts; using rote learning, routine summarising, and repetition; and not reviewing past tests). Colour (including highlighting) had mnemonic benefits. Explicit teaching of study strategies was rare, was apparently demonstration-based, and undermined by teachers’

efforts at supporting students. Students' test-preparation was not found to benefit from study skills input in Life Orientation, the official 'home' of test-preparation guidance in the curriculum.

Students generally exhibited low metacognition. Metacognitive strategising in the form of planning was undermined by uncertainty in daily student life, leading students to prepare in a distributed manner without cramming. Occasional tendencies for deeper processing (e.g., use of acronyms and mnemonic devices) were found. Overall, students were seen as having limited strategies rather than practicing the strategy selection indicative of well-developed SRL, but this was clouded by predictable test demands. The testing system appeared to reward students' surface approach, despite criteria specifying a spread of cognitive demands and skill abilities.

Students were regarded as holding performance-approach goals, though pleasing parents was sometimes a factor. Students' marks aspirations did not exceed the 80% benchmark for an 'A' symbol, despite universities basing entrance criteria on actual marks. Mothers played the clearest role in early test-preparation strategy formulation; later adjustments to strategy were mostly once-off and influenced by peers, work pressures, and incidental remarks at high school. Students' mostly discounted whatever study skills input they had been exposed to, and ultimately studied by intuition.

This study afforded a rare insight into students' test-preparation, suggesting that students are exhibiting low SRL and are preparing for tests in high school using intuition. The immediate implication is that students could benefit from exposure to meaningful test-preparation guidance and SRL input. Emergent opportunities for further research are discussed.

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## Chapter 1: Introduction

This thesis explores test-preparation in university-focussed, high school students from the perspective of self-regulated learning (SRL) using a multiple-case study approach. Data from student self-report diaries, study artefacts, and one-on-one interviews with students, teachers and parents is used to understand the behavioural, metacognitive, and motivational processes involved in students' test-preparation, and the influences behind students' formulation of their test-preparation. This research considers test-preparation to be an overlooked factor in the effort to improve academic achievement in the South African schooling system.

### Background and Rationale

The transition to a post-Apartheid South Africa and its attempts to redress past inequalities brought extensive changes to the South African Basic Education<sup>1</sup> system, one being the introduction of an outcomes-based education (OBE) curriculum. This curriculum, in its various incarnations, including the latest *Curriculum and Assessment Policy Statement* (CAPS) version, has been subject to wide and ongoing criticism over the twenty-or-so years since its inception for, amongst other things, its failure to address poor pass rates and low educational standards (Burger, 2011; HSRC, 2011; Jansen & Taylor, 2003; Motshekga, 2012; Strydom, Kuh, & Mentz, 2010). As an indication, a 2010 *Newsweek* article pegged South African education 97<sup>th</sup> on a global Top-100 list (Feroohar, 2010). The shortcomings not only impact schools but also manifest in the apparently 'academically successful' students<sup>2</sup> who attain Bachelor passes<sup>3</sup> and enter university, only to find themselves ill-prepared to cope with the new demands, leading to high university drop-out<sup>4</sup> rates (John, 2013, 17 May). According to some figures, South African universities have one of the lowest global graduation rates (15%), including a 35% reported drop-out rate among first-year students (Letseka & Maile, 2008).

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<sup>1</sup> Basic Education refers to the first ten years of compulsory schooling (Parliament of the Republic of South Africa, March, 1995) to Grade 9, and the three years of voluntary schooling up to Grade 12. Basic education is the domain of 'schools', of which 'high schools' usually cater for Grades 8 to 12. School-leavers completing Grade 12 in the expected time period are typically between 17 and 18 years of age.

<sup>2</sup> Currently, school-goers are officially known as 'pupils'. 'Student' is preferred in this research as the term commonly used in the literature for any individual involved learning, irrespective of institution.

<sup>3</sup> Pass level in the National Senior Certificate examination that affords provisional entrance into any University or degree course in South Africa.

<sup>4</sup> Students do not only drop-out for academic reasons; inadequate assistance, family -pressure, and finances also play a large role (John, 2013, 17 May; Pocock, 2012).

Academic standards and pass rates are largely determined in South African high schools by tests and examinations<sup>5</sup> (Department of Basic Education, 2011a), here: 'testing'.

To give some indication of the prominence of testing, students under CAPS face tests throughout the academic year, all of which contribute to year marks. An end-of-year examination counts 60% towards a student's final assessment in Grades 7 – 9, and 75% in the FET phase (Further Education and Training; Grades 10 – 12). The National Senior Certificate (NSC) examinations at the end of Grade 12 are set and assessed externally (Department of Basic Education, 2011a) and largely determine access to further education. In that sense these are 'high-stakes' assessments (Doe & Fox, 2011; Rowland, 2011) and significant effort goes into their preparation. As long as tests and examinations remain prominent in the curriculum it seems reasonable that addressing poor pass rates and standards must place an emphasis on improving test and examination results. Educational policy to date has sought various ways to effect such improvements, especially through improved training, capacity, motivation, resourcing, and working conditions of the teaching force; but also through access to learning resources, improved pupil-teacher ratios, and the control of notional teaching time (Organisation for Economic Co-operation and Development, 2008).

Concerns over poor achievement rates are not unique to South Africa. Elsewhere in the world concerns have been met with policy reforms, such as the adoption of the *No Child Left Behind* in the United States (Duckworth, Quinn, & Samantha, 2010; Hoffman & Nottis, 2008). These reforms, however, embraced self-regulated learning (SRL) in which students take greater ownership of their own learning and achievement (Boekaerts, 1999; Duckworth, Akerman, MacGregor, Salter, & Vorhaus, 2009) and skills (Ning & Downing, 2011) as the way forward. Many aspects of SRL are regarded as highly desirable precursors for life-long learning (Boekaerts, 1999) and SRL is now a global field of education research with a large body of research spanning more than thirty years. In South African policy and practice, where issues are complicated by concerns of social redress (Parliament of the Republic of South Africa, 1996), regard for SRL is essentially absent beyond glimpses thereof in the form of 'learning-to-learn' programs (e.g., Moonsamy, 2011; Thinking Schools International, 2012). SRL is also poorly represented in South African research: A search in the ERIC and PsycINFO databases using the search terms 'South Africa' and 'self-regulated learning' produced only five articles relating to both terms, none of which dealt with high school students. Together, these international and local observations, suggest SRL as an overlooked approach to addressing standards in South Africa.

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<sup>5</sup> Examinations are considered as a form of testing, but in the current context are considered as distinct from tests. Tests mirror the more high-stakes final exams at the middle and end of the year (Department of Basic Education, 2011c), but on a smaller scale, and can therefore be considered as important preparatory activities for examinations

Self-regulated learning has much to say about ‘studying’, of which test-preparation<sup>6</sup> represents a particular context. Under SRL, study habit, skill and attitude (SHSAs) are all reported as positive predictors of achievement (Elliot, McGregor, & Gable, 1999), and in some cases, SHSAs have been found to outweigh all other predictors of non-cognitive differences in achievement (Credé & Kuncel, 2008; Diseth & Martinsen, 2003). The regard for studying in SRL, the emphasis on testing in South Africa, and the ongoing struggle to address standards, suggest test-preparation as an important means of improving academic standards.

The importance of test-preparation (colloquially: studying) as a skill could be seen as officially acknowledged by the curriculum which aims to “develop the full potential of all learners ... of ... South Africa. It seeks to create a lifelong learner who is confident and independent, literate, numerate and multi-skilled” (OECD, 2008, p. 41). Further, ‘study skills’ form part of the specified content for Life Orientation (LO), a compulsory subject<sup>7</sup> for Grades 8 to 12 students (Department of Basic Education, 2011b), thus study skills should reach all students. In reality, however, the curriculum stipulations for LO translate to approximately two hours of study skills teaching in the Grade 7 year, increasing to four hours in Grade 12 (Department of Basic Education, 2011b). Life Orientation is also the only subject which does not have an externally set Grade 12 exam, raising questions of how seriously students regard LO and its content. One study (Jacobs, 2011) found this to be very little, the authors concluding that LO did not accomplish its aims. Under these circumstances, is test-preparation being adequately addressed?

A number of factors are known to impact the success of study skills input from an SRL perspective. For example, researchers warn that SRL is not something that is developed by simply giving learners a list of steps to follow (Lubbe, Monteit, & Mentz, 2006). Studies have also revealed that teachers prefer teaching study skills where and when they are most relevant, as opposed to in pre-determined slots (Postholm, 2011). The teaching of study skills in the current LO model could be criticised on both these points, but the pressurised South African syllabus leaves little time in other classes for anything besides core content and in this sense a preferred time may never present. To complicate matters further, getting this right (i.e., the ability to successfully assimilate study skills into everyday lessons) depends on the teacher’s own proficiency at study skills (Miyasaka, 2000). Practitioner expertise likewise impacts the success of SRL interventions (Dignath & Büttner, 2008).

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<sup>6</sup> For the purposes of this research, ‘test-preparation’ denotes the activity in which a student independently and voluntarily prepares content which they have previously been taught, for a standardized test.

<sup>7</sup> Students in the Basic Education FET phase must take a minimum of six subjects in each year. Four of these subjects are compulsory: Two languages, Mathematics or Mathematical Literacy, and Life Orientation (Department of Basic Education, 2011b)

How well-versed teachers are in SRL and study skills is open to debate. In 2008 most practicing teachers in South Africa were still products of the apartheid-era, Christian Nationalist Education (CNE) curriculum, which had emphasised rote learning, authoritarian teaching practices, and behaviourist pedagogy, leaving many teachers unprepared for the new approaches of the OBE curriculum (OECD, 2008). Ultimately, disregarding LO, students' study skills input might amount to little more than empty encouragements, such as, the currently fashionable, 'Work smarter, not harder'. But while there is no doubt truth to this statement, it is of little practical use to students unless teachers can, and do, successfully convey to students what 'smart' entails, explicitly or implicitly.

Understanding what smart means can be seen as an skill, but research shows that the explicit teaching of SRL skills, perhaps for reasons just outlined, is often rare (Hamman, Berthelot, Saia, & Crowley, 2000; Kistner et al., 2010). This rarity is in spite of research suggesting that the explicit teaching of SRL strategies to students is important (Kistner et al., 2010), especially to those who are struggling (McMillan, 2010), and it is therefore not surprising to find some researchers rallying behind calls for (more) explicit practice (McMillan, 2010; Perlman, 2004). According to Karpicke, Butler, and Roediger III (2009), the basic challenge for educational practitioners is getting students to base their study strategies on theories that include *why* a particular strategy is effective, rather than guesswork.

With an SRL approach essentially absent in the South African context, and limited exposure to meaningful study skills input likely, it seems plausible that students devise their own test-preparation strategies using guesswork as their innate source of guidance. This is a concern because test-preparation is known to be important for achievement (Entwistle & McCune, 2004), yet demanding for students (Pressley, Yokoi, Meter, Van Etten, & Freebern, 1997). Students' self-appraisal of test-preparation competence may leave them little more equipped than having illusions of competence when it comes to studying (Karpicke et al., 2009). Left to their own devices, it is conceivable that students – even those with their sights on university – may well be preparing for tests in ways that are noble attempts but are, however, sub-optimal. Inadequate test-preparation may represent the Achilles heel of students' efforts for academic achievement and a reason behind the reported school and university drop-out rates.

### **Problem Statement**

The paucity of data regarding test-preparation practice, for example, what students do when they study, why they do it and how it has come about, clouds the extent to which test-preparation is

under-rated as a factor of achievement and hampers the development of evidence-based, study-related interventions aimed at improving academic achievement.

### **Aims and Objectives**

The aim of this research is to gain insight into the nature and quality of test-preparation practices of 'typical' students at university-focussed South African high schools, in order to draw attention to test-preparation and promote discussion about test-preparation intervention in policy and practice.

This broad aim is composed of the following objectives:

- a) To gain rich insight into the habitual behaviour of 'typical' high school students preparing for a standardised, Biology test, that is, into what students typically do.
- b) To gain rich insight into high school students' metacognition of their test-preparation strategy implementation, revealing why students study as they do.
- c) To gain rich insight into the primary influences and motivations behind students' current test-preparation strategies.

### **Research Questions**

The problem statement gives rise to the following research questions:

- a) What strategies do 'typical' students habitually implement as part of their Biology test-preparation? (Objective a).
- b) What does student thinking reveal about why 'typical' students prepare as they do? (Objective b).
- c) What has influenced, and does influence, students to prepare for Biology tests as they typically do? (Objective c).

### **General Research Approach**

The lack of test-preparation and SRL research in South Africa suggests it is appropriate for this study to adopt an exploratory aim and approach. Despite the activity in the SRL research domain, some areas are nevertheless regarded as under-researched. For example, research that: examines what students actually do when preparing for a test (Tomes, Wasylkiw, & Mockler, 2011); examines the nature of SRL in informal (Boekaerts & Minnaert, 1999) and naturalistic (Thomas, 1988) settings; takes student views into account (Postholm, 2011); and uses more real-time data capture techniques (Boekaerts & Corno, 2005). Given the SRL lens, it seems fitting that this study attempts to address such gaps. Thus, in exploring the best-case examples of students' private test-preparation, a qualitative, multiple-case study approach is adopted in as close to real-time as possible.

On the basis of the argument presented, this study attempts to gain insight into students' typical test-preparation from the perspective of SRL. Where one should look in order to begin building such insight is moot, which led to a decision in favour of the optimistic. Thus, this research looks to 'best-case' examples of test-preparation, that is, test-preparation among students attending schools with a strong university focus. For now, these are regarded as schools with among the highest academic standards and holding high tertiary aspirations for their students. More detail for this and other decisions below follow in Chapter 4. Doing the research was seen to require a typical test-preparation episode, which implied a particular content domain. A Biology<sup>8</sup> test was chosen for the study because of the subject's high significance: Biology had the highest national enrolment figures in the lead-up to this research, after the compulsory subjects; it tests understanding, skill and content; and as a science subject it receives high national interest. In particular, the research looked at a *standardised* test, which all candidates write under controlled conditions.

A multiple-case study approach was adopted for this research. This involved students from four closely grouped schools in the Southern suburbs of Cape Town, Cape Town being the largest city in the Western Cape and academically one of South Africa's top performing provinces (Organisation for Economic Co-operation and Development, 2008). In these institutions, the student majority is assumed to possess a generally positive valence towards academic endeavour, irrespective of individual students' marks, and this research henceforth refers to these students as 'typical' students. Of these students, it is the seniors who have had the most opportunity to develop their test-preparation strategies and who are closest to the high stakes examination in which test-preparation matters most. It is among these seniors that we investigate test-preparation at its best.

### **Significance of the Research**

This research is significant for a number of reasons. Studying for tests is expected of all high school students and it is envisaged as propaedeutic to academic achievement in tests. The state of Basic Education as a provider of academic education is of national concern, and research with the potential to address struggling pass rates is worthwhile. This study's focus on test-preparation places it in a position to add to limited theoretical notions and empirical evidence associated with the phenomenon. Using the conceptual lens of SRL positions the study in a respected and popular field of international research (Boekaerts, 1999) and draws attention to SRL as a worthwhile direction of future research in the South African context. And lastly, this research conforms to the type of research that is seen to be lacking in the field of SRL.

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<sup>8</sup> Under CAPS, *Biology* is referred to as *Life Science*. Biology is used in this research as the more accessible and widespread term in the literature.

### **Delimitation of the research**

The study involves cases from four schools in close geographical proximity, in the Southern suburbs region of Cape Town, Western Cape, South Africa. The schools are academically focussed to the extent that they hope for a 100% pass rate, if not a 100% Bachelor's pass rate. They represent a mix of single-sex and co-educational models from the state and private sectors, all charge tuition fees, and all write the State Grade 12 NSC examinations<sup>9</sup>. The schools can be considered to come from what Fleisch (2008) conceives of as the minority, privileged system in South Africa that more closely mirrors a developed world education system.

### **Thesis Layout**

This chapter introduced the research. Chapter 2 covers the phenomena making up conceptual framework used as a lens for test-preparation, starting from Social Cognitive Theory (which gave rise to SRL), followed by SRL itself, and finally studying and test-preparation, as particular phenomena in SRL and the focus of this research. Chapter 3 uses an understanding of the concepts to review empirical and meta-analytic studies focussed on test-preparation or having elements relevant to test-preparation. Chapter 4 presents the methodology, Chapter 5 the findings, and Chapter 6 the discussion of the findings, and concluding remarks.

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<sup>9</sup> As opposed to the examinations set by the Independent Education Board (IEB), written mostly by private schools.

## Chapter 2: Conceptual Framework

### Introduction

Conceptual frameworks traditionally deliver a detailed rendition of “what is going on” – “the system of concepts, assumptions, expectations, beliefs and theories that supports and informs” one’s research (Maxwell, 2008, p.222).

This study is exploratory. Conceptually, this requires a framework that covers a broad range of phenomena rather than offering in-depth focus on a particular few. Test-preparation research is too limited to act as a standalone candidate for such a framework. However, test-preparation can be regarded as a particular instance of ‘studying’ – learning through private reading (Masitsa, 2006) and studying is represented by a large body of research, frequently considered from the perspective of self-regulated learning. Self-regulated learning is a broad framework (Dinsmore, Alexander, & Loughlin, 2008) dedicated to understanding the role of the individual in their own learning within the field of education, thus it is ideally suited to the explorative nature of my study into test-preparation at high school.

Self-regulated learning is historically and conceptually rooted in the works of Albert Bandura (1977; 1986) and Social Cognitive Theory (SCT), thus this chapter begins by considering concepts from SCT. After a review of SCT, and SRL, the framework hones in on two studies explicative of test-preparation itself. The first draws test-preparation concepts into a single framework of study habits, skills and attitudes as predictors of achievement (Credé & Kuncel, 2008) while the second is a theoretical model of test-preparation strategy adaptation by Broekkamp and Hout-Wolters (2007).

### Bandura’s Unifying Theory of Behaviour Change

While the *term* Social Cognitive Theory was novel in its day, the theory itself was mostly a formalising of ideas that Bandura had presented earlier in *Self-Efficacy: Toward a Unifying Theory of Behavioural Change* (Bandura, 1977). In this (1977) article, Bandura already asserted the dominant role of cognition in the acquisition and retention of new behaviours, and of cognitive events in turn shaped by performance. Bandura saw the mechanism whereby this is achieved as, on the one hand, relying on the retention of *experiences* in symbolic form – a major aspect of learning – especially experiences modelled by others. On the other hand, Bandura saw learning also as a result of the cognitive processing of response *consequences*. He saw such consequences as emanating from the actions of others, but also from one’s own actions. Relating these perspectives to everyday teaching practice raises two lines of thought. In my experience, teachers seldom, if ever, modelled test-preparation behaviour. Whatever the truth or reason for this, when it comes to learning skills,

Bandura (1986) believes that observational learning is greatly facilitated by models verbalising their thoughts as they engage in problem-solving activities. In this way, the thoughts guiding the model's decisions and actions are made apparent and accessible for the observer to adopt.

Questioning the existence of modelling is not to say that students receive no test-preparation input; one-on-one advice is usually open to students who seek it, and 'study skills' are part of the Life Orientation (LO) curriculum (Department of Basic Education, 2011b), but neither of these represents modelling as forwarded by Bandura. In the absence of modelling, the question arises concerning the symbolic construction students have of test-preparation behaviour, and what the influences behind test-preparation then are. There is also a question of whether the increasing access to online information has any impact. Bandura (2001) proposes that a vast amount of information about styles of thinking and behaviour patterning is gained from extensive modelling in the mass media. In this paradigm, the exposure to potential models transcends the bounds of the individual's immediate environment and enters a virtually limitless arena.

The second line of thought concerns the extent to which test-preparation consequences are informative of *how* to change future outcomes. Test-preparation is complex and subject to a high degree of situational influence (Van Etten, Freebern, & Pressley, 1997). It is conceivable that a disappointing mark will likely inform a student *that* there is an issue, but *how* is seen as a potential enigma to students. If learning relies on knowing how to make changes then it is relevant to inquire whether students do know how to respond: can they even identify the salient issues to address? Bandura asserts that "some complex skills can be mastered *only* [my emphasis] through the aid of modelling" and also that, through modelling, an "acquisition process can be considerably shortened" (Bandura, 1986, p. 20). Pajares (2002) comments that a mark itself offers no inherent causal properties. Thus, if test-preparation represents a complex skill, then one is inclined to interpret from the situation that students are left hamstrung.

Just as cognition has a role in the acquisition and retention of behaviour change, Bandura asserts that motivation, which is concerned with the initiation and persistence of behaviour, plays a role as a cognitive derivative (Bandura, 1977). He frames reinforcement as a powerful supporting factor of motivation which acts by increasing the expectancy that a particular behaviour will be rewarded; thus it affects beliefs. Similarly, personal goals enhance motivation by offering self-reward conditional on certain personal standards being met.

Bandura ultimately integrates the concepts of behaviour change – covered thus far under the unifying theme of self-efficacy – "the conviction that one can successfully execute the behaviour required to produce the [ones' desired] outcomes" (Bandura, 1977, p. 193). Self-efficacy is far-

reaching: It touches the choices people make, their effort, persistence and resilience in the face of challenge, thought patterns, and affect (Pajares, 2002). Sensitivity to sources of self-efficacy draws attention to the role of the teacher, parent, and perhaps peers.

According to Bandura (1977) self-efficacy has four major sources: Performance accomplishments, vicarious experience, verbal persuasion, and physiological states. Performance accomplishments (enactive sources) are seen as especially influential because they are based on personal experiences of mastery, as in attempts to master a situation. Successes raise mastery expectations while failures, especially early ones, reduce them, though, confidence or self-appreciation cannot produce success when the necessary skills or knowledge are absent (Pajares, 2002). According to (Bandura, 1977), strong efficacy is not easily assailed by occasional disappointments, and indeed the overcoming of disappointments can work to build efficacy. Vicarious experiences boost self-efficacy by increasing the expectation that if others can perform an activity successfully using mastery, the observer can too. Vicarious experience thus relies heavily on models. However, lessons from such experiences are usually weaker than those from personal experience (Bandura, 1986). Certain results referred to by Bandura suggest that seeing difficulty overcome (by experts) using effort is better than seeing it overcome effortlessly. Likewise an experience is stronger when the outcome is clear, and if diverse models are seen to prevail. Verbal persuasion (exhortation) is easy to implement, is readily available, and leads others to believe that they are capable of coping. But input from this source is fragile because, as with vicarious learning, it lacks an authentic experiential base. According to Bandura, the effect of exhortation is greatest when input accompanies the provision of mastery skills. This raises a question over the wisdom of praise on the part teachers and parents for student accomplishments, however well-intentioned, in the absence of confirmation that the vehicle of accomplishment was process improvement as opposed to serendipity, in other words, of empty praise. Emotional arousal is the fourth source of self-efficacy and helps to inform competence expectations. Feeling stressed is common in the lead-up to a test and an awareness of such a high state of arousal is usually taken to belie low competence (Bandura, 1977). Put another way, perceived self-competence can affect susceptibility to arousal, and fears and deficits often accompany one another. Approximately a decade later, Bandura was forwarding his ideas under the formalised title of Social Cognitive Theory.

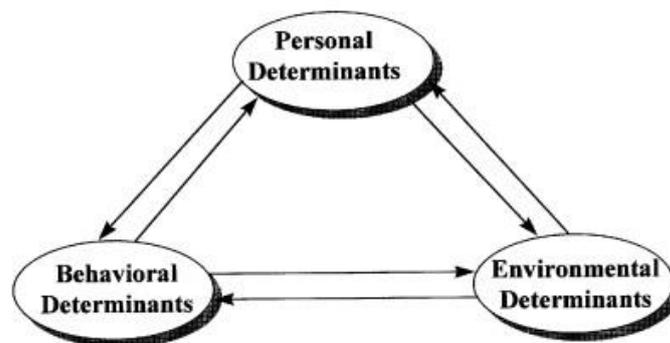
### **Social Cognitive Theory**

With *Social Foundations of Thought and Action: A Social Cognitive Theory*, psychologist Albert Bandura (1986) forwarded a theory of human functioning that presented an explanation of behaviour change that was novel and cohesive compared to the disparate array of theories prevailing at the time. In his theory, behaviour, environmental events, and personal factors all

operate as interacting determinants of each other, and a central role is afforded to cognitive, vicarious, self-regulatory, and self-reflective processes as fundamental human characteristics.

Bandura's ideas came at a time when the prevailing Social Learning Theory of his day consisted of a loose aggregate of ideas that largely ignored the psychosocial perspective; approached learning as a conditioned response model; and saw human action as a matter of needs fulfilment based on drives, expectancy, and conditioning (Bandura, 1986). To distinguish his ideas from these contemporary connotations and to stress the internal coherence between his theory's component parts, Bandura released his work under the banner of 'social cognitive theory' (SCT), in which 'social' ascribed importance to the social, or environmental, origins of thought and action, and 'cognitive' gave tribute to the central role of thought in motivation, affect, and action. As such, Bandura's theory provides a sound foundation on which to base an explorative understanding of test-preparation.

According to Pajares (2002, p. 3), SCT has had a "profound influence on psychological thinking and theorising" since soon after its inception in the mid-1980s. Bandura had previously drawn attention to the important roles of both cognition and the environment in behaviour modification but, in formalising his theory, he emphasised the idea that human functioning was a product of a mutual dynamic interplay of environmental, behavioural, and personal and cognitive influences as interacting components, each affecting, and affected by, the others. He referred to this as his triadic model of 'reciprocal determinism' (Figure 1).



*Figure 1: The causal pathways of triadic reciprocity (Bandura, 2001)*

That environmental and social factors are seen to exert an influence on behaviour through psychosocial processes, rather than having their own direct effect, helps form decisions in the current study regarding factors such as parental education, economic conditions, family dynamics, and the classroom environment. By operating indirectly through personal factors such as, aspirations, goals, emotional states, and self-efficacy indicators (Bandura, 1977), it is possible to accommodate sensitivity to their influence without them being a focus.

In the introduction to his book, Bandura expresses a view of humans as possessing fundamental capabilities that enable the cognitive means of self-determination. These capabilities are: symbolic thought, planning, vicarious learning, self-regulation, and self-reflection. Self-regulation is regarded by the current study as particularly relevant, given the essentially private nature of test-preparation. Indeed, it is only in circumstances where students are free to self-regulate that observations of what they do is an observation of *their* choices. Most behaviour is the product of multiple determinants operating in concert (Bandura, 2001), thus to understand test-preparation, it is time to turn to a theoretical framework addressing these determinants in the educational learning context. That framework is self-regulated learning theory.

### **Self-regulated Learning**

Self-regulated learning emerged in the mid-1980s, strongly influenced by the ideas of Bandura (1977; 1986) covered earlier, particularly the person-environment-action dynamic of SCT. It started out pertaining almost singularly to the educational academic learning context and remains so today (Dinsmore et al., 2008), thus it is ideally located to offer a perspective on test-preparation. An emerging new direction under SRL – co-regulation (Boekaerts & Corno, 2005; Hadwin & Oshige, 2011) – takes greater notice of the social context of learning but is not formally used in this study given that test-preparation is essentially private.

Self-regulated learning addresses the question of how students become masters of their own learning processes (Zimmerman, 1989; Zimmerman, 2008), which is increasingly regarded as vital for success in lifelong learning (Kistner et al., 2010) and for student progress through grades at school (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013). Such views have resulted in vibrant activity in the SRL field. SRL is important because without external guidance about learning, an individual is left with no choice but to regulate their own learning (Kistner et al., 2010) which in turn means they must decide on appropriate goals, plan the mechanism for achieving these goals, select strategies, enact these strategies, monitor their progress, weigh outcomes, evaluate the strategy, and make adjustments. From the outset this rather onerous set of tasks was understood to rely on a sensitivity to the thoughts, feelings and actions (Zimmerman & Schunk, 1989) of students in their own learning processes, and in the context of achieving their own goals.

Initial attempts to articulate the conceptual boundaries of SRL led to its being defined as the degree to which students are “metacognitively, motivationally, and behaviourally active participants in their own learning process” (Zimmerman, 1989, p. 329). In this article, which acted as bridge from SCT to SRL, Zimmerman states, with reference to the triadic reciprocity model, that to qualify as being self-regulated, learning must involve the use of strategies to achieve goals on the basis of self-

efficacy perceptions (and these in turn must be known to the researcher). This leads to the SRL interpretation of Bandura’s reciprocity model being interested in only those pathways with a causal link to the self and thus a more parsimonious view than its original counterpart (Figure 2).

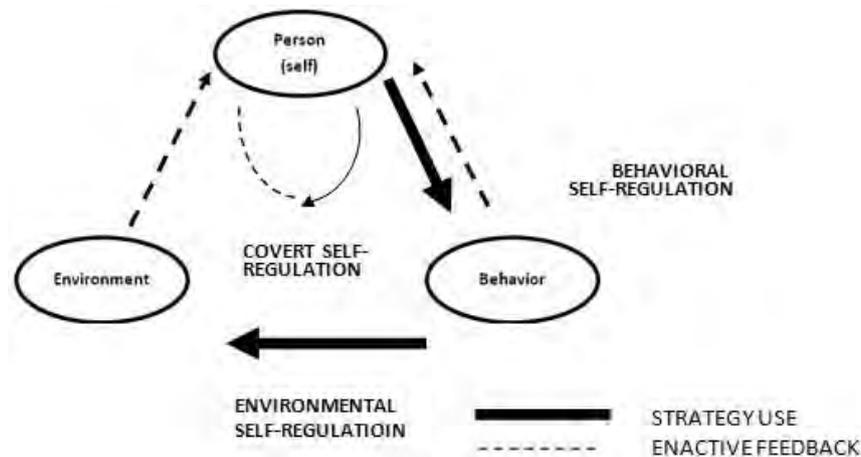


Figure 2: A triadic analysis of self-regulated learning (Zimmerman, 1989, p. 330). After: Tasnimi and Maftoon (2014)

A subsequent surge of research in SRL (Wirth & Leutner, 2008) expanded the definitions and boundaries of SRL and led to the construction of a wide variety of terminological usages and theoretical models, and necessarily, assessment methods (tools). Today SRL is perhaps better regarded as a meta-theory, yet despite its growth, motivation, metacognition and behaviour persist as key dimensions (Dinsmore et al., 2008). A strength of this all-inclusive formulation is that its adherents are required to be more committed to resolving internal conflicts in the theory (Kistner et al., 2010) than theorists in standalone camps. Positioning research of test-preparation within such a framework exposes it to a potentially broad range of constructs (Dinsmore et al., 2008) any of which may emerge as relevant in an exploratory setting such as this study is; a smaller framework that prematurely restricts research risks missing relevant phenomena.

### **Achievement Goal Theory (AGT)**

According to Ryan and Deci (2000, p. 54), to be motivated means to be “moved, energised or activated towards some end.” Motivation varies in degree (level) but also in type (orientation), and concerns the “why of actions”. Motivation is important in the current study because it is a dimension of SRL, and the reasons why students act and think as they do are part of the objectives. While no single model can fully account for the dynamics of motivation in any context (Bong, 1996),

achievement goal theory (AGT) is generally regarded as one of the most suitable for competence-based settings, such as, academics (Elliot et al., 1999).

AGT started out by considering two motivational orientations: to performance goals and to mastery goals (Ames, 1992). Goals in AGT are understood to be cognitive representations of what an individual is trying to achieve and are different from motives, which are less conscious and more affective, and typified by the likes of drives or needs (Pintrich, 2004). A particular strength of AGT is that it is considered as taking a social-cognitive approach (Bong, 1996), aligning it to the theoretical perspectives adopted thus far. Goals in AGT are further concerned with competence, either the showing of it to others (performance), that is, ego-centric, or developing it for personal edification (mastery), that is, task-centric (Hulleman, Schrage, Bodmann, & Harackiewicz, 2010). At their most basic, these forms roughly correspond to extrinsic versus intrinsic motivation respectively.

More contemporary forms of AGT (Dweck, 1986; Elliot & Church, 1997; Elliot et al., 1999) cross-associated these goals with goal directions that alternatively pursue positive outcomes (approach) or shun negative ones (avoidance). Elliot and Church (1997) regard fear of failure and the need for achievement satisfaction as the underlying motives for avoidance and approach respectively. This offers four permutations, of which three are in longstanding use (Ciani, Sheldon, Hilpert, & Easter, 2010): performance-approach, performance-avoidance, and mastery-approach goals.

Performance-approach is concerned with demonstrating competence relative to others (other-referential) or to some standard (self-referential) (Ciani et al., 2010), for example, the “desire to appear competent in the eyes of others” (Abar & Loken, 2010, p. 26). While performance approach is sometimes regarded as an impoverished motivation, it is nevertheless still powerful (Ryan & Deci, 2000), and its associations with positive and negative outcomes for learners shows it can offer adaptive benefit (Ciani et al., 2010). Performance avoidance is the desire to avoid situations where there is the possibility of failure or being cast in a poor light. Mastery approach generally predicts positive outcomes and is associated with doing one’s best, doing a task for its own sake, or attaining a personal sense of achievement independent of others (Ciani et al., 2010; Elliot et al., 1999); it is closely associated with curiosity and preference for challenge.

A recent development of AGT (Hulleman et al., 2010) argues that aiming for an outcome (such as, an A-symbol) should represent an ‘outcome’ goal distinct from performance or mastery. This is based on the belief that outcome goals are neutral in terms of defining a particular competency; the quest for an A-symbol could indicate mastery- or performance-motivation, depending on what the A-symbol means to the achiever. Clarification clearly begins with hearing the students’ perspectives. A number of researchers whose work is drawn upon in the current study (e.g., Ciani et al., 2010; Ryan

& Deci, 2000) adhere to a Self-Determination Theory (SDT) of motivation in the academic context. SDT is far less prevalent in SRL research but is regarded as relevant here due to the familiar terms it hinges on and its resonance with the everyday world of students. The theory centres on an individual's perceived locus of control, with autonomy, competence and relatedness as its key drivers (Ryan & Deci, 2000). The drivers are seen to work together to ultimately affect the extent to which an individual's motivation varies along a continuum from 'amotivated' through various levels of extrinsic motivation to fully intrinsic motivation. In this way, individuals are not either performance- or mastery-oriented, but can vary on a continuum between the two. Thus, some individuals might willingly pursue extrinsic goals, such as, 'a good mark' on the basis that it leads to university entrance, others might not want to pursue marks but nevertheless make themselves do so, while still others might be propelled to pursue marks against their will, such as, by a demanding parent (Ryan & Deci, 2000).

### **Models of self-regulated learning**

An abundance of SRL models can make the SRL field confusing to navigate. However, Wirth and Leutner (2008) see the models roughly classified into one of two types: process models and component models, each with their preferred methods of assessment.

Process models assess how learners regulate the use of their learning competencies, as opposed to establishing what competencies they possess. Process models differentiate between phases that are regarded as indicative of optimal self-regulated learning in the execution of a task. The phases, as seen by Zimmerman (1998), are forethought (before a learning event), monitoring (during an event), and self-reflection (after an event), though some researchers (e.g., Winne, 2010) include an overarching adjustment phase. Sequencing in these models is weak (that is, non-linear) and likely to be recursive (Winne, 2010). For Zimmerman (1998), forethought consists of task-centred activities, such as, goal setting and strategic planning, shaped by the self-motivation beliefs of self-efficacy, outcome expectations, intrinsic factors, and goal orientation; monitoring sees the individual enacting the task in accordance with goals and metacognitively monitoring actions through self-observation; and self-reflection leads to judgments of self, and self-reaction. According to Zimmerman and Martinez-Pons (1990), an individual would necessarily be responsible for the initiation, implementation, and monitoring of their activity; the individual would necessarily draw on motivational, cognitive, and metacognitive strategies (Wolters, 2003). The assessment of SRL in process models is based on standards that are dynamic, depending on the phase and the individual concerned, thus it is ideally conducted as close to live as possible. Online, computer-based learning environments (CBLEs) and think-aloud strategies are an increasingly popular means of assessment in

process models (Winne, 2010), but are ruled out here because they would interfere with test-preparation.

Component models assess the degree to which learners possess a set of competencies regarded as propaedeutic to SRL. The set is best understood as a pool of recurring competencies that have arisen from mostly laboratory-style research over time. Under SRL, an individual's 'set' of competencies is assumed to be relatively stable (Boekaerts & Corno, 2005)<sup>10</sup>. In these models, assessment is relatively independent of the specifics of a particular event, context, or individual, and there is no notion of phases. Self-report inventories/surveys, such as, LASSI (Weinstein, Zimmerman, & Palmer, 1988) and MSLQ (Pintrich, Smith, Garcia, & McKeachie, 1991), are popular assessment tools and vary in their depth and rigour according to their particular goals.

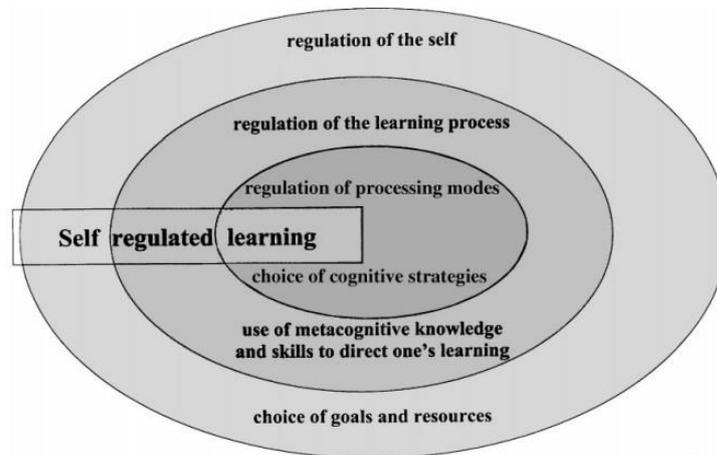
Both models have relevance to the research questions. The first question sees the research subscribing to the component-based model in its attempt to delineate the test-preparation competencies possessed by students. The research then draws on the process-based approach to explore the temporal patterning (when a competency is manifest), magnitude (the extent of a competency use), strength (how strongly a competency use persists), and origins of the competencies. But, in adhering to the type of research called for by the research field outlined earlier, the approach also breaks tradition: it relies neither on inventories nor online assessment tools, but on a qualitative framework in a naturalistic context. Overall, given the fundamental importance of establishing the student's particular competency 'set', the research can be seen as principally component-based, enriched with insight on the various competencies gleaned from the process-based perspective. A definition of SRL derived from both schools of thought (Wirth & Leutner, 2008) is thus most applicable here: "A learner's competence to autonomously plan, execute, and evaluate learning processes, which involves continuous decisions on cognitive, motivational, and behavioural aspects of the cyclic process of learning" (Wirth & Leutner, 2008, p. 103). A component-based model is thus used to further our understanding of SRL.

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<sup>10</sup> The co-regulation flavour of SRL sees SRL more as a developing and dynamic process (Hadwin & Oshige, 2011).

### ***A component model of self-regulated learning***

The importance of establishing competencies justifies the use of Boekaerts' (1999) widely accepted (Kistner et al., 2010) component model (Figure 3) as the basis for conceptualising self-regulated learning in this study.



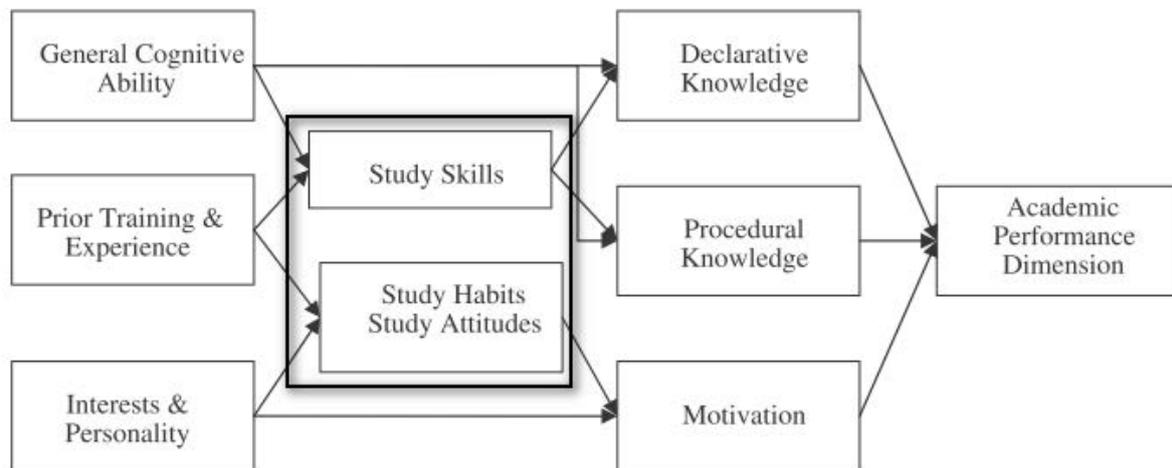
*Figure 3: Component model of self-regulated learning (Boekaerts, 1999)*

Self-regulated learning, in Boekaerts' (1999) model, comprises three concentric layers, each layer representing, respectively, the cognitive/behavioural (domain-specific), metacognitive (strategic) and motivation (goal-related) dimensions of self-regulation. The cognitive aspect relates to information processing, and lies innermost because an absence of competencies on which to operate renders metacognition and motivation of competencies meaningless, echoing the reason for using the model in the first place. The current research places heavy emphasis on establishing this core of student behaviours. Metacognition, as the "decision-making processes that regulate the selection and the use of various forms of knowledge" (Zimmerman, 1989, p. 329), relates to the process of learning as a whole and the individual's knowledge and skills to regulate it. It is often operationalised as planning and may be regarded colloquially as thinking-about-thinking. The outer shell relates to the self – goals, needs, expectancies, and beliefs – in other words, regulation of self. Researchers vary in their focus on individual dimensions or their sub-components, and the layers can encapsulate and group whichever particular learning strategies the researcher sees as relevant. Zimmerman (1989), for example, outlines fifteen strategies, across all three dimensions, commonly identified from laboratory-based studies, while Boekaerts (1999) lists ten. The exploratory nature of the current research calls for openness to the broadest possible range of strategies, thus it embraces the possibility that unforeseen strategies may surface and avoids adherence to one particular list.

Nevertheless, such lists are a useful starting point for bedding down interview protocols and deciding initial analysis categories. The strategy list of Hadwin et al. (2001), synthesised from a meta-analytic of other research, provides especially extensive detail, scope and method of categorisation (based on tactics, resources used, and goals for studying), and is presented in Appendix I (p.121).

***Study Habits, Skills and Attitudes (SHSAs)***

To repeat an earlier statement, the empirical and theoretical literature of studying and learning is large, fragmented, described by a wide variety of constructs and is operationalised in the research by an array of inventories (Credé & Kuncel, 2008). As part of a meta-analytic review aimed at uncovering predictors of academic success beyond the traditional marks-based measures, Credé and Kuncel (2008) proposed a model (Figure 4) which begins to steer attention towards the goal of test-preparation in a number of respects.



*Figure 4: Model of academic performance determinants (Credé & Kuncel, 2008)*

Firstly, the model speaks of study skills, a term commonly used in everyday references to studying but rather rare in the recent literature, perhaps because more recent research is conducted at a higher level of granularity (Richardson, Robnolt, & Rhodes, 2010). Secondly, it speaks of study habits – another term which gets less mention in the literature but which is implied in the research questions’ asking after ‘typical’ phenomena. Thirdly, it shows how personal factors (which can be seen as incorporating gender, socio-economics, home life, personality, etc.) are impactful on test-preparation, though of distal significance (Bandura, 1986). And finally it combines study habits, skills, and attitudes (SHSAs) into a single model that draws attention to their role as academic determinants. While the effect of test-preparation on test outcomes, and the mechanism of such an effect, is not part of this investigation, the state of academics in South Africa and the possible role of

test-preparation are central to the rationale for the research. The model shows general cognitive ability, experience, and the issues of self, referred to earlier, affecting SHSAs (shown in the shadow box), and SHSAs in turn affecting academic performance through the mediators of declarative knowledge (knowledge 'about' facts and procedures), procedural knowledge (skills know-how), and motivation.

Credé and Kuncel (2008) devised their model based on what they identified as the most frequently researched study constructs in the literature up until 2005, namely, study skills, study habits, study attitudes; study motivation, metacognitive skills, study anxiety, and depth of processing. The relatively rare usage of some of these warrants their clarification. According to Credé and Kuncel (2008) study skills refer to a student's knowledge of appropriate study strategies and methods, and their ability to manage resources to meet task demands. Study habits centre on the regularity of appropriate study and its context. Study attitude refers to a student's general valence towards studying in particular and academics overall. Metacognition, or self-regulative ability, they see as the ability to adapt behaviour to task demands. Metacognitive approaches assume that increasing cognitive ability offers more, but less predictable, paths of adaptation available to learners. Depth (level) of processing is an indication of an individual's level of cognitive processing applied to a learning task and the degree to which they cognitively integrate new material into existing symbolic structures. This concept features prominently in SRL and is seen as having large implications for test-preparation, where students process work on their own.

Certain researches, such as, Biggs (1987), conceive of two levels of processing – surface and deep – while others, for example, Credé and Kuncel (2008) speak of three – surface, deep and performance. The tri-level formulation is used here. Surface processing is identified by a reproductive, mnemonic (rote memorisation) approach; and deep processing, by a greater<sup>11</sup> degree of processing, synthesis and mental transformation (Boekaerts, 1999; Broekkamp & Hout-Wolters, 2007; Mårton & Saljo, 1976). Processing for performance involves the use of whichever method an individual regards as most effective in pursuing a performance result. This implies selection and thus it is mostly seen to apply to deep processors who are sensitive to cognitive demand and invoke surface processing where they consider it appropriate. Level of processing is thus closely linked to an individual's academic goals (Cano-Garcia & Justicia-Justicia, 1994). Generally, surface processing is regarded to have limited long-term retention benefits (McCormick, 2011), and is *inclined* to be progressively replaced by deep processing with age, subject to the degree to which independent study is

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<sup>11</sup> Level of processing is not an absolute; individuals display characteristics on a continuum which, according to their prevalence and strength, can be used to classify individuals as being more on one level than another.

promoted (Gow & Kember, 1990). Results of empirical research involving level of processing are covered in the Chapter 3.

### Test Preparation

This chapter began by introducing test-preparation as an instance of academic studying, thus it began with a review of concepts drawn from SRL, the framework dedicated to studying and learning. It is now necessary to show test-preparation conforming to this assertion, and its constructs and processes compatible with what has gone before, together with more specific insights.

#### A test-preparation model

The model of strategy adaptation proposed by Broekkamp and Hout-Wolters (2007), is used to understand test-preparation (Figure 5).

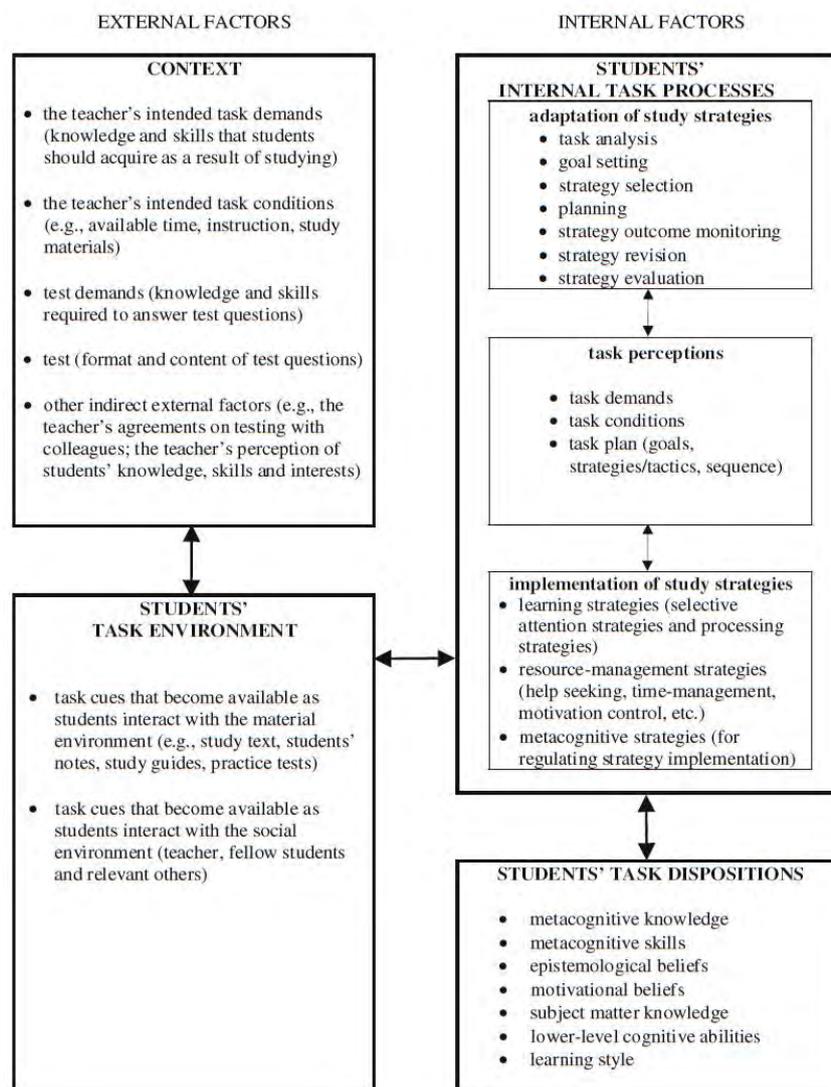


Figure 5: Factors that influence students' adaptation of test-preparation strategy (Broekkamp & Hout-Wolters, 2007)

The model is highly compatible with the current research for a number of reasons:

- a) it is dedicated to test-preparation rather than more generic notions of studying;
- b) test-preparation is discussed with relevance to a classroom test, which is seen as compatible with standardised tests in CAPS;
- c) it does not pertain to a particular subject domain;
- d) it is informed by investigations that include the high school context, for example, Thomas and Rohwer (1987);
- e) it was spawned in reaction to what the authors see as a lack of knowledge about conditions under which students adapt strategies to the demands of test-preparation tasks, and about the processes and abilities involved, which echoes the current context;
- f) it integrates 'all' factors seen to affect strategy adaptation, such as, test demands, teacher-related factors, personal goals, social influences, and personal mechanisms.

This comprehensive spectrum of influencing factors suits the exploratory nature of the current study.

The purpose of the model is to shed light on strategy adaptation – the degree to which students actively select, and subsequently manage, the implementation of a strategy, as opposed to performing behaviour without a sense of when or how to use it – thus the model is concerned with process and the individual. The goals behind the student's choices and processes are implied in the use of the term strategy; without goals adaptation cannot be truly regarded as being at work. The model views test-preparation as a 'task' influenced by external and internal factors. External factors are divided into those that affect the task indirectly (the 'task context') and those that have a direct effect (the 'task environment'). The task context is made up factors distal and opaque to the students unless they are made known, and in that sense they cannot affect students' preparation directly. These comprise the teacher's intended 'task demands', or planning decisions, which are the desired declarative and processing outcomes<sup>12</sup> of test-preparation; the teacher's intended 'task conditions', such as, assumptions about available time, study materials, and practice tests; 'test demands' – the cognitive and processing demands of the test itself; the 'test conditions', for example, format, timing, length, and assessor; and 'other influences', such as, the teacher's perception of the students' current learning status, or departmental influences.

External factors are made known to students by way of cues (and clues), the sum of which represents the students' 'task environment'. A student, for example, cannot know what line of

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<sup>12</sup> In the South African education system, processing outcomes are stipulated in the curriculum as adhering to Bloom's taxonomy (Bloom et al., 1956). Making the demands of a specific test known represents a dilemma in that it supports preparation and success but equally risks altering (lowering) the real test demands.

questioning a teacher might take for a test, or the format of the questions, unless the teacher makes these known either explicitly or implicitly, the student is attentive to (perceives) this information, and the student interprets (evaluates and judges) the information correctly. The teacher is not the sole source of cues: cues can come from social interactions in the environment, such as, from interactions with peers in a different class, or from a parent in a 'quiz-master' role. The material environment can also offer cues, such as, via the text decoration emphases in source materials and study guides, or the length of explanations. The task environment thus acts as the interface between the external factors and the second dimension of the model – factors internal to the student.

Internal factors are mostly grouped into one of three subgroups pertaining to the students' 'task processes'. The first, 'task perceptions', is based on cues. The authors regard task perceptions as critical determinants of strategy adaptation, and relate to the task demands and task conditions just described. For example, a student may decide up-front how demanding an episode of test-preparation is going to be or what plans will need to be made, based on their teacher's cues about an upcoming test. The authors warn that the 'validity' of cues – the degree to which cues are perceived to predict previous experiences – affects the degree to which cues are heeded, echoing the 'credibility' of the model under SCT. They see weak or inaccurate cues leading at best to vague or generalised strategy use, or worse, ineffective strategy use.

The second subgroup has cues influencing 'strategy implementation' – which of a student's available strategies will actually be implemented. In a similar manner as Hadwin et al. (2001), the authors distinguish between learning/cognitive strategies and resource-management strategies, managed in an executive fashion by a student's metacognitive strategies. Learning strategies are described as those producing material products, whether summaries, notes or underlined text, etc., or having behavioural manifestations. Here the authors distinguish between 'selective attention strategies', such as, slowing down for certain text, choosing what to omit versus read, re-reading, and adding text decoration or annotations; and 'processing strategies', which refer to the quality of cognitive products introduced earlier as surface, deep and performance levels of processing. Resource-based strategies focus on time management, help-seeking behaviour, management of the physical task environment, and motivational control. Research into strategy implementation was earlier seen to largely be the focus of component-based models of self-regulated learning. The authors make a terminological distinction, adopted in this thesis, referring to strategies as being at the global level, and tactics at the local. A student might, for example, choose a rehearsal strategy, or a writing-out strategy. In rehearsal, however, a student may choose to verbalise their rehearsal, or in writing out, to use underlining for significant terms, which represent tactics. The distinction between strategies and tactics can be somewhat arbitrary, however. One could, for example, elevate underlining to the

strategy level, and deliberately not using a ruler as the tactic. As with strategies, tactics have a goal in mind, thus when it comes to adaptation, the authors acknowledge four combinations: global strategies, global goals, local tactics, and local goals. For simplicity, tactics should be seen as subsumed by the use of the term 'strategy' unless otherwise indicated.

The third task process subgroup is the actual adaptation of the implemented strategies, consisting of the analysis of the task, including the goals set, monitoring, revision, and finally evaluation of the strategy. Strategy adaptation is considered by the authors in terms of the *quality* of the adaptation process – the students' 'adaptiveness' – and the *extent* to which the student can adapt – their 'adaptability'. The steps listed could equally be seen as phases, showing how this subgroup exhibits high parallels with the process model approach recently discussed. This completes the task processing group. Overall, the authors regard testing as most likely to translate into strategy adaptation when task demands are closely aligned to test demands and cues.

Finally, the model sees the internal task processes affected by the student's more general, inner processes. These guide, but are largely independent of, the task. Broekamp and Hout-Wolters (2007) refer to these as student 'task dispositions', and in terms of SCT, these may be closest to the representation of the self, and how this self is inclined to the task. According to the model, these include metacognitive knowledge and skill, epistemological and motivational beliefs, prior knowledge, learning style (propensity for a particular processing level), basic cognitive ability (such as, baseline processing speed and propensity for memorisation); and quite likely, mindset (Dweck, 1986) and character. Self-efficacy, all important under SCT, is included in the model under the motivational beliefs, and is the model's mechanism for introducing memory of past events.

The authors draw attention to a number of points. They see taking the test as potentially affecting the nature of students' self-reports in that students are more likely to judge the quality of their studying based on their mark than the test-preparation itself. A student who receives a disappointing result is more likely to downgrade their view of their test-preparation process than before the result was known. This represents a warning for the current methodology, namely that student input should precede knowledge of tests results. In the model, the various factor assemblages are seen to have bidirectional effects on one another. For example, task perception might affect the choice of strategy and its regulation, but the enactment of the strategy likewise fuels future task perceptions. Past tests thus have relevance to the current. Regarding task demands and cues, the authors ascribe the highest importance to the teacher's intended task demands on the basis that the demands have a cascade effect to, and can be at odds with, the three remaining contextual factors. For example, a teacher may give a false impression of the difficulty of work, or the various ways it can be asked, if they misrepresent the test difficulty and reserve their 'best'

questions for the test; or they may teach for deep processing but test for reproduction of knowledge. The second task demand point is that students ultimately are seen to interpret their teachers' input from the perspective of a value-system; they judge the relative importance of input according to the probability that the input reflects what is required in the test and the impact that it suggests. For example, a higher premium might be placed on sections that a teacher spends more time on and represent 'easy' marks, an activity commonly referred to as 'spotting'. High latitude in, or unclear, demands will translate into reduced strategy adaptation or the adoption of a uniform, middle-road approach. That test-preparation strategy adaptation 'originates' in a mostly teacher-centred task context indicates the need to expose the research to teachers' intentions and the degree to which teachers regard their intentions as available, explicitly or implicitly, as cues. The teacher input can then be compared against the students' perception of the cues they have received. Parents represent another group capable of providing cues, but more about test-preparation in general than domain or test-specific cues. Despite this, these sources remain external, and thus of secondary importance, to test-preparation, suggesting they should only assume focus where they connect with student accounts, such as in their formative effect on actual task perceptions. The same approach can be used for test-preparation dispositions which can be catered for in some part by working with multiple individuals of both sexes and a range of academic abilities. Finally, it is implicit in the model that every test-preparation episode (as in, studying for a single test) represents a potentially different window on test-preparation. While a single test-preparation episode can offer insight, the particular test interest in this study remains in its significance as a window on students' typical strategies. Broekkamp and Hout-Wolters' model suffices for the research's needs, leaving final concepts to the domain-specific.

### **Test-preparation for Biology**

According to Pressley et al. (1997), different types of tests call for different preparation strategies. While acknowledging this, an analysis of the tests chosen as the targets for test-preparation is not part of the current study on the assumption that all tests adhere to the curriculum requirements of Life Science (Department of Basic Education, 2011c), the subject domain of the research. But it is appropriate to briefly consider some theoretical implications of choosing of Biology (Life Science, in the South African curriculum) as the subject domain.

Biology is a science (Holschuh, 2000) and as such, it is challenging (Schraw, Wadkins, & Olafson, 2007) in that students are introduced to many and complex topics (Bednall & Kehoe, 2011; Watters & Watters, 2007). It often involves integration of concepts, problem-solving, and ideas and abstractions that can conflict with everyday experiences (Holschuh, 2000). These are indeed resonant with the Life Science CAPS document (Department of Basic Education, 2011c). Biology can

draw from topics that overlap with a range of traditional science disciplines (Watters & Watters, 2007), leading these authors to call for more explorative research in the domain to better understand students' approaches. Holschuh (2000) echo this, citing a number of studies that show Biology to be particularly rich as a domain for learning research by virtue of its often dense texts, difficult concepts, and use of unfamiliar and technical vocabulary. Holschuh (2000) generally regards science texts as written in a way that suggests memorisation as the appropriate strategy, for example, thanks to the prevalence of bold-faced terms. Pressley et al. (1997) level criticism at the general state of Biology texts as learning sources, though it is conceivable that much may have changed in the field of authoring since this article was penned. They cite evidence of books that are encyclopaedic, term heavy, often inaccurate in their details, written by authors with an insufficient grasp of the subject to provide proper explanations, poorly organised, and containing diagrams that are 'pretty' as opposed to being rigorous and informative. Perhaps for these reasons, Biology is observed by Dunlosky et al. (2013) as a popular research domain.

It is clear that choosing Biology as the test-preparation domain for this study will impact the nature of test-preparation, and the applicability of the research findings to other domains. That said, student accounts may partially resolve the extent to which their test-preparation for Biology is unique. This completes the conceptual framework for test-preparation. It is time to review the associated empirical research.

## Chapter 3: Literature Review

### Introduction

The current research aims for in-depth insight into the strategies of high school students preparing class content for a standardised test. This chapter reviews the primary empirical and meta-analytic literature associated with the concepts, just introduced, that are capable of shedding light on this aim.

Given the importance and prevalence of academic testing (Kitsantas, 2002), studies confined to test-preparation are surprisingly rare, the scarcity exacerbated by the current research addressing what is regarded as missing from the research field. For this reason, studies dedicated to test-preparation, or closely mirroring the study conditions, receive close attention in this review. Limiting the review to such studies would leave our understanding of test-preparation rather impoverished and, given that the adopted exploratory approach calls for broad understanding, the review also draws insight from many 'lesser' empirical investigations at the more generalised level of 'studying' that include or imply relevance to the test-preparation context. This follows Boote and Beile's (2005) advice that where little is written on a particular topic, the literature review may have to examine related research.

Strategy implementation has been shown to be best understood when an individual's actions and thoughts are considered in light of the individual's goal-directed and deliberate choices (Broekkamp & Hout-Wolters, 2007), that is, holistically. Studies that receive close attention are therefore reviewed as complete units and their results are given in context; lesser studies mostly receive sufficient attention to communicate the salient results.

The components of Broekkamp and Hout-Wolters (2007) test-preparation model underpinning this research are linked by the bidirectional influences they exert on each other, the influences acting as the glue that effectively binds the model into one. The notion of influences as the unifying theme is consequently used as the framework for structuring this review and, following the model, sees the implementation of strategies reviewed according to their contextual (external) influences and dispositional (internal) influences. Test-preparation is complex and this is not a perfect solution, thus some licence has been applied in the assignment of influences to one or the other category. Individual influences are ordered to minimise overlap, thus the major studies mostly precede the lesser ones. Sub-headings – included to aid navigation for those reading this document in electronic format – create an impression of multiple subsections; the review is intended to be a flowing narrative thus leads are not used and the reader is asked to overlook the effect. The strategy

implementation section is followed by a review of SRL in South Africa, the context for this research, and closes with a review of literature suggesting how students ought to study, which draws on some of the earlier materials.

### **Strategy Implementation**

This section reviews literature that is linked to students' test-preparation strategy implementation, according to certain major influencing factors.

#### **Studies illustrating contextual influences**

The work of Van Etten et al. (1997) is perhaps most compatible with the current research. These authors conducted a qualitative, interview-based study in the United States focusing on college students' beliefs about exam preparation. In pursuing their goal of establishing 'beliefs', the researchers adopted a broad approach that was open to when, how, and what students studied, which gave opportunity to hear about study strategies and other phenomena familiar within the SRL framework. In the sense of being an approach aimed at discovery rather than description (Davies, 2006), their work can be regarded as exploratory, which speaks directly to the current context. The authors adopted a methodological approach intent on maximising the likelihood that students would reveal "all they know about studying" (p. 195), though it is important that knowledge *about* studying does not necessarily translate into knowing *when* to select one strategy over another, or *how* to implement a particular strategy (Broekkamp & Hout-Wolters, 2007). The study involved roughly 150 university students of mixed genders, age levels and course majors. Rounds of interviews involving roughly a third of the students proceeded until saturation, and led to the development of a questionnaire that was ultimately administered to the remaining students. The findings revealed the most important constructs for students falling into four categories: external factors, strategies for coping with test demands, affect about test preparation, and motivations for studying.

Regarding external factors, instructors were found to be significant through their effect on the ease of test-preparation; exposure to exams held value for subsequent events; factors of a social nature could undermine or promote learning; and the physical environment impacted study. Strategies for coping with test demands were found to be: using appropriate study strategies, managing test preparation time, reducing distractions, and studying collaboratively. The following study strategies were mentioned: rereading assignments and notes; rewriting lecture notes; highlighting and memorising key concepts; using flash cards; using mnemonic aids (making up rhymes, acronyms, songs, stories, and images); posing questions about the material; relating information to prior knowledge; developing outlines, tables, figures, and graphs of important information; reading

related material; studying old exams; seeking help (from books, online, and others); and creating overarching conceptual structures to integrating ideas (though this was rare because of the effort involved). Though students acknowledged the benefits of time-management strategies and timeous and distributed practice (studying in multiple, spread out sessions), some still crammed. Particular mention was made of strategies designed to cope with noise distraction. Many these are familiar from the list of Hadwin et al. (2001) (Appendix I, p.121). Regarding affect about test-preparation, a positive valence was found to impact unpredictably on study, though negative affect was always deleterious. A range of motivators were found. Good marks in past examinations were foremost, with studying perceived as the vehicle for achieving them. Pleasing others, job prospects, etc., received sporadic mention. Overall, the students' are reported as demonstrating a predominance of performance-approach goals. The researchers concluded their work to have generated a "catalogue of possibilities" (p. 195) that could be used to further investigate the link between studying and achievement.

Some lessons are learned: While the authors do not refer to examinations to the exclusion of tests, it is likely that exams attract a greater level of intensity and strategic study. The qualitative approach did not compromise the power of the study to reveal novel phenomena or phenomena conventionally revealed by quantitative methods. The results are largely dependent on students volunteering their beliefs, and the extent to which certain phenomena may have arisen as a result of suggestion as opposed to spontaneously is questionable. This explorative nature of the current research represents a similar context. It is relevant that this study, and indeed most others, involve university-level students. This impacts the direct relevance of findings because studies show that processing level preferences, metacognition, and strategy selection change as students advance through levels of maturity (Gow & Kember, 1990; Veenman, Hout-Wolters, & Van Afflerbach, 2006) and educational stages (Postholm, 2011; Thomas & Rohwer, 1987). University is also expected to exact different demands compared to school (McMillan, 2005) and to represent an academically successful pool of students (Thomson & Falchikov, 1998). Unless indicated otherwise, all the reviews in this section refer to the university or college context.

Karpicke et al. (2009) represented a second study not seeking to understand the effect of one particular influence. Instead these authors investigated how often students used retrieval as a means of learning. They found the majority of students (84%) at a single university to adopt a strategy of merely rereading notes or texts, above ten other observed strategies, including repeated testing. Their findings included that students were not metacognitively aware of the benefits of repeated testing in particular.

Before moving to studies with particular influences, the work of Thomas (1988) and Thomas and Rohwer (1986) deserves mention as one of the most extensive investigations into studying to date. This study is somewhat dated and despite the study's impressive size the findings relate mostly to learning in the light of various tasks over the duration of an entire course. Broekkamp and Hout-Wolters (2007) raise methodological concerns that they see as fundamentally compromising the results. Despite its size, the only findings of relevance are that learning strategies became deeper with time, but did not differ within grade level; that students mostly used surface strategies aimed at basic memory or comprehension; and that students rarely discriminated important from unimportant information in texts.

### ***The influence of context itself***

Context is widely believed to affect self-regulated learning (Broekkamp & Hout-Wolters, 2007; Pintrich, 2004; Pintrich et al., 1991; Winne, 2010), leading research away from decontextualised studies to contextualised ones (Boekaerts & Corno, 2005). While contexts can be physical, it is more the context as perceived by students that is significant (Broekkamp & Hout-Wolters, 2007; Entwistle & Tait, 1990). Test-preparation is one form or context of studying (Hadwin et al., 2001) distinguished from other forms by the prospect of facing a test. The particular test represents even further refinements to the context based on factors such as, the knowledge domain and assessment mode.

Three studies (Doe & Fox, 2011; Hadwin et al., 2001; Theophilides & Koutselini, 2010) catalogued students' test-preparation investigated the influence of context. Hadwin et al. (2001) illustrate how quantitative studies hold relevance for the current, qualitative research. This inventory-style investigation compared studying of ninety first-year students across three contexts: reading for learning, completing an essay, and – of relevance – studying for a multiple-choice exam. While the study provides a useful inventory of test-preparation strategies, its aggregation of data hides the extent to which the use of a strategy was limited but strong, versus widespread but weak. There was strong, tactical evidence of planning, questioning, and collaboration across all contexts, but rehearsal and inventing examples were unique to test-preparation. Concept maps, transcripts and summaries were the most favoured test-preparation artefacts, but mnemonic devices – acronyms, annotation and mental imagery – were also used; the latter only in exam-preparation. Selection manifested as highlighting and note-taking. Changing content order and 'talking things through' were also unique to test-preparation. Resource management strategies saw consultation of case studies, reflection questions, and of a variety of textbook-related features being unique to test-preparation. Further strategies mostly centred on the use of material that gave hierarchical information. Students monitored goals variously. They: evaluated for contradictions, sought

understanding, tried to figure out the task, and sought feedback (all unique to test-preparation). Some aimed to reproduce materials. Selective attention goals were variously directed towards: challenging items, easy items, gaps, important ideas, and principles, whatever counted for marks, and checking progress. Students with a goal of remembering focussed on terms and not missing things. Students with translating goals sought various kinds of linkages. The results are helpful in providing an inventory of test-preparation, though it is recognised that survey-based studies are criticised for their dependence on possibly unreliable retrospective memory or recall bias (Tomes et al., 2011; Yukselturk & Bulut, 2007). In the case of this survey, 225 responses (from 75 questions x 3 contexts) were required in 40 minutes, which seems a great deal to report on with equal rigour and enthusiasm.

Theophilides and Koutselini (2010) compared student perceptions of study behaviour for closed and open-book examinations. A group of students, who had experienced both types of exams two months prior, assessed statements relating to each exam type using a 5-point scale. The results indicated that students preparing for a closed book examination (the current context) delayed their studying until close to the exam, focussed on assigned texts, memorised information, and relied on surface processing. The researchers regard their lack of direct observation and their reliance on self-reports of behaviour as major study flaws.

Doe and Fox (2011) conducted qualitative research on the test-preparation strategy use and motivation of three students enrolled in classes preparing them for an exam, albeit for English language proficiency. The research was partly motivated by the lack of student perspectives in the study literature, and inclined more towards test-taking strategies – strategies students use in a test. Data about the number and type of strategy use were gathered at various times, in various contexts (in the classroom, in a practice test, in a final test), using a variety methods (observation for the classroom and self-report interviews for the others.) It is noteworthy that data from observations versus self-reports, revealed a “layered and embedded nature of strategy use” (p. 40). The authors also note that their understanding of students’ inner workings, such as, motivations, is still only as accurate as the reports themselves. These two factors illustrate the weakness of a single mode of data capture and omitting the participant perspective, and offer guidance to the upcoming data capture and analysis stages. Despite their data being ‘rich and thick’, the researchers caution against using the *number* of reported strategies as indicative of strategy ‘savvy’ based on their finding that students’ motivation for taking the test affected the strategies they both acquired and used. This echoes Van Etten et al. (1997) and underscores the sensitivity to motivation.

### ***Achievement level***

Four qualitative studies – Kitsantas (2002), Warkentin and Bol (1997), Hong, Sas, and Sas (2006) and Thomson and Falchikov (1998) – looked the influence of achievement level among high and low achievers. The current study involves participants from across a marks spectrum and these results demonstrate the possible effect of this.

Kitsantas (2002) used structured 1-on-1 interviews to question college students about their self-regulatory processes. Their first aim – to *identify* self-regulatory processes used to enhance test-preparation – was relevant. In an interview that followed a mid-term examination, students were asked five questions designed to reveal what strategies they had used to prepare for the examination. In a later examination, students completed two surveys about their sense of self-efficacy (three items) and their outcome expectancy (one item) for the later examination. The results showed high achievers using more strategies more consistently than low achievers, specifically that they use more strategic process goals; plan; ask for assistance; and, organise and transform their notes more than low achievers. They also monitored progress, structured the environment, and used greater self-consequencing to motivate themselves than low scorers, though not to statistically significant levels. They perceived tests to have higher instrumentality than low scorers, and expressed higher self-efficacy beliefs regarding the test. Low scorers in the test used more rehearsal and memorisation strategies than high scorers. There are some issues. Firstly, a sample interview question, “What do you do when you study for a personality test and find the theories difficult to understand?” (p. 103) does not show the phrasing tying the students’ feedback to the particular examination; unless a preamble catered for this, it seems invalid to assume that students necessarily answered according to the examination. The questions do not probe for strategies that the students perhaps possessed but did not use (possession and demonstration are not synonymous (Credé & Kuncel, 2008; Theophilides & Koutselini, 2010), thus the picture seems likely to be incomplete. Despite making a distinction between high and low achievers, the students were all above the level of a C, which seems a somewhat narrow range to use as a basis for distinction.

Warkentin and Bol (1997) compared the metacognitive and self-regulatory test-preparation habits of higher- and lower-achieving students. Amongst other aims, the authors sought to “obtain qualitative information about students’ efforts within an ecologically natural setting” (p. 2), echoing the current study context. Participants were interviewed directly after the course final examination using open-ended questions. The students’ activities were interpreted by the researchers in terms of four effort management levels – planning, monitoring, regulating, and evaluating, echoing the process-based approach of SRL (Zimmerman, 1998).

Regarding planning, most students managed study time through 'self-instructional sequences', for example, they spent more time on what they thought was important. High- and low achievers both broke work into chunks and distributed it across a number of study sessions. However higher-achievers evidenced more selective processing, were more systematic and coherent across sessions, and mentioned a wider range of tactics during this process. While 90% of students cited a goal of good marks, only 9% of high achievers spoke of trying to memorise work, as opposed to 56% for low achievers. The authors subsequently hypothesised that study goal has an important impact on strategy selection, confirming that the approach of the current study to include both these factors. The authors comment on some students using boldface or just the definitions at the end of chapter as a matter of 'ritualised routine', and reflect on whether this action represents a student's preference or is encouraged by the format of the texts, as (Broekkamp & Hout-Wolters, 2007) suggested. Monitoring and regulation showed students to be generally unclear about what to study, what was important, what was going to be in the test, and how to study for the test. Most students showed some difficulty in monitoring effort. Tactics that received particular mention were those designed to maintain concentration and cope with distraction, and cope with learning effectiveness, such as, making concept maps, and underlining. No differences in response patterns were found between the high-low groups for monitoring and regulating activities. Regarding evaluation, 66% of low achievers tended to be vague and focussed more on regret and worry. In contrast most high achievers focussed on instrumentality – what worked and what didn't – and exhibited a greater internal locus of control.

Warkentin and Bol (1997) found that the students were not adequately aware of the test conditions, but it is not clear whether students or lecturers were to blame. The authors recognised that students' study practices should be understood in relation to course features yet did not seek clarity from the course instructors. It is also unclear when the students became aware of their participation, which could have affected their studying. The impact of having to practice accurate recall of studying immediately after writing an examination is seen to represent a dependability concern. No indication of interview length is given but it seems that the last students in line would have faced some delay. This study highlighted the importance of a well-considered data capture methodology, and the importance of thorough reporting.

Hong et al. (2006) considered mathematics students' test-preparation strategy use and their awareness thereof. The context advises a judicious application of the results to content domains, such as the current study. The study posed similar questions as the current study, used interviews, included high school students of both sexes, and includes high and low achievers. The authors' study

design stemmed from their opinion that high school studies of test-preparation are under-represented and that “unless educators recognise and understand fully students’ study and test-taking behaviours, strategy instructions may not help students improve their learning and performance” (p. 145). Sixty-one students were asked what strategies they used to prepare for a test and why, which closely parallels my research questions. As with Van Etten et al. (1997), the interview protocol relied on students revealing their strategies. In so doing the researchers believed that they did not *just* investigate strategies, but strategies *salient* to the students.

The most common cognitive strategies were reviewing (75%), solving problems (59%), checking (26%), and repeating (16%). Incidental others included outlining, memorising, understanding, reasoning, note taking, and externalising. Reviewing mostly involved notes, then selected examples, textbook items, past assignments, and lastly quizzes. A third of the students used only one of the 10 reported cognitive strategies, 31% used two strategies, and 28% three strategies. One student used more than three strategies. Resource management strategies related to time (23%), environmental issues, and help-seeking (7%). The 18% who spoke of motivation related it in terms of effort.

Strategy awareness responses were grouped in the same way as test-preparation strategies. Regarding cognitive awareness, 66% expressed their sense of preparedness in term of competence (‘I’m prepared when I know it’); 41% on behaviour (‘I’m prepared when I have studied enough’), followed by beliefs based on past achievements (15%). Emotional awareness manifested in 10% of the responses, and only as anxiety. Motivational awareness was expressed either as a matter of confidence (18%) or in terms of an obstacle (10%), such as, procrastination. High achievers made more use of cognitive strategies than low achievers, significantly ( $p < 0.05$ ) so for reviewing, problem solving, and note taking, and accommodated their surroundings, managed time, and sought assistance more than low achievers. High and low achievers made scant use of motivational strategies. The groups differed most in their levels of processing; low achievers used more surface strategies than high achievers, who tended towards deep processing. The only significant test-awareness findings were that high achievers were more likely to feel prepared when they felt they understood the work and when they had reviewed the material.

The authors cite lack of data and the single private school context as limitations but they fail to address other concerns. For interviews, students were ‘pulled’ from classes over a two week period, risking students being in different frames of mind depending when they were pulled. There is no indication of interview length and thus data richness; time constraints may account for the low number of reported strategies. The researcher’s priming statement, “Suppose your teacher says that you will be tested tomorrow on the topic you just learned in math class” (p. 145), is hypothetical; a

'surprise' test seems incompatible with investigating students views on test-preparation generally, and the two-week timespan of the interviews means the topic 'just learned' could differ from student to student, making comparisons questionable.

Thomson and Falchikov (1998) mixed-methods research investigated the issues and concerns salient to university students' studying, including evidence of mismatch between espoused theory and student practice. Two questionnaires yielded a quantitative inventory of studying and general well-being. Informal, semi-structured interviews conducted with a subset of students asked how students prepared for course assessments (i.e., not only tests). Assessment evidently played a key role in learning, with most effort directed at required tasks only. Load caused more superficial preparation than students preferred, sometimes by cramming thanks to leaving things too late. First year students, as opposed to seniors, saw acquisition of intellectual *knowledge* as the primary purpose of learning, pointing to surface preparation, and demonstrated higher anxiety levels and a lack of strategic approach. These questionnaire responses conflicted with qualitative data, which showed deep processing more prevalent than surface processing. The authors reflect whether the differences amount to socially acceptable answering in their survey, or differences between theory and actual use. The observation underscores the importance for data corroboration in an investigation (Yin, 2014).

This section shows that the inclusion of high achievers in the current study is likely to net more, and more varied, strategy use, though not certainly (e.g., Warkentin & Bol, 1997). Other studies not specifically reviewed here support this likelihood (Postholm, 2011; Zimmerman & Martinez-Pons, 1986; Zimmerman & Martinez-Pons, 1990). Despite this trend, it is misleading to regard high achievers as a uniform group in terms of SRL (Hopkins, 2005), though Winne (2010) warns that the ambiguity occurs at both ends of the achievement spectrum. For example, low achievers may underperform because of poor study strategy *or* the adoption of inappropriate goals. High achievers may adopt a narrow suite of surface strategies suited to their immediate needs (i.e., performance approach), and achievement does not tell us if this is their full repertoire (low SRL) or a judicious selection matched to circumstance (high SRL). The meaning of achievement is also blurred by teachers compensating for shortcomings (Boekaerts, 1999), with a decrease in achievement only being encountered once students have to self-regulate their own learning process (Kurtz & Weinert, 1989). This may partially explain South Africa's high university drop-out rates (John, 2013, 17 May).

### ***Expectations***

Three studies considered the influence of test expectations on studying (Abd-El-Fattah, 2011; Burns, 2008; Feldt, 1990). Feldt (1990) instructed 42 psychology undergraduates, divided into three groups,

to study in the way they considered best. Each group was told to expect a test consisting, respectively, of factual questions, higher-order questions, or questions of undisclosed nature, whereas in reality students wrote the same test. The researcher looked at student test-preparation material for further insight into students' text processing, but does not subsequently refer to these materials. The researcher found no alignment of strategies and expectations. The research is compromised by overlooking the extent to which students *could* not, versus *did* not, adapt their strategies, the issue highlighted by Winne (2010), that is, adaptability (Broekkamp & Hout-Wolters, 2007). Most students reported using underlining and rereading – as selection and retention tactics – which the authors interpret as a rote-learning approach. Students tended to highlight already emboldened text and be drawn to bold or italicised text. As with Warkentin and Bol (1997), the available study time and the time elapsed between studying and report back is not indicated. Students reported on their study behaviours as part of their test. This practice – also used by Kitsantas (2002) – seems questionable. The author acknowledges the demand effect<sup>13</sup>, but does not address the effect of their prompting students about strategies using highlighting, skimming, and reviewing notes as examples.

Burns (2008) investigated the relationship between students *anticipation* of achievement – akin to outcome expectation (Bandura, 1977) – versus what they believed they were capable of – their self-efficacy *expectations*. The study is relevant because it draws attention to self-efficacy, an important factor in self-regulation (Bandura, 1977). The results stemmed from a questionnaire administered to students at the start of a course, and another administered just prior to the course final examination, separated by two intervening examinations. The second included scales for self-handicapping<sup>14</sup> tendencies and anxiety. The results showed that students aiming at higher grades in the final exam felt more likely to achieve them. Anticipated performance for the final examination was found to be significantly related to performance in the more recent of the two exams, and experience was most likely to predict anticipation. There was no relationship between anticipated and actual performance, nor between time spent studying and anticipation of performance. The author sees most teachers and students holding the view that amount of time spent studying equates to test performance, which is contrary to research evidence. Higher levels of anxiety and self-handicapping were significantly linked to lower anticipations of performance. This study used an un-validated tool and there is no indication that students kept accurate logs of time, nor the precision of their reporting.

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<sup>13</sup> Where participants form an interpretation of a study's purpose, and change their behaviour accordingly.

<sup>14</sup> Self-handicapping is the tendency to provide face-saving excuses in light of anticipated negative outcomes.

Abd-El-Fattah (2011) investigated how cognitive test demand expectations (see Broekkamp & Hout-Wolters, 2007) influenced the strategy use of Egyptian undergraduates. Participants attended lectures about surface and deep questioning, and were then randomly assigned to one group – told to study for a test that required deep-level cognitive processing – or another – told to prepare for a test demanding surface-level processing. After a study period (of undisclosed length) all students wrote the same mixed-item test and completed a survey that measured deep versus surface approach. The results showed students aligning study strategies with expected test demands and performing better in questions aligned to those expected. The authors discuss how they mitigated a demand effect on their results (by only making students aware of the research once it was complete), suggesting the same for current study as necessary. The authors advise teachers to make test demands clear to students and to use teaching practice appropriate for the test. They call for more process-based research.

### ***Planning, load, and effort***

Study effort and time are commonly investigated (e.g., Boekaerts, Otten, & Simons, 1997; Gow & Kember, 1990). Cerrito and Levi (1999) investigated self-directed effort for a Mathematics test using self-reports. Despite the rather limited findings, this study used diaries. The authors ‘just’ gathered information about student attitudes and behaviour regarding study time. A survey of student habits was administered to a sample of all entry level Mathematics students and compared to a diary listing of times of study, work, and leisure activities over one week. The diary results were found to correlate highly with the survey records – though in terms of what is unclear – showing students had sufficient time to study despite most choosing to abuse it. Overall, the study lacks sufficient detail to facilitate detailed critique; it appears in non-peer-reviewed publication which perhaps accounts for its lack of rigour. A diary, however, seems a sensible way to track study patterning and load.

Planning and self-monitoring attract relatively little empirical attention in the SRL literature (Sitzmann & Ely, 2011) and results are fragmented, thus they receive brief mention: In Sitzmann and Ely’s (2004) adult training meta-analysis, planning was found to be unrelated to learning. Van der Meera, Jansen, and Torenbeek (2010), found their first-year undergraduates realistic about the need to plan but struggled with time management and coping with load. Van den Hurk (2006) found that planning led to more efficient studying in first-year students. Some studies (Berry, Cook, Hill, & Stevens, 2010; Tomes et al., 2011) found university pressure leading to cramming. Innis and Shaw (1997) investigated study patterning, finding students to study in roughly one-hour sessions during the week and two-hour sessions on weekends.

A student's perception of academic load is a key influence in study behaviour (Berry et al., 2010; Thomas, 1988) and along with an over reliance on teacher supports, can inhibit study proficiency (Thomas, 1988). High work load and lack of freedom have been shown to lead to surface processing (Entwistle, 1987). According to (Mohlala, 2011, 13 December), CAPS is designed to reduce student and teacher workload compared to earlier curricula.

### ***Teacher, classroom, and curriculum***

Various disparate results illustrate the influence of the teacher, classroom, and curriculum on students, with pathways to test-preparation. The teacher poses a major influence on students (Broekkamp & Hout-Wolters, 2007). Thomas et al. (1993) show support practices on the part of teachers, such as, assigning challenging homework and giving meaningful feedback, to have a positive general effect on students' studying, and Gow and Kember (1990) relate a number of examples showing teaching style to affect learning. In the study of Van Etten et al. (1997), reviewed earlier (p. 27), instructors were among the few factors raised by the study participants as significant. Learning environments are shown to affect processing approach (Entwistle, 1987; Ning & Downing, 2011), for example, an uninteresting and irrelevant curriculum promotes surface processing (Entwistle & Tait, 1990). Teachers have been shown to significantly shape student course perceptions (Usher, 2009), and Muller (1998) found different curricula to foster distinct and different kinds of self-regulated learning. Students' perception of teaching quality and skills development are predictors of achievement (Ning & Downing, 2011), and according to Pressley et al. (1997) teaching has the potential to undermine learning where it is found wanting. Such results underscore the importance of hearing the student perspective. Dweck (1986) argues that teachers can affect their students' engagement (focussed interest) in academic tasks and whether students are subconsciously encouraged to focus on effort or ability. She advocates a focus on effort and a 'growth mindset'. In a South African study, engagement and mutual acceptance were shown to be important to high school students (Moloi, Dzvimbo, Potgieter, Wolhuter, & Van der Walt, 2010). Teachers can also affect test-preparation by way of study skills input, but this can emanate from other sources, thus its discussion is considered separately following this one.

Teachers also have psychological impacts. Furrer and Skinner (2003) provide evidence that Grade 3 to 6s' sense of self in relationships (relatedness) holds important motivational consequences for the child. They report students to be more comfortable and stimulated by teachers who appreciated them and valuing teacher-relatedness above all others. Similar effects are shown on high school students' (Changeiywo, Wambugu, & Wachanga, 2011). According to Deci and Ryan (1985), students aware of gaps in their basic psychological needs in a specific learning context will not identify with

the context's goals and values. Studies at various levels of education confirm the central role of the teacher in student motivation (Ning & Downing, 2011; Van Etten et al., 1997; Williams, 1997). It is hardly surprising that Rothbart and Jones (1998) call for teacher training to include a greater basic understanding of psychological phenomena.

The quality of teaching affects studying – mostly through motivation and attitude towards study (Ning & Downing, 2011) – but only student perceptions – which are now clearly called for in the current research – can reveal which matter for test-preparation.

### ***Study skills input***

Test-preparation input frequently goes under the banner of study skills (Richardson et al., 2010) – abilities that enhance study efficiency. Dignath and Büttner (2008) found in their meta-analysis of 35 high school studies that exposure to strategy instruction improved self-regulated learning. Explicit approaches in this regard are shown to benefit students (Lubbe et al., 2006) more than implicit approaches (Kistner et al., 2010), and are seen by students as the more helpful approach (Postholm, 2011), perhaps somewhat obviously. Despite these findings, the explicit teaching of SRL skills is often rare (Hamman et al., 2000; Kistner et al., 2010).

McMillan (2005) made findings that ended in calls for explicit instruction. Despite not looking at test-preparation per se, the study a) was a multiple-case study; b) used interviews with students and teachers; c) involved students fresh from high school; d) was conducted in South Africa; e) sought to understand the “typical” (p. 1125) case using an explorative approach; and f) studied students from an apparently similar pool to that here. This virtually ‘mirrors’ the current study context, making the results especially relevant. The study investigated the nature of the transition from school to university in 15 first-year students and how students become independent learners. The methodological detail is limited, for example, there is no indication of questions asked or the lengths of the interviews, presumably because the explorative approach.

Lack of academic skills for university was a recurrent theme. Many students put their lack of ‘study skills’ down to being ‘spoon-fed’ at school. The author details some deficiencies in learning strategies (here: study strategies). Some students were unaware that their learning strategies were inappropriate to the task. Others rote-learned and were aware of the pitfalls but had no knowledge of alternatives; many admitted needing help with study skills. Many lecturers recognised the students’ shortcomings when it came to study methods. One student described how mind maps had helped her at university and reflected that it was a strategy that could benefit other students. The author called for the explicit teaching of skills, but in an embedded manner.

More than a century ago, Binet, Simon, and Kite (1916, p. 257) concluded their study on intelligence, saying that “before subjects ordinarily taught, ... they [students] must learn how to learn”. Study skills are LO content (Department of Basic Education, 2011b), but studies show that the manner of instruction in formal contexts can lead students to disregard skills input (Entwistle, 1987), such as, when delivered by non-credible or incompatible models (Bandura, 1977), or when delivered as a ‘list of steps’ to follow (Lubbe et al., 2006). Radovan (2011) cites early studies of SRL showing substantial academic performance improvements in adults through skills training, but a rapid return to old ways after training ceased. A focus group study involving 62 participants from a range of former model-C, township schools in South Africa showed students seeing Life Orientation as irrelevant and not accomplishing its aims (Jacobs, 2011), risking disregard for its content. Study skills instruction is unlikely outside of LO, given the high ‘opportunity cost’ associated with teaching skills over required content (Perlman, 2004). Research shows that teachers prefer teaching study skills where and when skills are most relevant, as opposed to in a pre-determined slot (Postholm, 2011), and Miyasaka (2000) sees teachers most attuned to test preparation practices as more adept at assimilating it into the everyday. The success of SRL interventions is closely related to practitioner expertise. Dignath and Büttner (2008) found, for example, that strategy instruction more effectively promoted SRL when conducted by the researchers instead of the teachers. Perhaps researchers provide more credible mastery Bandura (1986). Politically-based stratagems also affect teachers and their test strategies (Miyasaka, 2000): In 2008 most practicing teachers in South Africa were the product of an educational system characterised by rote learning, authoritarian teaching practices and behaviourist pedagogy (Organisation for Economic Co-operation and Development, 2008). This raises a question over the valence of South African teachers towards self-regulated learning in general, and their familiarity with strategy. This seems a factor to consider.

Schools can outsource study skills instruction to independent service providers. Evidence shows that such programs can be of benefit. For example, Butler (1998) found that weekly individual tutoring of a Strategic Content Learning program positively militated various SRL phenomena, including, metacognitive knowledge, task-related self-efficacy, task achievement, and approaches to tasks, though in learning-disabled young adults. According to Rubenstein (2004), schools using outsiders should take interest in the actual effectiveness of the programs, in what areas, and why.

In the absence of study skills input, students formulating their study strategies are ultimately left to their own devices. Yet test preparation is known to be demanding for students (Pressley et al., 1997), and Karpicke et al. (2009) warn that students may be little more equipped for studying than having illusions of competence.

### ***Parents and socio-economics***

As with the teacher, parents can potentially affect test-preparation. Furrer and Skinner (2003) point to research showing parents to affect their child's performance partly through academic motivation, perhaps via self-esteem processes; and Zeegers (1999) cites studies showing parent education as a potential factor in the positive relationship between student achievement and motivation. Davis-Kean (2005) support the idea that a parent's education impacts their child's academic achievement. Ryan and Deci (2000) suggest that children of parents who are more autonomy supportive are more likely to be mastery oriented. As with teachers, the effect of parents is as important as my participants' perceptions.

### ***Peer collaboration***

Entwistle and McCune (2004) assert that collaboration should receive greater attention in descriptions of study strategies because of its growing everyday significance and Hammond, Austin, Orcutt, and Rosso (2001) see the structuring of opportunities for collaboration influencing the learner's understanding and construction of knowledge. Only one study showed a collaboration effect. This study (Crookall et al., 2000) looked at out-of-class academic collaboration (OCAC) in a university environment. The study investigated a number of OCAC dimensions but the only finding of relevance to test-preparation at high school was that OCAC enhanced understanding. High schoolers quite likely do not have the same opportunities for OCAC as university students.

### ***Studies illustrating dispositional influences***

Success in scholastic endeavours seemed to Binet et al. (1916, p. 257) as more than just intelligence but also a matter of "attention, will, and character; a regularity of habits, and especially continuity of effort", pointing to dispositional factors, the factors of self that the individual brings to the task (Broekkamp & Hout-Wolters, 2007). Under self-regulated learning, the effect of these factors on achievement is mediated by self-regulated learning activities (Boekaerts & Corno, 2005).

### ***Age and grade***

Individuals begin school as a cohort of similar age, thus age and grade are closely related. Studies show that study strategy varies according to school grade (Postholm, 2011), and that age affects students' metacognitive functioning (Veenman et al., 2006) and impacts learning (Lai, Chan, & Wong, 2006; Zeegers, 1999). Self-regulatory efficacy can decline from junior to senior high school (Caprara et al., 2008), or increase (Zimmerman & Martinez-Pons, 1990). Harris and Hodges (1995) reported a shift, over Grades 3 to 9, from intrinsic motivation towards extrinsic motivation, which is compatible with findings by Ryan and Deci (2000), but outside of high school, a surface approach has been found to give way to a deep approach over the first three years of university (Gow & Kember,

1990). Perels, Guertler, and Schmitz (2005) see strategy repertoire becoming more entrenched as students age. These may represent real differences or be illustrative of the effect of context or research method (Doe & Fox, 2011). Age and grade are embedded in this study, and will limit the application of this study to similar contexts. .

### **Sex**

Only one test-preparation study focussed on differences between boys and girls. Rogers and Hallam (2006) compared test-preparation in boys and girls using a self-report questionnaire tool to investigate Grade 10 and 11 high achievers from single-sex schools preparing for the GCSE. The findings showed relatively few significant gender differences: Compared to girls, boys preferred the clear criteria of exams, and studying in short bursts; girls tended to be overwhelmed with knowing where to start, varied their strategy use more than boys, and were less satisfied with their results. There was a small significant indication that boys study more favourably overall. Neither group showed a propensity for long-term planning. Many resource-management strategies differed significantly between boys and girls: Boys favoured studying with music on, in front of the television, in a particular place, taking time to relax, and ensuring they had what they needed to study. The involvement of only high-achievers limits the utility of this study somewhat.

Some studies related to SRL more generally: Caprara et al. (2008) found males to decline more than females in SRL in the transition from junior- to senior high school. Midgley, Kaplan, and Middleton (2001) found performance-approach goals appealed more to males than females. Duckworth et al. (2010), In a longitudinal, high school study, Duckworth et al. (2010) found girls to be more self-controlled, to spend more time on homework, and to earn higher grades than boys. According to Furrer and Skinner (2003), girls expressed higher levels of relatedness to others than boys, but boys' relatedness to their teacher was a better predictor of engagement. Changeiywo et al. (2011) found no gender-related differences in students' motivation to learn physics. Zimmerman and Martinez-Pons (1986) found self-regulation strategy use to be a better predictor of achievement in standardised tests than sex. As with age, there is no conclusive effect of sex on test-preparation or SRL.

### ***Learning preferences, goals, and motivation***

While a student's strategies, goals and motivation can vary from task to task (Ryan & Deci, 2000), they are relatively stable per individual (Broekkamp & Hout-Wolters, 2007). Learning dispositions – habits of mind and response tendencies in the context of learning – are envisaged to affect a student's goals (Warkentin & Bol, 1997) and strategies (Carr & Claxton, 2002) and are seen to include levels of processing (Broekkamp & Hout-Wolters, 2007). To risk overlap of this latter concept

with Chapter 2, studies show variable links between achievement goals and levels of processing. For example, Lai et al. (2006) showed that a performance-approach goal and a performance-avoidance goal in university students are significantly and positively related to both deep and surface strategy, with a mastery goal significantly related to deep strategy only. Elliot et al. (1999) found a performance-approach goal at college level predicting only surface processing, but mastery goals predicting deep processing. Kirby and Downs (2007) similarly found a performance-approach goal at college level to predict surface processing. While surface processing is generally replaced by deep processing, it seems to depend on the degree to which independent study is promoted (Gow & Kember, 1990). Further, it is reported that where well-being is threatened, students could be more concerned with protecting positive feelings than with the pursuit of mastery goals (Boekaerts & Corno, 2005). Overall, however it would seem that deep processing is more convincingly associated with mastery goals, and surface processing with surface goals. Performance goals can apply to both types (Winne, 2010).

Goals and motivation have already been shown to be closely linked (p. 13). Various motivation results were uncovered: Motivation has been found to increase in response to greater course self-monitoring among high school students (Barber, Bagsby, Grawitch, & Buerck, 2011; Williams, 1997); to be a predictor of academic achievement at university level (Borges del Rosal, Hernández-Jorge, & Sierra, 2012); and to affect students' perception of various teacher-related phenomena (Changeiywo et al., 2011; Furrer & Skinner, 2003; Ning & Downing, 2011). Mastery motivation, in particular, has been associated with an increase in achievement at primary school (Broussard, 2002) and university (Credé & Kuncel, 2008); and with greater strategy selection and use (Doe & Fox, 2011), especially in challenging environments (McMillan & Schumacher, 2001). It is sobering that Wong and Csikszentmihalyi (1991) regard many adolescents as neither happy nor intrinsically motivated while they study, with most studying in order to achieve longer term goals such as, getting good marks.

### ***Self-handicapping and anxiety***

Study anxiety refers to feelings of tension and anxiety based on perceptions of low competence that accompany studying (Credé & Kuncel, 2008) and is anticipated to manifest in test-preparation settings. Burns (2004), in a university survey, did not observe any relationship between anxiety at the time of a final exam and actual performance on the final exam. Yet Burns (2008), reviewed earlier, found that students possessing higher self-handicapping tendencies and higher levels of anxiety were significantly ( $p < 0.05$ ) less likely to perform up to their own expectations on a final exam than students with lesser propensities. Others (Credé & Kuncel, 2008; Hong et al., 2006) found anxiety to be a negative predictor of actual performance; Elliot et al. (1999) found anxiety to

mediate the relationship between performance-avoidance goals and exam performance. Performance-approach goals have been found to lead to an increase in anxiety over the course of a term (Pintrich, Conley, & Kempler, 2003).

### ***Physical Study Environment***

A single study (Cox, 2011) showed influences linked to the physical study environment. The study was exploratory, relied on interviews, and used photographs as a tool for eliciting memories and opinions; it was not dedicated to the test-preparation context but investigated the spaces in which university students study. Many locations were campus-related and are thus largely irrelevant here. The study found that de-personalised and regimented environments predicted a propensity for surface preparation. The study showed students to prefer study locations that were well-resourced and low on social and noise distraction.

### ***Texts***

We already know texts to influence studying (e.g., p 24) and bearing in mind that studying is mostly about private reading (Masitsa, 2006), the effect is hardly surprising. Texts are important in this study because students mostly study from texts. While test-preparation texts are not analysed here, how students interact with them is relevant. The literature reveals that student experience with texts in knowledge-based environments can affect students' subsequent learning (Mamllok-Naaman, 2011), and according to Pressley et al. (1997) textbooks have the potential to undermine learning where they are found wanting. Students can be inclined to highlight already emboldened text and pay more attention to emboldened or italicised text in their strategies (Feldt, 1990). Despite modern technological advancements, students spend most of their study time with textbooks and not computers (Narciss, Proske, & Koerndle, 2007).

This concludes the review of strategy implementation and we now move to a review of literature showing the state of SRL in South Africa.

### **Self-Regulated Learning in South Africa**

Studies of self-regulated learning in South Africa are found to be under-represented, given SRL's potential relevance. Three authors made specific mention to self-regulated learning. McMillan (2010) sought to understand how academically successful dental students learn. She interviewed seven third-year students about learning strategy, followed with a 45-minute period of observing the student in a quasi-authentic setting, whose meaning was established by a subsequent interview. Her study was motivated by pleas in the literature for rich, qualitative data onto models of motivation and learning. Engagement and being valued ranked highly as key contributors to success, and the

role of the teacher as key to academic development. An earlier study (McMillan, 2005) was relevant to self-regulated learning without mentioning the term, showing that SRL-type research may exist in South Africa but guided by other theoretical frameworks. Kirby and Downs (2007) investigated the status of self-assessment – a metacognitive skill in self-regulated learning – among Grade 12s from disadvantaged backgrounds entering a Science and Biology foundation program at the University of KwaZulu Natal. The program provides skills, resources and self-confidence for tertiary studies. Students were found to come with a surface approach, performance goals, and lack the metacognitive knowledge typically associated with mastery approach goals. According to the authors the research provided overwhelming evidence that students of all achievement levels were unable to accurately self-assess. These findings are important because the students reflect the product of the school system, in a Biology context. Their participation in the program suggests they are possibly from more under-resourced backgrounds than the students in the current study. Lubbe et al. (2006) looked at the relationship between self-regulated learning and keyboard skills in first year university students enrolled in a word-processing course. The results showed that learners classified as self-regulated learners – using a self-constructed and verified questionnaire – were more adept at keyboarding skills than those who were less self-regulated.

Three further studies did not refer to self-regulation but investigated phenomena familiar under self-regulated learning. Masitsa (2006) administered the Study Process Questionnaire (Biggs, 1987) to judge levels of motivation in Grade 12 learners in township schools. The study appears to transgress a number of the requirements for valid self-report instruments (Strydom et al., 2010)<sup>15</sup>. Of serious concern is that instrument was validated against university students: Given the low pass rates in Grade 12 (Parker, 2012, 5 January; Strydom et al., 2010) validation against university entrants but deployment among Grade 12s seems dubious. Moloï et al. (2010) used semi-structured focus group interviews involving an equal mix of four boys and four girls from each of three successful rural schools in Mpumalanga province to investigate what comprised a successful school. The authors gathered what appears to be a maximum of 180 minutes of transcript, using it to propose a new six-quality model. The schools are deemed to be historically black but as the study was completed six years after racial democracy in South Africa, it is unclear the degree to which the purposive selection of only black students represented a fair selection. Likewise students were selected on demographic characteristics alone leaving other aspects of student profiles and their effects an open question. For

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<sup>15</sup> There is no indication of the circumstances under which the forms were completed and thus the diligence of completion. The questionnaire instructions were deemed to be “unambiguous and easy to understand” (p. 126) – important given the poor literacy environment of schools in the study - but there is no objective evidence to support how this was established. The requirement that questions refer to recent activities was not addressed.

example, given students punctuality problems (Organisation for Economic Co-operation and Development, 2008), did these students represent punctual students with a greater penchant for school? The amount of interview data seems on the short side in order to propose a model. A final study by Strydom et al. (2010) related to engagement but was concerned with validating the psychometric properties of the South African Survey of Student Engagement (SASSE) adapted from its American counterpart for the South African university context. This held no relevance for my study.

### **How Students Ought to Prepare for Tests**

The scarcity of test-preparation information and the positive link between strategy use and desired outcomes were the rationale for a seeking an understanding of student test-preparation. It is therefore fitting to briefly consider what the literature says students ought to be doing. As in earlier discussion, a topical approach inevitably sees some overlap with results already mentioned.

The single most useful study giving an overview of the use of techniques/tactics seen to promote self-regulation was a recent monograph by Dunlosky et al. (2013). In this comparatively lengthy publication, the authors identified 10 learning strategies seen as readily implementable and valuable, or simply already in widespread use. No specific mention is made of test-preparation but the relevance to test-preparation is clear. The study aimed to give informed assessment of each tactics' utility according to: learning conditions (independent learning, group study, etc.), student characteristics (age, prior learning, etc.), materials the strategies could apply to (from simple worksheets to complex analyses) and task requirements that strategies could assist in (relying on memory, problem solving, reading for understanding, etc.).

The identified techniques were: elaborative interrogation, self-explanation, summarisation, text decoration, keyword mnemonics, text-to-imagery conversion, re-reading, practice-testing, distributed practice, and interleaved practice<sup>16</sup>. A number of patterns are noteworthy. Regarding utility, practice testing rated high based on empirical evidence that they benefitted students in criterion tasks across ages, abilities, task types and contexts; elaborative interrogation, self-explanation and interleaved practice lacked sufficient evidence to rule on utility. The remaining

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<sup>16</sup> Summarisation, keyword mnemonics, text-to-imagery conversion, rereading, and practice testing are hopefully self-explanatory. Elaborative explanation sees students responding to self-constructed questions regarding the content, making them essentially questions prompting conjecture and reasoning. Self-explanation sees students self explaining their processing, which may promote insight by interrogating new information alongside existing. Text decoration refers to underlining or boldening text, varying fonts, and highlighting. Distributed practice spreads learning across study episodes or different study sessions, as opposed to once-off cramming. Interleaved practice divides study into content or problem units with high internal cohesion, versus mixing up content and promoting mental agility.

techniques had low utility for various reasons: Summarisation and text-to-imagery are seen to benefit some students, in criterion tasks, but the conditions under which this happens are unclear, especially when it comes to achievement tests. Keywords mnemonics work only for short retention spans, and in limited numbers. Re-reading, highlighting and summarising are used by most students, are of questionable benefit to achievement. The researchers see research into the use of tactics for high stakes tests as “crucial for recommending educational changes that will have a reasonable likelihood of improving student learning and achievement.” (p. 5), exactly matching the rationale here. They take the view that

“some effective techniques are underutilised—many teachers do not learn about them, and hence many students do not use them, despite evidence suggesting that the techniques could benefit student achievement with little added effort. Also, some learning techniques that are popular and often used by students are relatively ineffective.” (p. 5)

Several studies offer guidance on specific strategies. We are already familiar with levels of processing effects; these are closely linked to academic goals (Cano-Garcia & Justicia-Justicia, 1994) and a popular area of research, yet have been found meta-analytically (N = circa. 72 000) to be the least in a range of academic outcome predictors at college level (Credé & Kuncel, 2008). Surface processing is unlikely to have long term retention benefits (McCormick, 2011) and is generally not associated with mastery and life-long learning. Students can also benefit from practice tests (Williams, 1997); and repeated testing, compared to the re-reading of the textbook (Karpicke et al., 2009), favoured by most students (Dunlosky et al., 2013). Kirby and Downs (2007) showed students to be overwhelmingly deficient when it came to self-assessing an essay, and also ill-equipped to interpret assessment criteria, irrespective of academic ability. Barber et al. (2011) investigated university students experience of using a computer application to monitor their course progress. By students accounts, the application helped monitor students’ progress, and benefitted their motivation and concentration.

Schraw, Crippen, and Hartley (2006) reviewed selected science education journals from 1996 to 2006, and refer to six teacher instructional practices that emerge as improving self-regulated learning. These findings are especially credible given the meta-analytic method involved and that the domain is Science. They present their recommendations already highly summarised (Figure 6), the headings showing the SRL influence:

*Ways the Six Instructional Strategies Increase Cognitive, Metacognitive, and Motivational Processes.*

	Cognitive processes	Metacognitive processes	Motivational processes
Inquiry	Promotes critical thinking through experimentation and reflection	Improves explicit planning, monitoring, and evaluation	Provides expert modeling
Collaboration	Models strategies for novices	Models self reflection	Provides social support from peers
Strategies	Provides a variety of strategies	Helps students develop conditional knowledge	Increases self-efficacy to learn
Mental Models	Provides explicit model to analyse	Promotes explicit reflection and evaluation of the proposed model	Promotes radical restructuring and conceptual change
Technology	Illustrates skills with feedback. Provides models and simulates data	Helps students test, evaluate, and revise models	Provides informational resources and collaborative support
Personal Beliefs	Increases engagement and persistence among students	Promotes conceptual change and reflection	Promotes modeling epistemology characteristic of expert scientists

*Figure 6: Instructional Strategies (Schraw et al., 2006)*

But it is the statements about test-preparation which are most informative. Poor general test-preparation and test-taking skills are known to negatively impact students' test performance and achievement (Hong et al., 2006; Pressley et al., 1997), and these authors recommend sophisticated study strategies be learnt as a useful starting point to promote achievement. Bednall and Kehoe (2011) and Bothma and Monteith (2004), based on their results, both root for students gaining a broad range of strategies, over specific ones, though Tomes et al. (2011) see the selection of strategies that are *activated* as crucial. But the development of a sophisticated, flexible repertoire of strategies is seen to require a great deal of application and practice over a protracted period and teachers should make a point of applying the skills being learned rather than trying to drill them (Pressley et al., 1997). Miyasaka (2000) asserts that if teachers could understand test-preparation practices from an instructional perspective, they could more easily integrate the practices into their own classrooms: Including test item formats as part of everyday teaching offers students the "best kind" of test preparation and the least questionable from an ethical point of view. An then it seems input should also be tailored to individual developmental levels (Postholm, 2011).

Some researchers look to explicit instruction as the appropriate means of input (McMillan, 2010; Perlman, 2004), the mode reviewed earlier (p. 38). Rubenstein (2004) identifies five problem areas in which students ought to be assisted: general test strategies (timing strategies, knowledge of scoring,

question selection strategies, etc.), problem-solving skills, psychological skills, physical demands, and content-related skills. The authors emphasise the destructive effect of testing something other than what was taught. Miyasaka (2000) offers a similar list. McMillan (2005) presents a rather more specific list of study skills based on observations in the South African context.<sup>17</sup> The bottom line seems to be that learners who are truly self-regulated ought to “rely on an integrated repertoire of cognitive, metacognitive, and motivational skills” (Schraw et al., 2006, p. 130).

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<sup>17</sup> Identifying key concepts, strategies for summarising and organising information, and note-taking skills specific for test-preparation, such as, spider diagrams and mind maps.

## Chapter 4: Methodology

### Introduction

The previous two chapters showed that richer descriptions of SRL phenomena, particularly those which occur in naturalistic settings, are lacking in the test-preparation research field. This chapter begins with argument for implementing a qualitative mode of enquiry, and the multiple-case study methodology in particular. This is followed by explanation of case bounding criteria and how these led to the selection of schools and individual cases within them. The chapter closes with an explanation of the data capture, management, and data analysis, ending with issues of trustworthiness (which include ethical considerations).

### Theoretical Considerations

This section deals with theoretical considerations that led to the use of a qualitative mode of enquiry, and specifically multiple-case study.

#### The qualitative mode of enquiry

McMillan and Schumacher (2001) describe qualitative research as a mode of enquiry designed to gather in-depth information that gives insight into some phenomenon or situation. They see it as important for informing educational practice improvement, and in comparison to quantitative research, as a) recognising the existence of multiple realities, that is, relative knowledge and truth constructed by each individual through their own lens; b) aiming to understand social situations from the individual's perspective rather than a relationship between measured variables; c) invoking broadly phrased research problems, that make extensive use of "how, what and why" (p. 76); d) relying on smaller data sets and fewer participants; and e) having richer, narrative data. The current research looks to understand test-preparation in the educational context as a lived experience of individuals; it presumes no individuals are the same. The study aim, research questions and general approach are rooted in exploration and are thus broad, based in 'what' and 'why'. Qualitative enquiry is thus highly suited to the current study.

The qualitative approach offers a number of methodologies (McMillan & Schumacher, 2001), of which case study, seeks to answer focussed questions by producing in-depth descriptions and interpretations over a relatively short period of time. According to Yin (2009), case study has a distinct advantage over other design methodologies<sup>18</sup> where research questions are of a 'what, why or how' nature, relate to contemporary phenomena, occur in naturalistic settings, are sensitive to

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<sup>18</sup> Including, ethnography, which interprets a cultural group or system; phenomenology, a philosophical consideration of the meaning of a lived experience; grounded theory, which formulates theory, beginning with data (McMillan & Schumacher, 2001)..

context, and include focus on organisational phenomena. Yin later (2014) clarifies ‘what’ as in the sense of ‘what can be learned’, in order to distinguish it from what-styled questions more typical of quantitative research. The current research context and questions conform closely to these criteria, thus case study was chosen as the methodology for this research.

### **Case study as methodology**

In case studies, the case can be an event or an entity (Yin, 2014) and the accurate definition of the case is of primary importance. Yin (2014) refers to the ‘study proposition’ – a statement about the issue that directs us to the sources of information most relevant for addressing the research questions – as pointing to the case. McMillan and Schumacher (2001) state that the case should always be informative of the topic under investigation. In the current study, this pointed to the individual student, rather than a school or test-preparation as an entity.

Unlike statistical studies, case studies are not seen as having samples (Yin, 2009) constrained by issues of statistical representivity (Creswell, 2007), and their findings do not make assertions regarding some ‘population’. What is learned can nevertheless apply beyond the case (Evers & Wu, 2006) as long as the same phenomenon is investigated (Hays, 2004). According to Yin (2014), ‘analytic generalisation’ is possible in the sense of ‘lessons learned’.

While case study can centre on a single individual, it can also apply to a small *group* of individuals in what Yin (1994b) refers to as multiple-case study. ‘Units of analysis’ in a multiple-case study design, that is, cases, have the benefit of being able to corroborate one another, and in so doing, enhance the truth value of statements about the phenomenon concerned. In multiple-case study, the individual cases are seen as ‘replicates’, analogous in the quantitative paradigm to repeating a single experiment for as many times as there are cases. The design offers benefit by reducing the difficulty in real-life contexts of identifying meaningful controls to the unique instances that individuals represent. Given that ‘all’ students practice test-preparation, generalisations about test-preparation seem desirable, and likely to be more meaningful, when based on data from a range of voices, thus the multiple-case route was taken.

Multiple-case study generally employs ‘purposive’ case selection which seeks to identify members who represent maximum variation within the pool of information-rich individuals, sometimes acting as extremes, or ‘rivals’ (Yin, 1994b). According to McMillan and Schumacher (2001), purposive case selection (or ‘purposeful’ case selection, as they refer to it), has a number of sub-strategies including ‘intensive’ selection (to identify members who represent variations in a group, but not extreme variation) and ‘typical’ selection (to identify members who are most representative of a group). This study seeks to understand the typical student as anyone from the majority group of students

showing academic endeavour at a university-focussed school. Identifying the typical student meant being sensitive to certain variations within this student majority, such as, achievement level and sex. According to McMillan and Schumacher (2001), selection seldom fits as neatly into one kind of sub-strategy as theory might suggest. This assertion addressed the dilemma of having to choose one sub-category as most suitable by opening the door to a hybrid approach. Ultimately, this study adopted a hybrid of intensive and typical, purposive case selection, in which 'rival' denotes the 'intensive' variants within the 'typical' pool. How this was operationalised will become clear later.

Yin (1994b) lastly distinguishes between three case study approaches – exploratory, descriptive, and explanatory – though McMillan and Schumacher (2001) see all case study as being essentially explorative. Of the three, the exploratory approach is best suited to conditions where little is known about a phenomenon (Yin, 1994b). This has been shown to apply to students' private test-preparation, resulting in an exploratory multiple-case study approach as the final methodology.

### **Bounding the Cases**

This section presents the criteria by which students were identified for case selection, that is, the case-bounding criteria. A number of the bounding criteria were applied at a high level by virtue of the particular school that students attended, thus this section begins with school-related criteria before moving to criteria associated with the individual. Identification of the criteria was largely guided by Yin (1994a), our test-preparation model (Broekkamp & Hout-Wolters, 2007) covered in Chapter 2, and evidence of test-preparation influences from the empirical data (Chapter 3).

#### **Selection of schools**

The selection of schools had a strong bearing on the nature of the 'typical' students involved in this study, and thus our particular view on test-preparation. A decision in favour of the best-case scenario of test-preparation led to schools focussed on maximising university entrance for their student bodies being targeted. To remain sensitive to the various models of schooling in South Africa (e.g., state versus private; single sex versus boys/girls only), cases were ultimately drawn from a mix of four schools in close geographical proximity to one another in the Cape Town metropole of the Western Cape Province, South Africa. This section gives a detailed, top-down account of the bounding criteria inherited from the school level.

#### **Culture**

Zhu (2009) describes European-American culture, as opposed to Eastern culture, as follows: predominantly individualistic and espousing of individual rights, offering equal opportunity, affording personal freedom and agency in shaping personal destiny, having national curriculum

guidelines that permit a degree of localised control, lower educational expectations, moderate parental involvement, less time spent on academic work, a tendency to view intelligence and ability as 'fixed', a greater emphasis on process as opposed to content, and a generally lower sense of achievement-related anxiety. The South African education system focusses on "each learner's needs and success" (Organisation for Economic Co-operation and Development, 2008, p. 261), and is based on inclusivity and individual rights (Department of Basic Education, 2012), indicators of the system's *prima facie* alignment to the European-American culture described by Zhu (2009). Schools had to subscribe to this cultural norm to qualify for selection.

### ***Academic standing***

Cases must be informative of the topic (McMillan & Schumacher, 2001). To provide a best-case view on test-preparation, schools were sought where test-preparation was presumed to be approaching optimal, that is, best-case. This amounted to schools with an academic focus 'assuring' a path to university, that is, offering every chance of a Bachelor's degree pass. Formally, a school was deemed to have an academic focus where it declared a high regard for academics or university entrance on its website, or delivered an overall Grade 12 pass rate in excess of 98% in 2011, the year prior to this study's commencement. Cape Town, situated in South Africa's Western Cape Province, was deemed a suitable study location, given the Western Cape's repeatedly high standing in the annual provincial academic rankings (e.g., Department of Basic Education, 2012), and the large choice of high-achieving, university-focussed schools in the city, for example, Rustenburg Girls' High<sup>19</sup>.

### ***Funding model and parent body***

Schools in South Africa are either funded by the State, or privately (Parliament of the Republic of South Africa, 1996). Within the State system, the so-called 'ex-Model C' schools may be seen as offering the highest levels of privilege (Jansen & Taylor, 2003). Along with many private schools writing the State examinations, these schools dominate the Western Cape Education Department's annual academic excellence awards (which take Bachelor's degree pass rates into account), for example, the 2011 awards (Western Cape Education Department, 2012). Both models of school are well-represented in the Cape Town Metropole, thus both qualified for the research. Certain private schools in the study area have religious affiliations, but, thanks to the government's directive education (Parliament of the Republic of South Africa, 1996), these are largely multi-faith, discounting religious affiliation as a concern. Religious affiliation featured in only one study (Jeynes, 2003), where links with diligence and course enrolment were observed. While ex-Model C and

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<sup>19</sup> As a school fitting this study's selection criteria, Rustenburg is henceforth used for illustrative purposes.

private schools may be conceived of as traditionally white<sup>20</sup>, the directive also means that contemporary models for these types of school are far more racially diverse (Fleisch, 2008).

Education research presents complex issues (McMillan & Schumacher, 2001); what attendance at a fee-paying school means about a case is one such, but issues of money risk questions of a sensitive nature (Marks, McMillan, Jones, & Ainley, 2000), raising ethical concerns. Parents who can afford more expensive schooling might be seen to hold a higher level of academic qualification than those who cannot and thus better positioned to support their child's test-preparation. Chapter 3 showed that parent education can impact academic achievement (Davis-Kean, 2005), and evidence of a positive relationship between parent education, student achievement, and motivation (Zeegers, 1999). However, the relationship between qualification types – academic and trade – and wealth is not straightforward (Marks et al., 2000), and in South Africa is further complicated by redress factors. Students' enrolment at fee-based schools does not mean that parents all pay fees to the same extent, if at all; State schools offer fee exemptions on a sliding scale according to need (Parliament of the Republic of South Africa, 1996) and students may attend schools on scholarship or bursary programs. As far as this study is concerned, attendance at a fee-based school brings no assumptions about students or their test-preparation.

### ***Examining body and curriculum***

The external examining body that a school is affiliated to determines the curriculum and assessments that students face. For example, private schools opting to write the Independent Examinations Board (IEB) examinations would follow the IEB curriculum (About School Assessment, 2015). Curriculum has observable effects, for example, it affects academic load (Berry et al., 2010; Entwistle, 1987; Thomas, 1988; Van Etten et al., 1997) which cascades to students' SRL (Entwistle & Tait, 1990), thus examining body affiliation warrants attention.

Private schools are in the vast minority in South Africa (South African Government, 2015). Many, though not most (Gravett, 2011, 14 Jan), administer the IEB final Grade 12 examination, though they have the option of writing the state examination, whereas state schools are obligated to write the state exam. In the Cape Town Metropole, the private schools qualifying for this research are somewhat unusual in that many do administer the state examination. To exclude test-preparation influenced by curriculum- and assessment-driven differences, and to stick with the mainstream curriculum, this study only took State and private schools following the State CAPS curriculum (Department of Basic Education, 2011a) into account.

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<sup>20</sup> White in this sense was an official classification of race and implied people of apparently Caucasian descent, as opposed to people from other races and cultures, such as, of Indian, Asian, Middle Eastern, traditional black African, or mixed descent.

The curriculum, in its broader sense, can include extra-mural activity. Extra-murals are not dictated by the State curriculum, though many schools – all, in this study – offer impressive and diverse programs in which students are expected to participate. This is relevant load-wise, though the expected participation puts all students in a similar boat. Ultimately, extra murals did not form part of bounding and instead a sensitivity to load effects was maintained via data logs and case inputs.

***Boys vs girls; co-ed versus single sex models***

Co-educational and single-sex, boys- and girls schools are common in South Africa. Some studies find no gender<sup>21</sup>-related differences between students (Richardson, 1993; Wilson, Smart, & Watson, 1996; Zeegers, 1999), while others do (Lai et al., 2006; Wong, 2005). Boys are proposed to have a much worse time generally in school than girls, leading to possible differences in messages about the value of effort (Dweck, 1986). Some evidence suggests single-sex schools can gear academic education more age-appropriately for both girls and boys than co-educational environments (Younger & Warrington, 2006). Other evidence suggests girls are more short-changed in co-educational environments than boys (Campbell & Sanders, 2002), as evidenced in lower self-esteem and poorer science marks than boys (Salomone, 2002). While the effect is unclear, sex is taken as possibly relevant.

Both sexes are well represented in schools thanks to South Africa’s equal-education policy, thus one girls’ school, one boys’ school, and two co-educational schools were ultimately selected, as detailed in Table 1. To disguise their identity (Kvale & Brinkmann, 2009), the schools are referred to by alias. To ensure a balance of boys and girls, equal numbers were selected from the two co-educational schools. The study design thus incorporated six girls and six boys.

*Table 1: Characteristics of schools used for selection of cases*

<b>Alias</b>	<b>Gender model</b>	<b>2012 Basic annual tuition fees (R)</b>
School S	Girls only	>40 000
School Q	Co-educational	>45 000
School R	Boys only	>25 000
School P	Co-educational	>15 000

<sup>21</sup> Gender is acknowledged as a social construct based on sex.

### ***Subject offering***

Context impacts SRL (Boekaerts & Corno, 2005; Pintrich et al., 1991; Theophilides & Koutselini, 2010; Winne, 2010). While Biology was mentioned in Chapter 1 as the domain in which test-preparation was investigated, this was largely applied at school level.

Students all take a mixture of compulsory and elective subjects, which they finalise going into Grade 10, presumably discontinuing subjects for which they are least motivated. Investigating test-preparation in a subject for which students are motivated was seen as in line with the best-case test principle. Biology is one of the subject options. According to 2010 statistics (Department of Basic Education, 2011a), the latest available at the time of case selection, Biology had the highest national enrolment outside of the compulsory subjects: approximately 285 000 fulltime matriculation candidates. As a science subject, the current study regards Biology as part of the push towards improved national Mathematics and Science enrolment and achievement (Department of Basic Education, 2013). Further, Biology has a large body of content, and places high demands on cognitive processing and skills (Department of Basic Education, 2011c), suggesting significant test-preparation demands. For these reasons it was decided to use a Biology test, which meant schools had to offer it, and students had to be taking it.

### ***Class size***

Students in smaller classes might be perceived to benefit, for example, from the more individualised teacher attention they afford, and small class sizes are often advertised by schools, suggesting it to be a drawcard. Class sizes vary between and within schools. The closest generalisation of class size is the officially targeted teacher-pupil ratio, which at its highest (in 2005) was 1:32 (Organisation for Economic Co-operation and Development, 2008). This average ratio does not, however, translate well into individual class sizes, which can fluctuate enormously, though classes having 35 – 70 students are seen as 'large' (Hofmeyr, McCarthy, Oliphant, Schirmer, & Bernstein, 2013). Rustenburg Girls High, an ex-Model C school in the study selection pool, for example, advertises class sizes on their website that "vary considerably", with the largest "averaging 30, but never more than 34"; and students who "benefit from having fairly small class sizes" by receiving "much individual educator support and supervision" (Rustenburg Girls' High, 2015a). In order to ensure that cases were not unreasonably compromised by class sizes, cases were only drawn from schools having Biology classes of less than 40 students.

## **Selection of cases**

This section details the bounding of individuals within the four chosen schools.

### ***Grade***

Grade 11s formed the case selection pool. Chapter 3 reviewed studies demonstrating an age effect (e.g., Veenman et al., 2006) and its impact on learning (e.g., Lai et al., 2006; Zeegers, 1999), and study strategy (which includes test-preparation) to vary according to school grade (Postholm, 2011). Grade was seen as a proxy for age, thus selection of students from a single grade largely negated an age effect, except for repeat students, who were therefore ineligible as cases. Being eldest, Grade 12s were presumed to be the most mature, and with their NSC exams looming, most committed to studying; older students are seen to have their strategies better bedded down (Perels et al., 2005). Interfering with students in such an important year was, however, seen as ethically dubious, thus Grade 11s were chosen as the best available option.

### ***Teacher***

Chapter 3 reviewed numerous studies showing the central and complex role of the teacher in the lives of students (Broekkamp & Hout-Wolters, 2007; Thomas et al., 1993; Van Etten et al., 1997) . This raised questions concerning what ‘type’ of teacher the typical student might experience, and the implications for test-preparation. Despite the assumption that all teachers are professionals, education in South Africa is sometimes compromised by teachers who are uncommitted (Organisation for Economic Co-operation and Development, 2008), and even ‘good’ teachers are not ideal all of the time (Davis, 2010). Given the importance of the student-teacher relationship (e.g., Furrer & Skinner, 2003), a first criterion saw students having to be in a healthy teacher-student relationship, from the teacher’s perspective.

Biology teachers following the State curriculum are expected to adhere to the CAPS requirements (Department of Basic Education, 2011c), but in this study a proven teaching record is also regarded as a marker of being a ‘good’ teacher. A Head of Subject can be considered to represent a teacher with such a record – perhaps with a solid grasp of subject content, success with students and colleagues, and high professionalism. To shield test-preparation from the impact of inadequate teaching, the case-selection pool was limited to students taught by the Head of Biology. A fall-back plan allowed for cases to be drawn from a class taught by a teacher that the Head of Subject could vouch for. To restrict class-related effects, the plan was to draw cases from a single class. In so doing, the cases were all assumed to experience ‘good’ teaching.

### **Test**

The adaptation of study strategy can be a function of the particular test and its cognitive demands (Abd-El-Fattah, 2011; Broekkamp & Hout-Wolters, 2007). Bounding cases on factors relating to a test is seen as dealt with by assuming school adherence to the Biology CAPS assessment requirements, such as, correct mark allocation, cognitive-level assignment, and breakdown by question style (Department of Basic Education, 2011c). Biology tests are set according to cognitive demand criteria, of which “Knowing Science” contributes 40% and non-applied understanding counts a further 25% (Department of Basic Education, 2011b, p. 67). Each test counts a minimum of 50 marks but timetables usually restrict these tests to one hour and whatever marks that allows. Inter-school test demand variability was therefore assumed to be eliminated. The CAPS requirement for internal moderation ‘ensures’ quality control and takes care of test-to-test disparities within a school. Any departure of the *actual* test from what students *expected* was considered irrelevant, on the basis that it cannot influence past actions. This eliminated the need to analyse the test itself. Together, these assumptions removed concerns that test variation might compromise generalisability, and opened the door to using any standardised test. Contemporaneous tests, that suggested a common amount of exposure to Grade 11, were however favoured.

### **Individual students**

The cumulative bounding effect achieved thus far left most students in the Head of Biology’s Grade 11 class eligible for selection. This section details the bounding at the level of the individual.

#### *Parental assumptions revisited*

It was explained earlier (p. 52) why school selection made no claims about parental body. Nevertheless the reality is that individual parents *can* influence their child’s performance (Furrer & Skinner, 2003), for example, a student’s sense of well-being can affect their goals (Boekaerts & Corno, 2005). To exert some simple bounding on the level of individual ‘home-life’ and to ensure a study location conducive for studying (Cox, 2011), cases were required to have their own room in which to study. Cases were also required to not display serial absenteeism, for what this might say about home conditions.

#### *Personal traits*

Internal, personal processes are of demonstrated importance in study-related research (Broekkamp & Hout-Wolters, 2007). Numerous SRL scales (e.g., LASSI (Weinstein et al., 1988)) are available to classify students on, for example, self-efficacy, engagement, goal-orientation, and academic anxiety. Bounding cases by such traits, however, runs counter to the spirit of listening to the voice of the individual that is typical of case study, the exploratory nature of this research, and the notion of the

typical student, thus it was discounted. Despite this, students exhibiting recurrent behavioural- or cognitive challenges were excluded on the basis that these are not the norm and may point to a lack of even basic study and test-taking skills (Rozalski, 2008).

### *Achievement*

Achievement in the form of 'marks' lies at the heart of test-preparation and the schooling system; and records are readily available.

Achievement level was shown earlier (see p. 31) to impact students' SRL and test-preparation, and has close ties with self-efficacy. Reflection on past achievement, for example, is known to affect the formulation of self-efficacy belief (Thomas, 1988; Van Etten et al., 1997). High achievers are seen to generally display a greater use and range of SRL strategies (Kitsantas, 2002; Zimmerman & Martinez-Pons, 1986; Zimmerman & Martinez-Pons, 1990), thus their inclusion in particular was seen as part of the best-case approach. However, achievement level can also be ambiguous where, for example, teachers compensate for student shortcomings (Boekaerts, 1999). Ignoring achievement level, or favouring one level over others, ran counter to the hybrid case selection approach and the notion of the typical student, thus criteria were applied to ensure cases represented a broad, yet typical, marks spectrum.

The three rival cases at each school were selected to represent 'low-', 'middle-' and 'high-achieving' students, translating in this study to an E-symbol (40 – 49%), C-symbol (60 – 69%), and A-symbol ( $\geq 80\%$ ) respectively. Marks below an E-symbol were considered extreme for the target schools, and while an A-symbol is uppermost on the scale of symbols and *seems* extreme, a real-life example<sup>22</sup> gives credence to the opinion of Jansen (2012, p. 2), namely, that it is commonplace to "find students easily obtaining 7 distinctions [i.e., 'A's]". Selection by achievement was based on students' average mark in the pair of 2011 Grade 10 final Biology examinations.

### **Summary**

Case selection criteria saw target schools comprising a mix of boys-, girls-, and co-educational South African schools, both private and state, following the State curriculum, and pursuing near-perfect pass rates and high Bachelor's degree pass rates. Individual criteria saw cases narrowed to 'A', 'C', or 'E', non-repeat, Grade 11, Biology students from a 'small' class taught by the Head of Biology; having a healthy relationship with their teachers, their own room at home in which to study, and facing a standardised test.

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<sup>22</sup> In 2014 the Rustenburg Matrics' individual subject averages were all above 60%, with ten subjects over 80% (Rustenburg Girls' High, 2015b).

## **Data Collection, Management and Analysis**

### **Tools**

Test-preparation data was gathered on each case by, a) interviewing each student, the student's teacher, and their parents; b) having students keep a diary of their test-preparation processes; and c) calling for test-preparation artefacts. These tools are described in turn.

### ***Interviews***

Interviews are one of the most powerful ways for humans to understand one another (Fontana & Frey, 1994). Interviews were held with the students' Biology teachers, their parents, and the students themselves, following semi-structured protocols. This protocol encourages an individual to reflect on thoughts and feelings and is suited where there is less need to keep an interviewee to a particular train of logic (Boekaerts & Corno, 2005). The interview protocols are presented as Appendix II (p. 122), Appendix III (p. 123), and Appendix IV (p. 124) respectively. Interview questions addressed the research questions in an explorative manner, based on commonly reported aspects of SRL in the research literature. Interviews were recorded using a digital voice recorder, and typically lasted 40 minutes-to-an-hour. Interviews were later transcribed verbatim in a way that ensured loyalty to the interviewees' oral statements and non-verbal signals, seen as important by Kvale and Brinkmann (2009), using their system as a guideline. Disfluencies and pauses were captured. Transcriptions doubled-up as evidence of an audit trail (Creswell, 2007).

Teacher and parent interviews allowed insight into influence on test-preparation from these sources, allowed a neutral perspective on reported points of view, and afforded the opportunity to hear outside perceptions of students' test-preparation. These interviews later acted as sources of triangulation with student data. It was noted that parents were all highly supportive of the research and invariably reflected on the interview as a highly valuable event.

Though most senior high school students in the study by Nairn, Higgins, Thompson, Anderson, and Fu (2006) elected a group method to discuss a personal issue, the current research employed the individual interview technique. Student interviews were conducted once the other forms of data collection were complete, and following an initial review of the diary and artefacts for legibility, face-value comprehension, and probing opportunities. The students' interviews were therefore conducted against the fullest possible backdrop of students' test-preparation.

### ***Diaries***

Diaries in SRL literature appear most commonly employed as time logs of study activity (e.g., Burns, 2008; McCormick, 2011) but their wider, though rare, application is evidenced in a review by Tomes

et al. (2011). Diaries were used in the current study to a) capture data in close-to-real time (Boekaerts & Corno, 2005); b) overcome the issue of inaccurate recall associated with retrospective reporting (Tomes et al., 2011); and c) act as a source of internal corroboration with other sources. Diaries are suitable for older students (Boekaerts & Corno, 2005), as Grade 11s are taken to be.

Diaries were given to students to log their daily test-preparation activity, following the lead of (Boekaerts & Corno, 2005; Cerrito & Levi, 1999), and reflect in free text on their test-preparation behaviours and thoughts. The diary also required responses pertaining to each student's standard study practice, creating an opportunity for inconsistencies between 'habitual' responses and any specific entry to act as a flag for non-standard behaviour, questionable reliability, or genuine differences in student actions and perceptions.

The research followed the lead of Lubbe et al. (2006) to make a diary adapted for record-keeping. A 36-page, A4, exercise book was used. The diary had the following elements:

- Outside cover page with identifying information (Appendix V, p.125).
- Instructions pasted inside the front cover (Appendix VI, p. 126). These included instructions for completing the diary, contact information, and participants' rights. Instructions followed the advice of Bell (1993) in Innis and Shaw (1997) to be explicit, and sufficiently robust to last the diary period.
- Study Habits section, used to establish test-preparation habits and students' awareness of any test criteria. (see Appendix VII, p. 127)
- Daily Entries. Except for the above, the diary was blank and reserved for entries. This prevented a *pro forma* from influencing entry length and exerting a demand effect (Feldt, 1990). Students were required to make entries on each of the seven days leading up to the test. A sheet of daily tear-and-paste banners provided space to record start and end times of sessions and other commitments, such as, extra-murals. The 'Day 1' banner was pasted in as an example. Though some students are known to (and did) write more than others in a diary mode (Boekaerts & Corno, 2005), no entries occupied more than two sides. The banner for the last entry ('Day 7') included a reminder to write an entry about test-preparation that was likely to occur on the day of the test. (Appendix VIII, p. 128)
- Compact Disc (CD). A sleeve pasted in the diary contained a blank, formatted R-CD, for storing electronic copies of study artefacts.

Students were required to complete their entries as soon as possible after studying in order to minimise unreliable recall (Tomes et al., 2011), and record 'reflections' about their test-preparation

on days they did not study, the latter in an attempt to boost metacognitive input. Consecutive bouts of test-preparation were deemed to be discreet sessions when separated by a break of more than 30 minutes, and required separate entries. To minimise negative impact due to over-burdening, students were asked to merely distinguish between multiple sessions on any given day and only report on any differences. Diaries were issued to students pre-assembled in an unsealed, personalised (but anonymous) envelope, as a Research Pack. Students were instructed to seal their completed materials in the envelope and hand the Pack to their teacher on the day of the test.

### ***Artefacts***

Artefacts are viewed as good practice in qualitative studies (Yin, 1994b), and were used by Cox (2011). Students were asked to provide illustrative examples of test-preparation as artefacts (or electronic copies thereof), described to students as anything they produced during or for test-preparation, or used as a source material during test-preparation. Photographs of study notes, printed materials, exercises, wall planners, and room layout were suggested as ideas. Artefacts provided another means of internal corroboration, and allowed students to convey what is otherwise difficult or time-consuming to convey verbally.

All artefacts were received as electronic images from students, apparently captured via cell phone. The utility of some images was compromised by poor focus or awkward camera angle. Some students experienced 'problems' transferring images to CD, and subsequently in sending images by email. It was therefore sometimes necessary to take photographs at the student interviews, a recommendation for future researchers.

### **Ethical considerations**

Confidentiality of information and identity is a vital ethical consideration (Kvale & Brinkmann, 2009). Aliases were used for schools and individuals; as far as the study design was concerned, only the three students and their teacher were aware of one another's participation. It is not possible to distinguish state versus private schools in this thesis, thanks to the inclusion of both funding models. Confidential information from the teacher and parent interviews was not divulged to students; other information was used rarely and then only with the source's permission. The grounds for the students' selection was withheld from students and parents in order prevent participation being used as a basis for making personal assumptions; only teachers were aware of academic achievement as a criterion. Teachers provided names of case candidates for each achievement band; marks were therefore not divulged by the teacher. The use of personal pronouns for teacher participants does not necessarily indicate their true sex, preventing the formulation of opinion based on this basis.

Interviewees should know the purpose of a study beforehand and should give informed consent before participating in a study (Kvale & Brinkmann, 2009). Schools, students, and parents received comprehensive information about the research and were required to sign their relevant documents (Appendices IX, X, XI, XII, pp. 129 – 133) before the research commenced. The documents included the researcher’s contact information. Participants were informed up front and again at various points in the study of their right to unconditionally withdraw from the research. No incentives were offered to elicit participation or reward particular responses. Schools were asked to offer recognition to students who participated, as per the lead of Nairn et al. (2006), but none agreed. In accordance with the ethical considerations offered by Kvale and Brinkmann (2009), the interviews were designed and conducted as low stress events that avoided having personal consequences for the interviewees, and the penetration of the subsequent analysis was maintained within licence. An ethical responsibility was felt towards students experiencing study-related issues. To avoid influencing the data, assistance was offered to students after data collection was complete, but no students took up the offer.

Research in education faces challenging constraints, one being ethical and legal considerations attached to the involvement of public institutions (McMillan & Schumacher, 2001). Research that reflects on schools, or impacts parties under school authority, requires permission from the respective education authority. The current research: did not identify schools, was conducted outside of school hours and the school context, asked students what *they* did and thought regarding test-preparation, was not intent on, nor revealed, information about individual schools and teachers, and was not a state-private comparison. All interaction with teachers took place entirely in teachers’ private capacity, in their private time, at their and the schools’ agreement, with no coercion to participate. Comment on LO was sourced from published research or primary sources. Grounds for Departmental permission were therefore unnecessary.

This research adhered to the design approved 23/10/2012 by the University of Cape Town Ethics Committee.

### **Implementation timeline**

The research implementation was divided into two parts: A pilot phase, which according to Yin (1994b), is particularly apt in exploratory case studies for test-running procedures and protocols; and the main data collection.

### ***Pilot design***

The pilot ran at School Q in February/March of 2013. A letter outlining the purpose of the research (Appendix IX, p. 129 ) – as recommended by Creswell (2007) – was delivered for Headmaster’s

approval early in the 2013 academic year. To cater for possible rejection, five prospective schools were lined up to participate in the study. Following approval, a meeting was held with the Head of Biology, explaining their role in the research and to discuss implementation details. A short-list of candidates fitting the required selection criteria was prepared by the teacher, and cases were drawn 'from the hat'.

Personalised invitation letters (Appendix X, p. 131), and forms of Parental Consent (Appendix XI, p. 132) and Student Assent (see Appendix XII, p. 133) were then issued. The teacher's offer to assume responsibility for this and all subsequent logistics involving the students was gratefully accepted. One student declined participation due to a spike in extra-mural commitments. A replacement was found by the procedure just described.

A Student Briefing Meeting (see Appendix XIII, p. 134 for the agenda) was held with the cases at a mutually agreed time and place after school hours. This occurred roughly two weeks before the test, leaving students enough time to assimilate the brief without losing the sense of urgency. The meeting was used to introduce the research to the participants, collect the Assent/Consent letters, hand out the Research Packs (see p. 59), walk through the instructions, and explain their rights as participants. It was confirmed before adjourning that students were clear on what was expected of them, especially the expectation to 'study for the test as they typically did'. The meeting lasted roughly half an hour and was not audio recorded. On the morning of 'Day 1', students were sent an SMS reminder of it being 'D-Day', and then left to complete their diaries.

On the day of the test, one student forgot their Pack, one requested an extra day to complete the two-part 'Day 7' entry, and one wrote the test a day late. This delayed the submissions. The Research Packs were collected a few days hence at the teacher interview (see p. 59). The interview was followed a few days later by the three parent interviews; and the next day by the three student interviews. Interviews were scheduled as close to the test as possible to ensure memory of events was as fresh as possible. In the lead-up to the student interviews, all available material was reviewed and colour printouts of electronic images were made. Diaries and artefacts were taken to the student interviews 'just in case' where they proved to be highly useful. The interviews concluded the pilot data collection, and interviews and diaries were transcribed by the researcher (p. 59).

The pilot proceeded without concerns, and the data were subsequently pooled with that of the main study. A few lessons were learned: Having the teacher coordinate students was recognised as the best option, and issues with student reliability advised the need for backup plans, especially with respect to the photographs. Minor adjustments were made to the interview protocols; wording, and the exclusion of one question in the student protocol that proved too abstract for students, making

them uncomfortable. The options for students to choose their own aliases, and record diary entries in audio format, were not taken up by the students, suggesting they were superfluous, but a decision was made to keep them. The issue of photographs not being named as per the instructions was ignored given that the context of images was self-explanatory and could be linked, if need be, to an interviewee by cross-referencing image metadata with appointment schedule details. The pilot surfaced the need to employ the services of a research assistant (to manage meeting arrangements), and a professional transcriber.

### ***Main study***

After receiving proof of concept from the pilot, the procedure as for the pilot was rolled out at three further schools. All schools and students approached in the main study accepted, the personalised approach apparently playing a facilitating role. Accommodating individual school test schedules, extra murals, school holidays, and other tests was complicated and led to data collection coinciding at two schools (School P and School S). The E-symbol student at School S withdrew for personal reasons too late to find a replacement, reducing the final case-count to 11 students.

Some teacher interviews occurred in the lead up to the test, but this was perceived to pose no issues. At School P, the fall-back plan of selecting a case from a class other than the Subject Head's was called upon, leading to a second teacher being included. Students continued not to show a preference for choosing their own aliases or recording audio diaries, confirming that these instructions could have been streamlined. Importantly, diaries almost invariably lacked references to thought-processes or metacognitive information, demonstrating the importance of the interviews with this age group. Boekaerts and Corno (2005) see younger students' descriptions of inner thoughts as possibly hampered by an insufficient vocabulary. Data collection took three months, and ended in late April of 2013.

### **Data management**

The research generated a large amount of data: 11 each of student interviews, parent interviews, photograph sets, and diaries; and five teacher interviews. Data losses were avoided by making back-ups of each interview recording and CD on the day they were received. Hardcopies were made of all electronic materials. From the outset, each individual's data was assigned an identifier that associated the data back to the source. An Excel Gantt chart was used for scheduling, and a useful means of cross-checking with electronic metadata 'just in case'. For audit purposes, most arrangements and communications were done via email. Password-protected backups of all data were kept online and on a portable device.

### **Method of analysis**

In multiple-case study design, it is typical to begin with a detailed description of each case (within-case analysis) and follow it with a cross-case analysis aimed at identifying themes that transcend cases (Creswell, 2007). Within-case analysis in this study included condensing (Kvale & Brinkmann, 2009) the data into a usable format, and seeking assurances that data was sufficiently trustworthy to act as a basis for thematic analysis. Deficiencies in student diaries and artefacts, such as, the occasional omitted or retrospective entry, and the lack of metacognitive reporting, were compensated for by the student interviews. This made it possible to analyse students with partially incomplete materials as fully-fledged cases, even PE, whose diary was essentially empty

### ***Within-case analysis***

A student's diary, interview and artefacts represented internally triangulated sources, while parent and teacher interviews acted as external sources of triangulation; triangulation is an important feature of trustworthy research (Creswell, 2007).

A trial of three CAQDAS packages saw Microsoft Excel adopted as the analysis tool. A workbook comprising five spreadsheets was created in order to condense and synthesise the data into a workable format, one for each of parent interviews, teacher interviews, student interviews, diaries, and artefacts, that is, the document types. The same row within each spreadsheet was reserved for a case, while each column comprised a category, either identified ahead of time from the literature (e.g., Hadwin et al., 2001) as being of likely importance, or by virtue of being embedded in the diary as a requirement, such as, 'Study location' and 'Session length'. Each spreadsheet had its own 'category set', as relevant to the document type. Some categories appeared in more than one set, such as, 'Standard strategy', while others, such as, 'Number of hours', appeared only in only the Diary spreadsheet.

Analysis of a case initially began with a review of all the source content in order to establish a feel for the case as a whole and the adequacy of the *a priori* category sets. A thorough review then proceeded. On a per document basis, content was divided into 'blocks', corresponding to the 'natural elements' of Kvale and Brinkmann (2009), and distinguished from adjacent blocks on the basis of having a coherent meaning. In the case of the image-based artefacts, meaning was put into words based on the researcher's interpretations and deductions, guided by student input from the interview and diary references. Using the relevant spreadsheet, the essence of each block was then paraphrased as an 'element' into the appropriate row, under the most suitable category, or categories if the meaning was multifaceted. If no suitable category existed, one was created, for example, 'Medication'. Assignment of an element to a category amounted to the coding or tagging

of text that is common practice in interview analysis (Kvale & Brinkmann, 2009; Usher, 2009). Elements varied in length depending on the nature of the narrative. To enable the later conversion of the populated Excel spreadsheets into Word format, and manipulation (re-organisation) of the data in Word without the risk of losing track of any elements inadvertently orphaned, all Excel elements were appended with the starting line number of the element's block in the original source document.

The early stages of categorising elements led to an initial expansion of each category set, though the sets soon stabilised. The system of identifying blocks, and recording them as appropriately categorised elements, saw each row expanding as sometimes more elements were added to the same category. On completion, a completed row represented a fully paraphrased (condensed) version of the source document, with all elements tagged, and the target for subsequent analysis.

Initially, all documents for a case were processed consecutively in an attempt to construct a holistic view of each case. This supported within-case analysis but, because of the multiple-case study approach, activity switched to processing all documents of a particular type together (for example, all diaries). This approach accelerated the stabilisation of the category set and, importantly, facilitated greater consistency in the categorising of elements. Consistency was important given the absence of member checking, the usual expectation (Dellbridge & Lubbe, 2012; Hays, 2004; Kadri et al., 2011). The review of a completed spreadsheet saw categories demonstrating a broad overlap collapsing into one; and occasionally the reassignment of elements in one poorly represented category to another appropriate category and the deprecation of the original. For example, 'Study for understanding' and 'To improve marks' represented reasons for studying in the diary but students did not mention these, hence they were deprecated in the Diary spreadsheet. Perhaps due to the rigour of the initial category selection, and contrary to the experiences of Usher (2009), there was no need to split categories.

On completion of the paraphrasing, within-case analysis amounted to considering each case's five rows (one from each spreadsheet) as a collective. An Excel format is not conducive for textual management or analysis and so the completed spreadsheets were first exported, each to their own Word document, to allow for reorganisation and key-word searching. Random back-checks against the Excel version verified the integrity of the export. Within-case analysis of each case sought evidence of corroboration between the five data sets on the one hand, and no *inconsistency* on the other, and led to continual cross-checking between the sources. This represented a thorough implementation of triangulation and afforded a high degree of certainty that a clear and internally consistent picture of each case was established on which cross-case comparison could proceed. The

global category set of the student effectively represented the outcome of within-case analysis per case.

Apart from the artefacts, which largely reflected information mentioned in the interviews and diaries in visual format, the content of each case's four sources demonstrated a relatively high degree of mutual exclusivity. Likewise, the input of the teacher and parent were found to have little overlap with the actual test-preparation accounts of the students. Importantly, input that did overlap inevitably agreed in all but two minor instances, indicating a high degree of trustworthiness in the data. Teacher inputs, which revealed little of individual cases, were valuable for understanding the educational environment in which test-preparation was being conducted, while parent inputs mostly contributed to an understanding of test-preparation development, the third objective.

### ***Cross-case analysis***

The primary role of within-case analysis in this study was to provide a sound base from which to launch cross-case analysis and surface cross-case generalisations (themes), in accordance with the analytic generalisation of Yin (2014). Themes were defined as phenomena presenting in most of the students, that is, in six or more cases. Scarce but expected phenomena were also regarded as significant by their absence, and were recognised as 'negative' themes, but only where a phenomenon was approaching completely absent in order to avoid rendering 'every' observation as a theme.

The within-case methodology was conducted with the downstream cross-case analysis already in mind, thus when the time came for cross-case analysis, it was largely a matter of interrogating each Word document on a category-by-category basis for elements that were common across cases. The focus on one document at a time was largely possible given the documents' high degree of mutual exclusivity. The accurate definition of themes was subject to nuances, flavours, and contexts that were sometimes stripped away in the paraphrasing of the elements. In the post-modern view, fixed meaning ought to give way to such nuances, differences and paradoxes (Kvale & Brinkmann, 2009). In such instances, the source data was revisited, a simple process thanks to the line numbers embedded in the elements, Word's search capability, and the manner in which data could be dynamically organised. Themes emerged largely by reorganising the Word document so as to place category information together, considering the subtleties of individual elements, and recording compatible accounts as tallies. Compared to within-case analysis, cross-case analysis had to deal with pictures of cases that were not necessarily complete in precisely the same way, depending on how the respective narratives had played out.

## **Validity, Reliability, and Trustworthiness**

The terms 'validity' and 'reliability' have their roots in a positivist philosophy of inquiry (Golafshani, 2003), raising questions over their place in qualitative research (Cohen, Manion, & Morrison, 2007). The rejection of reliability and validity as directly transferable to qualitative research in the 1980s (Morse, Barrett, Mayan, Olson, & Spiers, 2002) caused Lincoln and Guba (1985) to reframe reliability and validity as 'trustworthiness', consisting of four criteria, namely 'credibility', 'transferability', 'dependability', and 'confirmability'. While the authors later revised their definitions, many works continue to favour using these four constructs (Golafshani, 2003). Ary, Jacobs, Razavieh, and Sorensen (2006) see the criteria as 'standards' for addressing issues of 'rigour', in which credibility addresses 'truth value', transferability addresses 'generalisability', dependability addresses 'consistency', and confirmability addresses 'neutrality', equivalent respectively to 'internal validity', 'external validity', 'reliability', and 'objectivity' in the quantitative paradigm. According to Cohen et al. (2007) and Ary et al. (2006), rigor is achieved through honesty, depth, richness, scope, triangulation and objectivity. This section follows the guidelines of Ary et al. (2006) to argue for the constructive trustworthiness of the data. Reference is made in the argument below to various sub-criteria seen by these authors as operationalising each criterion, using their terms. These are all identified in single quotes, and for readability, the authors are not acknowledged after each term.

### **Credibility**

Triangulation is a vital source of credibility (Creswell, 2007; Darke, Shanks, & Broadbent, 1998; McMillan, 2010) on the basis that it leads to richer data, and promotes rigour of interpretations by confirming convergence of data and interpretations. Triangulation was prominent in the current study. Different tools (i.e., diaries, artefacts, and student interviews) gathered data on the case, representing 'methodological triangulation'; and data from parents and teachers offered external perspectives, representing 'data triangulation'. The symmetry in all the accounts, and the absence of contradictions, are good indicators of the data's credibility. To reduce the researcher bias and undue influence of the researcher which detracts from triangulation, teacher and parent interviews were conducted prior to engaging with the diary materials and holding the student interviews. Responses during interviews were not led, though a certain degree of prompting and probing was necessary in student interviews to reach clarity in the students' utterances. While children of the participants' age can be regarded as adults, Borgers, De Leeuw, and Hox (2000) warn that the researcher should not take it for granted. In the sense of the clarity achieved, and the inclusion of the views of all those closest to students' test-preparation, the data is 'complete', bearing in mind that no true exploration ever really is.

Credibility can be undermined where the interpretation of data calls for 'high inference' (Ary et al., 2006). The current study required low inference, thanks largely to its exploratory nature which sought more scope than depth, and the precision of the source inputs. 'Negative-case selection', that actively seeks information contradicting preceding expectations, was addressed by having rival cases within a multiple-case study design, and an exploratory design with open-ended expectations.

'Theory triangulation' is one form of 'theoretical adequacy', and considers how a phenomenon might be explained by multiple theories, instead of just by a chosen framework. Chapter 2 showed the understanding of test-preparation informed by a number of theoretical models, for example, SCT *and* SRL as conceptual lenses; component *and* process models of SRL; and studying *and* test-preparation as contexts. Understanding further stems from the consideration of both qualitative studies, for example, Usher (2009), Van Etten et al. (1997) and McMillan (2010), *and* quantitative works, for example, Hadwin et al. (2001).

Retrospective reporting is subject to inaccurate recall (Boekaerts & Corno, 2005; Tomes et al., 2011; Van den Hurk, 2006). The diary was a means of reducing this effect (Tomes et al., 2011) by having students record in close to real-time, approximating that of traces (Boekaerts & Corno, 2005). The credibility of recall was supported by: a) minimising delay between the test and the student interviews; b) having the diary and photographs available at student interviews to act as a form of 'stimulated recall', requiring students to identify and label their own actions (Boekaerts & Corno, 2005); c) posing questions in the interview schedules continually anchored in the concrete instance of 'the last test', rather than a hypothetical example, and d) adhering to a similar set of interview protocols.

### **Transferability**

Ary et al. (2006) see transferability having four measures. The current research provided 'descriptive adequacy' by giving full, rich descriptions and including numerous quotes in support of the findings. Interviews were transcribed with disfluencies and annotations designed to preserve the original nature of the interviews. 'Similarity' is the extent to which the research represents a context or entity that is similar to others; test-preparation was tightly bound in the current study but it is common as a general phenomenon to 'all students everywhere'. Transferability is enhanced by 'cross-case comparison' which is inherent in the multiple-case study design and has been demonstrated. 'Reactivity' is the extent to which the research impacted the data, and was minimised in the current study by students being told to 'study as you normally do' (and they mostly did). Researcher cuing can lead to a tendency towards socially acceptable answering (Ley & Young, 1998); completing the diary in private was seen to reduce such an effect. A 'clear conceptual framework'

(i.e., test-preparation as a context of studying under SRL) provided a well-understood and solid ground on which to base an understanding of test-preparation. The research drew on principles from similarly structured, qualitative studies, such as, Usher (2009), Van Etten et al. (1997) and McMillan (2010), facilitating its comparison with such studies.

### **Dependability**

Guba and Lincoln (1998) regard dependability as relying on stability of observation, that is, that the same observations would have been made irrespective of what the researcher was looking for, though they simultaneously acknowledge the existence of idiosyncratic differences between individuals. Being wide and exploratory, the study was open to whatever presented, reducing the potential influence of a particular observer intent. Ary et al. (2006) see an 'audit trail' as the most convincing means of establishing dependability. Clear evidence of an extensive audit trail has been reported, through extensive and meticulous record keeping. 'Replication logic' involves conducting the research in multiple settings and with different sets of people to look for consistency of findings. As with cross-case comparisons, replication logic is inherent in the multiple-case study format.

### **Confirmability**

Confirmability appraises the degree to which another set of investigators doing the same study would arrive at the same interpretations and conclusions. The audit trail, triangulation and rich documentation are all sources of confirmability. Ary et al. (2006) see a 'reflexive statement' – a declaration that addresses possible bias – as a meaningful vehicle for supporting confirmability: This study has grown out of the researcher's experiences over 20 years as a high school teacher, which included hearing of students' struggles with their studying. Exposure to authors, such as Csikszentmihalyi (1990), Claxton (1999), and Robinson (2001), suggested that the solution to the struggles went beyond mere skills acquisition, and included motivation, student-teacher relationships, and understanding the individual. In adopting an exploration of test-preparation from the students' perspective, the current research avoids topics that are exposed to conflicts of interest, such as judgement of what students do, or the merits of one or another intervention. For the reasons covered, the study is seen as having a high degree of credibility, transferability, dependability, and confirmability.

## Chapter 5: Results

While case study is ideal for understanding individuals (Yin, 2014), multiple-case study is focussed on making generalisations, as in seeking analytic generalisation (Yin, 2014). This chapter therefore does not consider results on a case-by-case basis but presents the research findings in the form of themes, defined earlier (p. 67). The themes are grouped under sections corresponding to the dimensions of SRL – behaviour, metacognition, and motivation. The variation within a theme, that is, the individual case voices, nevertheless remain important and help to illustrate the nature of the themes, thus the themes do refer to individual cases as relevant. These are supported by illustrative quotes. Results which are currently typical of students' test-preparation are written in the present tense, and unless otherwise indicated, all results presented in this chapter refer to typical behaviours. The term 'studying' was used in interactions with the various individuals as the every reference to test-preparation. This convention is evident in quoted extracts in this chapter. Finally, personal pronouns for teachers should not be used as an indication of their true sex.

Most authors use pseudonyms to protect the identity of study participants, for example, Dellbridge and Lubbe (2012) and Doe and Fox (2011), some opting for a name that preserves the ethnic and semantic origin of the original (Usher, 2009). The use of name injects a sense of the individual into a study but it can be difficult in large studies to keep track of individuals. Some researchers therefore refer to their participants by code, for example, '#15' (Martin, 2007). The current study has 11 cases plus teachers and parents, and uses the latter option but with a meaningful, two-letter code for students. The first letter of each student code represents the school (P, Q, R, or S) and the second, the individual's achievement level (A, C, or E). Thus RA denotes the 'A' achiever at School R. Quotes are identified using case identifiers in tandem with codes distinguishing the source type. The system for quotes allows auditing; the reader is not expected to be familiar with the system, though details are provided<sup>23</sup>.

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<sup>23</sup> Additional codes distinguish type of data source (diary/interview) and participants type (student/teacher/parent): 'D' for diary, 'S' for student interview, 'P' for parent interview, 'T' for teacher interview. These are followed by the student code (or just the school code in the case of teachers) and the line number in the source data (to assist readers with access to my data). Thus, 'S-QC-398' denotes a student interview for individual QC, line 398 of the transcription; T-Q-45 denotes a teacher interview for School Q, line 45 of the transcription.

## Behaviour

Behavioural themes are primarily physical or cognitive in nature. Figure 7 provides a quick cross-case comparison of each student's studying for the current test. Because almost all students studied typically (as they normally do) the table also represents typical studying in many respects. School R shifted the test forward by one day; students completed their diaries for six days, hence the three deleted cells in Figure 7.

Case	Tactic	Diary Entry Day							
		1	2	3	4	5	6	7	Test
QA	H, <u></u>				W, Rcs, Pc+		W, Rs, Pc	G	G
QC	H	Rt, Pc, M^	Rt, M^		Rt, M^			Rt, M^	?
QE	H	X		S^	Pc, X	X	Rct, M	S, Rs, G, C	C
PA*								Rt	S, Rt
PC			Rt	S		P+	Rs, C	Rs, O	G, C
PE*	H	?							?
SA*	Ac	S	S	S	S	S	Rds, Pc, M^	Rdst, Pc+, M^	Rs, C
SC	H	S		S, Pd	S	S	Rs^	Pd, Rs	Rs
RA	H	Rst, Pd		Rs^ct	Rst	Rc^st	Pc^, G		G, Pd
RC*	H, Ac					S, Rst	S, Rst		S, C
RE*	H			X	X		Rt, M^		G, C

### LEGEND

\*: Student with preparation atypical in some respect

**Activity type:** ■ - Written activity    □ - Mental activity    ▒ - Mixed activity (written and mental)

**Study duration:** □ - 30 mins    □ - >3 hours of study; breaks ignored    □ - weekend day

**Tactics:** Ac – Acronyms/Poems; H - Highlighting;  - Underlining

### Strategy:

**Activities:** W - Write out verbatim; R – Read; S – Summarise; P – Practice examples; M – Memorise; C – Collaborate;

G - General review; O – Other method; ^ – Performed Aloud; ? – Unknown; X – Missed session. Multiple targets are concatenated per activity.

**Source material:** d - diagrams; + - extra material; c – classwork (activities or examples); t – source text; s – summary/own notes

Figure 7: Infographic summary of students' test preparation activities

The test-preparation of five students was atypical in some respects, detailed below.

Two students used a different strategy to normal, both having run out of time:

- PA typically writes notes for six hours over two days before the test, instead of just revising the notes the night before as shown in Figure 7.
- RE typically summarises and memorises, instead of just reviewing the textbook as shown in Figure 7.

Two students (SA and RC) had minor departures from their typical method:

- SA typically studies for four days before the test; she performed below her goal in the last test so started studying seven days in advance for the current test.
- RC said that he typically gets his mother to question him about his notes but there is no record of this happening in the current test.
- PE only completed Day 1 of the diary, recording where and for how long he worked, but with no detail of his strategy. He typically summarises, revises and memorises his work. There is an indication that the Day 1 entry may reflect what he did on the day before the test, that is, Day 7.

And finally, while RA studied typically, he had already completed summarising his notes before the commencement of his diary recordings.

### **Study location**

Most students spent the majority of their time studying privately at their bedroom desk, though many remarked that in earlier years (junior- to early high school) they had studied in more public areas in the house.

Ten students reported that they typically study at a work surface reserved for their use. QE did not give a typical study location, though according to her mother, QE prefers to study in her room in private. For this test QE studied on her bed, at her desk, and in various locations around the home. In nine instances the work surface was in the student's bedroom, while for the tenth (SA) it was the dining room table, which she has annexed. Of the ten, three (PC, SA and RA) included secondary locations: RA occasionally reviews his notes in the lounge, in which case his parents leave him in private; and PC and SA include sitting on their beds, but only when reviewing or skimming their work. SA wrote the following:

S: On the last day before the test you would find me sitting on my bed with my textbook (to look at diagrams and tables) and with my written notes that I have made, reading over my work and making sure that I know everything. D-SA-28

In the current test, four of the ten mentioned using locations other than their typical:

- QC was ill on the day of the test and spent some time reading his notes in the lounge.
- RC worked for one session at his bedside table, where it was cooler.
- PA spent his once-off session reading over the work on his bed.

- RE was reviewing his work in the study, where his parents make him study, but moved to his bed after his parents retired early. Like PC and SA, he sees his bed as acceptable for doing mental activities.

Nine students study only at home. RE gave input that was vague, and QE had an ad hoc quiz about the work with a friend while waiting for extra-murals.

### **Study duration**

Study duration was mostly derived from the diary entries. While students said they studied normally, the research did impact *when* some students started studying: Having the research on their minds prompted PC, SA and SC to start studying sooner, while QE, PA and RE expressed an intention to study sooner, though they did not follow-through.

The exact total time that each student spent studying was impossible to establish given that all students had a degree of vagueness in their entries. Some students spoke of sessions that “went on ‘til late”, or omitted an end time of a session in the diary. Excluding RE, who did not complete his diary, the total of logged study time ranged from a total of 80 minutes (for QA) to 8 hours 25 minutes (for SC). However RA, who logged 7 hours 20 minutes of studying, had summarised all his work before the diary period began, thus in all likelihood studied the most.

Accurate totals for number and length of study sessions were equally difficult to derive. Some sessions had time restrictions imposed, for example, those that occurred in a free period or between commitments. Except for QC, who adheres strictly to a self-imposed, 45-minute session regimen, the duration of students’ study sessions varied from 10 minutes, spent on a quick review (RA), to 2 hours 6 minutes, spent writing out (QA). Six students recorded at least one study session in excess of one-and-a-quarter hours, as can be seen in Figure 7. Some students can comfortably study for longer than their records show. For example, QA says that she can focus comfortably for two-and-a-half hours before needing a (short) break. Three students mentioned the use of a clock: QC studies strictly by the clock, while RE and QE merely observe the time.

There is an indication that some students did not study as long as they typically might have. PA and RE both said that they ran out of time, and QC also indicated a time pressure:

R: What were you happy with? [Regarding his study for the test]

S: Applied the 45 minute rule. And I did the techniques that helped me the best. I was unhappy about the part that ...<sup>24</sup> not on every day ... I would have liked to fit ... to have fitted in two 45 or three 45 minute sessions but with time and other things I have to focus on other subjects as well so ... S-QC-247

QE said, in relation to a number of short study sessions, that she “intended” to study for longer but did not do so because she “forgot”.

The eight whose study time seemed typical (that is, excluding PA, PE, and RE), logged between four (QA) to nine (SC) sessions over the research period, excluding sessions on the day of the test, which all cases normally have. Five students did some form of study as early as Day 1, seven students studied on four or more of the seven days, and all students studied on at least two days. All studied the day before the test, and for an equal or longer time than on any other single day.

#### **Collaborative study**

No students studied collaboratively before the day of the test. However, eight students referred to the apparently usual group discussions at school on the day of the test. Five students participate in these; one (PC) appears to be torn on the matter; and two (QA and RA) do not get involved:

For QC, being able to recite work in these discussions gives her confidence. SA, SC and RC see their involvement in the discussions as beneficial. In a free lesson (regularly given to the students before Biology tests at School R), RC added to his study notes as a result of a discussion. SC said that it helps her discover material taught in other classes; while SA merely said that she got involved in the break-time discussion. RE gets involved, and in the current test it was a positive experience:

R: In this last test, what were you most happy with?

S: Um. The last test? [pause 10 secs]<sup>25</sup> the um the next morning um we ... me and my friends we normally test each other and there was this one section that I knew well but ... none of my friends knew it. They didn't know at all but ... and I felt confident and I knew it and ... in the test that's where I got most of my marks. S-RE-231.

PC is torn on the matter and is inclined to review her work alone. She illustrates the risk:

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<sup>24</sup> An ellipsis (...) is used to indicate pauses lasting two seconds or less, typically accompanied by grammatical disjuncture.

<sup>25</sup> Square brackets indicate duration of pauses exceeding two seconds, and non-verbal information.

R: How does it make you feel when people react in that way [students going over their work frantically]?

S: If I know what they are talking about then I will feel good, but if I don't then I'm like – *whaaat*? Not so good – then I am frantic. S-SC-1095

Of the two students who shun involvement, QA reads over her work in the car and privately at break. RA actively avoids the discussions, and says regarding getting involved:

S: I don't do that. That's something I will not do.

R: Why?

S: Because everyone ... I just can't do it. In the morning when people gather and they ask each other questions and they start confusing each other because classes vary and different and then they just ... I can't do it. I just walk away. S-RA-728

Later he describes what he *does* do:

S: ... Say I write the test in like the next period I'll try ... and go through everything in that 20 minutes before that test ... I just cram everything in ... when I'm walking to the test I will just read over random stuff.

R: And do you feel that's useful? Constructive?

S: In a way it makes me feel better and also ... I think it builds a lot of stress and ... maybe just makes you just nervous in a way ... ja S-RA-757

His diary entry about test day corroborates his statement, adding further insight:

S: My second session [His first took place at home before school] was in my classroom [In the free lesson where discussions were taking place]. I was sitting in a desk studying relevant information; I would sometimes look around the classroom or stare out the window. I was nervous and stressed. I kept thinking of the test and what could be asked; I kept thinking of my work I needed to study and how I must focus on it. D-RA-234

### **Study strategies**

This section outlines the basic, behavioural strategies that students used for their test. Ten students had strategies that generated artefacts. The eleventh (QC) used to summarise until the start of Grade 11 but subsequently only relies on repeated read-throughs. Of the ten, eight summarise the source material in some way, while QA and PC copy the material verbatim

### **Summarising**

Nine students from across all achievement bands study for Biology tests by summarising their source material. In the current test, two students who would normally summarise did not do so because of time constraints: PA made notes in the free lesson before the test, while RE only read through the work.

Four of the nine said that they typically begin their summarising with a full read-through of the source material, while SC said she reads and summarises on a page-by-page basis. Responding to why he begins with a full read through, RC said:

S: So that I know what to go over when I make the questions [He practices self-testing] and I don't have to spend more time reading over and reading over and going, "OK that's not important." I know what is important and what's not important. S-RC-484

It was evident from the narratives and photographs that, except for RC, summarising for eight summary-makers means précising the source vocabulary by omitting non-essential words, though not in an extreme fashion (Figure 8).

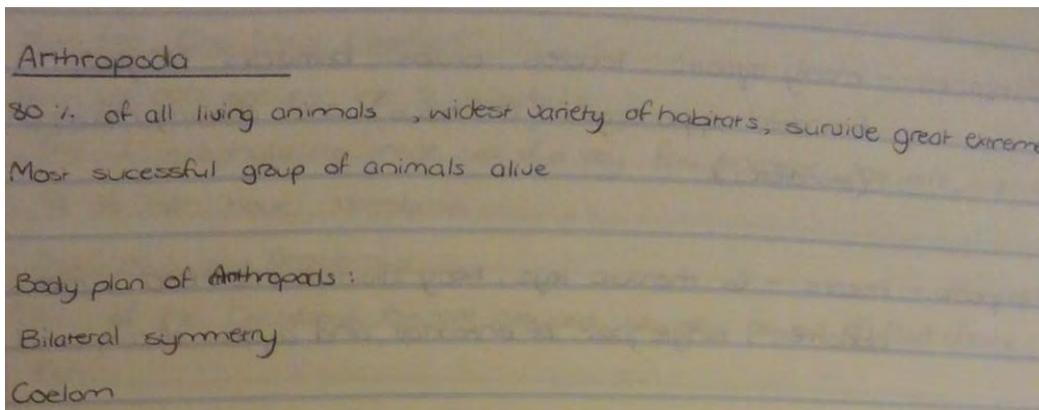


Figure 8: Evidence of précising in study notes (SA)

Shorthand was occasionally evident in the artefacts but no students mentioned examples of using such. For example, Figure 9 shows arrows used for causation.

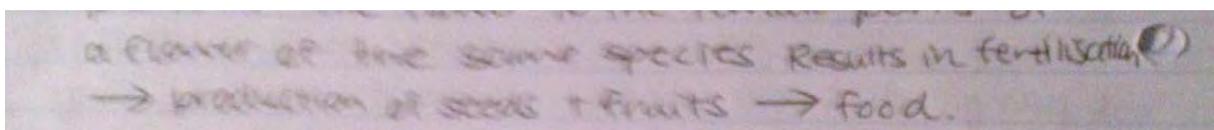


Figure 9: Evidence of shorthand in study notes (SC)

Most summary-makers spoke of converting text into bullet-point paragraphs, was borne out by artefacts. Some students were metacognitively aware of their reasons for summarising, to be covered later.

Two of the eight students (RC, and to some extent SC) apply a degree of selectivity in their summaries, while the remaining six are non-selective. The artefacts suggested support for the principle of non-selectivity. For all eight students who summarise, the summary becomes the principal target of subsequent review.

### ***Practice examples and resourcefulness***

None of the students prepare for tests by practicing past papers. Most students are under the impression that pasts are unavailable on account of the new curriculum. The teacher at School R said that tests were available in the library, but the students were not aware of their availability. This he-said-she-said was common. Students, such as QA, said that they would use past tests if they were available. RC adopted a more pragmatic view of the non-availability argument:

S: Um the curriculum has changed a bit but I mean generally it's pretty much the same and if you can answer those questions [From the previous curriculum] you know you should be fine. S-RC-384

Student SA reacted to the absence of past tests by doing questions from a published revision series, but only the short answer ones. She was also the only student who revisited her own past tests, but only to review certain techniques, such as, essay writing. Apparently she had access to past test, which was not commonly the case. Five of the students used demonstration examples or class exercises in their preparation. Three merely reviewed such materials, QA redid them *all* from scratch, and QC redid a selection.

The use of online resources was scarce: PC completed the school's compulsory online quiz as her singular source of practice. Otherwise only QA occasionally looks for *additional* online examples:

R: Do you ever look for practice examples on the net?

S: Ja I do sometimes. If in class we only get one example and ... I'm not comfortable with just doing one and I think ok well if he gives us a different one in the test ok well then I'm not really gonna know what to do .. um then I'll go and Google them, and type in, you know, like practice examples for this section of work. OK I'll print some of those out. S-QA-684

It was noted that RE ignored his school textbook entirely and studied from a non-prescribed textbook provided by his guardian. The books cover the same topics but are otherwise quite different.

### ***Study assistance***

None of the students have ever asked for study assistance, nor were seeking it at the time of data collection. It is evident, however, that mothers were a strong source of guidance at junior school. In some cases the role continues at high school:

- QA rote learns work then gets her mother to quiz her on the content
- QE relates content that has piqued her interest to her mother
- RC prefers his mother to quiz him on his self-devised questions. It stops him from “seeing ahead”, and because she muddles the otherwise predictable order which might give contextual clues.

### ***Context***

Ten students volunteered information about studying in other contexts; it is useful as an indication of the degree to which the all-important strategy selection (Winne, 2010) is at work. Two students spoke of their Biology study strategy in comparison to other subjects; they use the same strategy for all their content subjects. In contrast, they always study for Mathematics and the sciences by practicing examples; and for languages by going over the rules.

Eight students spoke of their Biology study strategy in comparison to examinations. All use the same strategy in both contexts, with perhaps more effort expended in exam preparation. Whereas no students practiced past questions for tests, three students seem to prepare for exams using doing past papers. All students repeat their entire study exercise for exams, except for SA who reuses her text summaries for exams. RC normally throws out summaries, but keeps his June exam summaries for the November exams; he scored well in his latest test and so might re-use its summary.

### ***Study tactics***

This section outlines the common tactics (see p. 22) that students use as part of their Biology study strategy.

### ***Use of text decoration***

All eight students who summarised used some form of text decoration. PC used the least decoration, writing in her diary that she typically encloses each section header in a cloud and underlines all headings in her notes. Her photographs supported this but also showed the size of headings to

reflect their level in the content hierarchy. QA used underlining to draw attention to definitions. Two students use different coloured pens to that used for the text body for certain things: SA reserved a blue pen for definitions; PE wrote sentences and headings in colours at random.

Highlighting was the most common form of text decoration. Six students of the eight who summarised used highlighters: Four students highlighted headings and important words, or 'keywords'; RE highlighted blocks of text he regarded as important in one of five colours, at random; SC also used colour but indiscriminately. QC, who only read, highlighted "important" words in his source material, bringing the total number of students using highlighters to seven. Three students explained how they identified what was important:

For RA, emboldened text was of predetermined importance, but he weighed up other content:

R: Would the font of those words [Words he highlights in his notes] in the textbook influence your highlighting of them? So if they were bold or italics?

S: Ja, I would highlight all bold or you know like words I would highlight already.

R: And if they weren't bolded?

S: I would have to read over them and think, 'Is this important or is it not?' S-RA-464

For SA it was words that the class had been told to underline:

SA: It isn't often – only if she [the teacher] says like, "Underline that. It's important." S-SA-513

RC highlighted his self-devised questions, and the answers to what he anticipated were sure-fire questions:

S: Um I also do sometimes highlight if there's something very important ... like I know 100% sure it's going to be in the test... I highlight the whole thing, make sure I know everything. And then I know that when my mom tests me on it as well she's gonna see, 'OK this whole thing is highlighted – he has to get this all right because obviously it's important or he wouldn't have highlighted it'. S-RC-560

### ***Diagrams***

Seven students referred to their handling of diagrams, an integral component of Biology:

- SA simply reviews diagrams.
- RC reviews diagrams carefully, and then attempts to redraw each from memory.

- Four students *copy* each diagram from the source material. SC then attempts to redraw each from memory.
- QA traces diagrams so that she can practice labelling from memory. She also prints diagrams from the Internet where she judges the source diagrams too complicated to trace, or deficient. She said: “I don’t like things to be untidy and squiggly lines so I’m tracing over it [the diagram]” S-QA-365.

### **Metacognition**

This section outlines themes associated with students’ metacognition, the reasoning behind their actions and their self-awareness.

#### **Phones, music and distraction**

Apart from PE, 10 students and many parents were vocal about the use of cell phones, music and distraction.

Four students study in silence (QA, QC, SC, and RC). Despite this, the first three say that the silence makes a distraction of all ambient sounds, though RC is undistracted by noises. Both SC- and RC’s parents are against music and phones, and in both cases apparently enforce a no-technology-while-studying policy. The remaining six students study with music playing. All six students listen to lyrical music and two students say they ‘find themselves singing along’. A third (PA) only sings near the end of session. For SA it is just the occasional song. Two students (PA and PC) play music to specifically mask the noises that silence turns into distractions. PC was however also the only student to admit music occasionally becoming a distraction in itself, and she avoids it when she studies for exams. She articulated this effect:

S: I generally do listen to music because I fidget in silence, so if it’s completely silent I can get distracted easier. If it’s completely silent – like if it’s silent and then the dog barks? – then, “Oh what happened?” But if I am listening to music then, “Oh, stupid dog!”, and I just carry on.

R: So it’s not that the music is loud enough to block those sounds out?

S: No, it just fills the space. S-PC 521

Four students (SA, RA, QE, and RE) study with their cell phones on hand, and switched on. All find the message signal as an ongoing source of distraction. A fifth student (QA) said that her phone is present but off; her mother contests this, saying that the phone interferes. Only one student (PC) used her phone as a study tool – to complete her compulsory online tutorial.

### **Metacognition of strategy**

This section recounts evidence of students using tactics or strategies with a particular intent. While it only includes five students, the rarity of metacognition calls for its inclusion. The evidence is presented in increasing order of complexity:

- SA mostly prepares by reading but used the incidental acronym to help her.
- PC uses physical gesturing to reinforce the work, but when this fails, resorts to mnemonic poems. For the current test she also moved from simple revision to ‘teaching’ her teddy and was aware of its benefit: “If you think you understand something by reading it and then trying to explain it, it’s a lot different. So it helps to understand”
- QA creates numerous rhymes for remembering lists.
- PA is aware of his preference for lists and flow diagrams and tries to convert as much content as possible into this format.
- RC, after pre-reading the content, summarises only that which he anticipates will be tested:

S: Um. Your teachers usually like ... they don’t obviously say learn this, learn this ... learn this exactly but you can tell what they focus on usually. If you listen in class you can see ok this is going to be important [...] Like sometimes things aren’t covered in our book and he’s [The teacher] ‘OK take this down’, because it doesn’t give a lot of information in the book and it will probably important. S-RC-137

RC structures the summary as questions in the “only way they could be asked”, again based on his experiences. For example, he chose to only learn the labels of the heart, envisaging the full diagram too complicated to be asked to draw it. He lays his answers out in point form, as diagrams, or as flow diagrams, according to the anticipated answer format. The majority of his lists are annotated with an acronym scribbled in pencil. He explained how the acronyms help:

RC: It’s not like I remember the acronym I’ve written, but I know ... say I remember two of the ... say there’re four. .. I remember two of four [Letters]. They start with these letters and then I relay back to the acronym.

R: OK, so the answers you get are acting as a trigger to the acronym and then that enables you to get the two you’re missing?

RC: Ja. S-RC-646

## Time management

Time *management* is a metacognitive issue. Eight students said that a lack of available study time impacts their test-preparation. This theme covers the students' conceptions of load and *enough* time, the impact of time shortages, and procrastination.

A few students logged commitments in their diaries, for example QC, RE, and PE, while others documented a full schedule, for example, QA and SC. The contrasting schedules of QC and QA offer insight into what students' conceive as a shortage of time: QC plays one extra-mural sport that, according to his diary, occupies one weekday afternoon and a Saturday morning. He recorded no other commitments. He has a 'read only' study strategy, having given up summarising because it is too time-consuming. He indicated on five occasions that he would like a study strategy that is not too time-consuming:

R: Are there things that you wish you could do better?

S: I think time ... time ... I wish I had more time to study.

R: Do you think that you could manage your time better or are you literally out of time?

S: I think I'm out of time. Because I like to have a good sleep as well so ... S-QC-260

And later:

R: If I could grant you one wish about your studying, what would it be?

S: [5 sec pause] A technique that's not time-consuming because I need time to do other things ... other things ... but allows me to learn my work more efficiently. S-QC-465

According to his mother, he cycles a lot and has become obsessed with gym (he describes himself as a 'gym-junkie'). She acknowledges his busy-ness but also sees him wasting time, saying his time management "needs to be addressed. [...] I definitely need to guide it because I've noticed in the last couple of weeks it's been more [sighs] cycling and gym and everything else."

At the other end of the commitment spectrum, QA offhandedly said that there is "not a lot" of time to study. Her diary shows that she was involved after school in three sport practices, two singing practices, a dance class, a school committee meeting, and a school evening social event which she helped organise. She also recounted after school errands, family events, and homework demands from other subjects.

For SA, high school time constraints caused her to switch from memorising to summarising. Time constraints prevented her (and still do) from considering alternate study strategies. She holds the view that study duration is the key to success, and that 'harder' study is a matter of just studying

further in advance, as does PA. Harder to her means to “Start further in advance and just keep reading my notes and stuff before the test and do work examples.” She later reduced it to only a matter of more time.

None of the students use study timetables for tests. Students did not give reasons for this, nor were reasons pursued. The students at School Q spoke of being surprised with new content two days before the test; at school R the test was shifted forward a day – when students became aware of this unknown; and PA spoke of an ad hoc rehearsal schedule and other unforeseen events that left him with only the night before his test to study.

Seven students exhibited a tendency to procrastinate. Of those who did not, RA and SA simply get on with their studying. PC does not have the space to demonstrate procrastination given that she typically studies the day before a test. Though PA admitted leaving his studying ‘too late’, this is more evidence of misjudging the test-preparation time available.

Three students (QA, RC, and RE) used the word ‘procrastinate’, while QC, SC and QE implied the tendency. PE’s time log data was incomplete, but he spoke of wanting the self-discipline to study further in advance. QC said that he “put off” studying on Day 1 because he knew he had more time (despite his above lamentations about time shortages); and SC said that she finds it “hard” to get down to studying. QE attributed her chronic not getting down to studying to forgetfulness. She uses the word ‘forgot’ on 10 occasions in her diary and on 13 occasions in her interview. Despite putting her lack of studying down to forgetting, there are indications that procrastination plays a role, for example. “Yesterday, on Sunday, I would have studied but I had too many things to do that I left for Sunday.” In reaction to forgetting she writes, in a seemingly hypothetically voice:

S: This year I want to change the way I study and concentrate on how to manage my time. I wouldn’t want to do cramming a day before and I would also like to concentrate on study methods and how they would improve my marks by doing them. D-QE-21

### **Sensory influences and experiences**

The use of visual recall featured in nine students’ accounts (all except PC and QE). Five showed evidence of using auditory recall.

Seven students (QA, PA, PE, SA, RA, RC, and RE) are aware of ‘seeing’ the work that they are trying to recall. Of the remaining two, SC (who makes summaries that approach verbatim) says that she does not ‘see’ her work, yet she recounts having a visual recollection of mind maps (despite not using them anymore), and that knowing a word is highlighted helps its recall. QC, who has only a ‘read-

only' strategy, attempts to visualise the page layout when practicing immediate recall but does not say whether the strategy is successful or if any visual memory persists into the test stage. Four excerpts provide insight into the variety of experiences:

QA says that she better recalls pages of her summary that are distinctive, such as, those having bullet points:

R: Is there anything that makes certain pages stand out from the others?

S: Aah ones with points because I can see the sentence and then the points. I ...ones that look like this [points to full paragraph where there's writing everywhere]... some of them ... ja I can't remember all of this ... S-QA-445

Despite colour helping RE to locate content, he cannot always recall the content itself. He says of its location utility:

S: Ja. So I can ... so I can ... [see the page] if they ask a question here on Protista I'll put ja, ok, I did that in green, so then I go and I try picture what I did in green. S-RE-287

PE heard from a teacher that colour promotes recall. He says, somewhat enigmatically, that colour helps him "if I don't forget". RC demonstrated evidence of his visual memory by correctly describing where on a page a particular question that was singled out during the interview appeared in his study notes.

Five students spoke of vocalising what they read or recite. Only two said that it helps, the rest having no views on their actions: RA merely said it helps, while SA reported re-reading work louder if she feels it is not "going in".

PA spoke of a kinaesthetic experience in addition to visual recall. He describes in his diary how the act of writing helps him remember:

S: I have noticed I remember more by writing things down. [...] I later review my notes and I am able to remember the act of writing specifics down. D-PA-32.

In his interview he spoke of the rhythm of the yes/no entries in his summary table aiding his recall:

S: [...] in the test I can write down the table, because I can remember the yes-no-yes-no.

R: You can remember the order of that?

S: Yeah.

R: And you can see that in your mind's eye, can you?

S: Oh, it's just that it's almost a beat – yes, yes, no, no; 4,5,3,2. S-PA-230

QC – the 'gym-junkie' - was told exercise helps one to study; in the current test he put his textbook on the floor and reviewed it while doing press-ups over it. This is not an experience, but it illustrates how students interpret what they hear.

### **Motivation**

This section outlines themes related to the students' motivation and goals for studying as they do. The section begins with historical influences – how students have arrived at their current strategy – followed by contemporary goals and motivation.

#### **Strategy influences**

Students were asked to describe how they arrived at their current study strategy as part of understanding their motivation. A follow-up question asked about the impact of LO (see p. 3). The subsections below report on the students' strategy development in chronological order, and then present parent and teacher perspectives as a means of triangulation.

#### ***Strategies in junior school***

Six students (QA, PC, SA, RA, RC, and RE) recounted how their mothers' shaped their strategy during junior school. Fathers were mentioned as influential in just two cases, and in both instances as either unhelpful or obstructive. Maternal recollections generally revolved around entrenching fixed study routines (e.g., RC), but also passing on their practices, as revealed by QA:

R: How much influence has your mom had over how you study?

S: Um I think quite a bit. I know when I was still in grade 4 and grade 5 we used to have cycle tests every week and ... I think she also used to write everything out when she used to study herself – we both learned like parrot fashion – learn everything off by heart ... um so she used to do it with me and ... we used to write everything out and then she used to test me on it and so that's also ... (S-QA-438)

QA's mother also taught her to devise 'dirty' rhymes as a mnemonic device.

Five students (QC, PA, PC, SA, and RE) had memories of being influenced by junior school itself:

- QC was told to look for keywords and use them to make acronyms. He sees this untenable in high school due to the volume of work, thus he discarded it. PA thought he recalled learning to make up acronyms (he uses them only occasionally now).
- PC was encouraged to make an audio recording of his textbook and replay it to himself but he has never used the technique.
- SA and RE were exposed to mind mapping but did not adopt it.

### ***Strategy changes in high school***

Most students recalled past influences. Mothers and students spoke of a sudden reduction in maternal involvement in early high school. Mothers now act as resident quizmasters (for RC, and to some extent QE), or general supporter/encourager/gatekeeper (in seven cases). Students reported making strategy adjustments at high school. Table 2 summarises these adjustments in chronological order, with an indication of the source of the influence – the trigger.

*Table 2: Students' strategy adjustments at high school*

Case	Year	Trigger	Change
QE	?	Teacher	Told to highlight 'important' words, which she now does.
QA	8	Self	Switched from working with her mother to working alone
SA	8	Peers	Switched from pure reading to summarising after seeing friends' notes at school, and because of time shortages.
RE	8	Mom/ Peers	Forced to study independently where previously his mother had read him the content and quizzed him on it. Opted to mimic his friends and his cousin who all summarised.
PE	8/9	Teacher	Learnt from Consumer's and English teachers that making 'colourful notes' helps recall. He now produces notes rich in colour at random.
QC	8	Self	Switched from summarising to pure reading when work seemed too complex for his keyword summary technique and when he saw no way to improve on the summarised notes provided by his teacher.
	10	Course	Learnt that the brain can only focus for 45 minute periods. He now observes strict 45-minute study sessions (30 mins study + 15 mins recap.) He also learnt to "highlight the three most important things" and now highlights in his source text.
SC	10	Self	Realised the significance of listening in class.
RA	10	Self	Switched from pure reading and highlighting, to summarising.
RC	10	Mom	At his mother's suggestion, he switched from bullet point summaries to a question-and-answer format.

Three students said that their strategy was partly influenced by a desire for neat notes:

- RC said that any messiness distracts him, to the extent that he uses Tippex<sup>TM</sup> on his notes.

- PC said that she rewrites her pencil notes, incorporating relevant content from other sources so as to keep the logic together, but also for neatness and prettiness.
- Neatness is the main reason why QA does not use mind mapping, and why she traces her practice diagrams.

Students also recounted instances where they had disregarded what they were exposed to. QA recalls a study skills module in Grade 8/9, perhaps LO, where she was taught to “record, write up and stick up”, but she does not use this technique. Indeed, none of the ten students saw their exposure to study skills in the LO curriculum (typically just before exams), or having LO exam questions on the topic (as recounted by RA), as in any way worthwhile. At School R, two students (RC and RE) enrolled in a course run by external service-providers but reported it as having had no value, while the third (RA) dismissed the course due to its speed-reading emphasis being non-aligned with his goal of memorisation. Two students, at different schools, could not recall receiving any input from outsiders. Of all input that students have received, mind maps are mentioned the most – in six cases. Of these, only SC – who says that she struggles to visualise her work in tests – uses mind maps, but only occasionally. She struggles to recall their effect, saying “I think I see them” (S-SC-446). RA discounts the utility of mind mapping for content at high school on the basis that he “thinks” it can’t be mind-mapped, though he does use mind maps to plan essay answers. Student accounts of high school – and vaguely of junior school – indicate that the students were ‘told about’ techniques, over a lesson or two. Below SA recounts a typical high school experience related to mind maps. She confirmed that the teacher has never shown or explained to the class how to make mind maps.

S: Um, well they [the teachers] don’t really interfere too much with our studying. During class it’s like a section ... that it’s ... part that we don’t understand or that it’s a lot of work? – then she’ll like tell us to mind map between two, or get into groups and make a mind map, or something, but... S-SA-282

Three students (PA/SC/RA) said that the way they studied was of their own devising and essentially intuitive.

### ***Parent and teacher perspectives***

Parental input corroborated student input in all but a few trivial exceptions, showing almost universal parental concern for children, a ‘thing’ for studying to music, and accounts of children being under pressure. Otherwise parents did not add directly to an understanding of a student’s test-preparation.

All five teachers had after-hours study expectations of their students, for example, summarising, revising and memorising, and see studying as necessary for student success in tests. None of the teachers knew any details of their students' actual studying. The closest was the teacher at School S who has a biannual mentor session with all her students. Each session appears to translate to about five minutes of contact time, and centres on goals. Otherwise, it was mostly students who, by the teacher's account did poorly, that received her attention.

Teachers were asked to talk about the influence of implicit and explicit skills instruction on students' studying. No teachers spoke of trying to convey skills implicitly. At School Q, the teacher made inferences about the quality of students studying based on their marks. When it comes to test-preparation, he<sup>26</sup> sees time-management as the critical factor in studying, and that students should work hard for marks. He does not give test advice on the basis that students in Grade 11 should be familiar with the style of questioning.

Two teachers were involved in the study at School P. The first (Teacher T1) saw memorisation as critical given the prominence of terminology in the content, but acknowledged she had seen students' skills as lacking, describing herself as "amazed" at what they seemed to lack. She is in absolute agreement that students getting 60s and 70s might well be 80s and 90s candidates but for their ineffective studying. Answering how she knew about her students' studying, she recounted being surprised by students who didn't know where to start with a five-minute class summary task. She recounted an effort to upskill her students in mind mapping when it emerged in class they didn't know how to go about it; she 'knows' they do it in LO, along with other "stuff since Grade 8." After devising a mind map together, ending with students' saying, 'Oh *that's* how you do a mind map', the class copied it down. When one student asked how to use it in studying she said:

T1: "Okay, so you write it down; put it on a piece of paper; put that piece of paper aside; take a fresh piece of paper, and from memory, you write it down and compare the two and see what you have forgotten." T1-P-554

About how her students study she says, "I don't have time to be concerned" and "I actually don't care one way or the other as long as they are doing some studying and that it's having an impact." These appear callous but in context they convey exasperation.

The second teacher at School P (Teacher T2) saw success in the last test hinging on "summarising, reading over the summary, and making notes". The teacher has not shown the students how to

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<sup>26</sup> Pronouns do not necessarily reflect the teacher's true sex

summarise, expecting Grade 11s to come equipped with this skill. The teacher admits to lacking procedural knowledge when it comes to study skills, but argues that it doesn't matter, on the basis that "every learner's got their own individual way of doing things. I'm probably the worst person to ask how to study because I just remembered stuff."

The teacher at School S recounted how she sees her summaries as aiding test-preparation. The students are expected to work daily on making key word summaries – which she sees as most useful for Life Sciences – and use their notes for the next step – "rote learning". She likes them to follow with "old papers and questions". They must make summaries from her summary notes, which she bases her lessons around. The students also peer-teach the summaries to one another. She gives input to individual students whose marks trigger her concern. She says of her ability to provide skills input that "you just begin to pick it up" but she is capable of doing what is required because she "has been teaching for a long time".

The teacher at School R stated having "no idea" how the students study, and that due to time pressure, "That's how it is." Weak results are addressed as they arise and no test-preparation input is given. He adopts a lecturing style in his teaching.

### **Marks and university**

Nine students voiced personal academic achievement as their motivation for studying. Eight referred to 'marks' explicitly, while a ninth (PE) expressed marks in terms of wanting 'to do better'. While many spoke of 'As' either as personal goals or outside expectations, no students aspired to achieve a mark above 80%, in other words, students were aiming purely for the symbol. A different assemblage of nine students study in order to achieve university entrance, sometimes in association with parental expectation: QE's parents were incentivising her with the promise of a car and house if she gained university entrance, though QE spoke of studying primarily to please her parents by achieving at least 55%. RE speaks more of parental pressure than being incentivised:

S: I just leave them [parents] disappointed and then to ... I'd rather ... I want them to be angry with me than disappointed with me. 'Cause it just, just makes you feel ... like ... We'd have like another talk. Same ... 'This is like the most important year of your life' ... and ... and ... 'If you don't start working you're going to be a bum on the street'. And all that. Ja. (S-RE-67ff)

In the two cases where university did not crop up explicitly as a motivator, it seems that PA will in any event follow in the footsteps of his university-going siblings, while PE aspires to be a professional footballer.

Peer-pressure was linked to motivation in two cases: PC aspired to good marks in the school's online test-preparation quiz because the results are public and she wants to be seen to do well, while peer-pressure made SA downplay her talents in Grade 7:

S: There was that thing with the girls that...um... they didn't want to be seen to be clever because it was nerdy... (P-SA-295)

Few students held any regard for their relative marks position: RA actively sought to remain in first place in his Biology class; PC that it was "nice" to stay in top 20; and RC remarked that keeping the same relative position would "be good". SC commented that at her school only the top three positions in the grade are publicised to the students.

Three students said the fear of achieving worse marks prevented them from experimenting with their studying. PC said she was "worried that a new one [method] would not work as well", while SC and QA expressed the concern more specifically in terms of achievement outcomes. SC said "it would be dangerous, and it might influence my marks." QA was "nervous to try something else and then get my test back and find out ok ... that like ... didn't work at all."

### **Memorising as the strategy goal**

Ten students have a strategy aimed at memorising the work. All spoke of their study strategy as a deliberate attempt to memorise content for the test. They either attempt to recite what they have just read, or read the material one or more times. PA alluded to memorising the *terminology* in particular: "So I would look through all the terms and the things I'm not sure of, and just familiarise with like the big words and whatnot."

PC said the following of re-reading, indicating his lack conviction in its efficacy:

S: So for me, like going over things like making myself read it and see it over and over, it's like I've seen it so many times it's got to be in my brain? S-PC-1042.

RA represented the most extreme case of memorisation. He summarised the entire content for the test before the research period began then reportedly re-read the summary in full on every one of his eight study episodes during the research period. QA said that memorisation is good and that her ability to recall from class imparts a degree of confidence:

R: You say, 'I'm fairly confident I know my work well'. What makes you confident?

S: Ah I think it's a lot about listening and paying attention in class because ... I think I have quite a good memory so what I listen to in class ... if I read over it again in my book then sort of like, oh ok I already know that ... so ... ok ja that section of work ok I know that ...

S-QA-625

### **Studying as the vehicle to achievement**

Responding to a question about the contribution of their studying versus class or other activities towards achievement, ten students (all except for PE) reported seeing their studying as being of equal or greater impact. Six students expressed their answer as a percentage: RC attributed 50% of his test mark to private study; QA and QC said 60%; SA 80%; and SC and RA, 100%. RA sees the class as irrelevant to his success because his studying is so effective, though he later acknowledged that class attitude had some role to play:

R: So do you think that you could mess around in class, study hard and still get the marks you're getting?

S: [5 sec pause] I would ... I'd actually say there's no question, to be honest. 'Cause I'm so ... I'm so confident with the way I study. S-RA-149

Another two students saw class as irrelevant because of their inability to concentrate in class, as opposed to it not being worthwhile. QE said that her studying was tantamount to teaching herself content:

R: But I would have thought you would have learnt those new things already in class? When you're studying the work surely you've already done it? I mean it can't be a surprise – what's in your book?

S: Ja, but in class I would look at the board and I'd be distracted 'cause I'm ja ... because my concentration is ... S-QE-59

RE said the following of his inability to concentrate, later adding that in order to avoid drawing attention to himself he does not ask questions in class:

R: What percentage of your mark in a test is caused by your studying as opposed to your class [Cuts me short]?

S: ... listening? Very. Because um in class ah I do struggle concentrating. I do take tablets. Um and ... I can ... I can't just not study ... go to a test and not study. I have to study. I have to. Have to. S\_RE-592

PA, RC, PC, and SC see class listening as important, yet studying as crucial. SC acknowledges the importance of class learning, but sees its benefit degrading after a month or so. PA acknowledged that the less attention he paid in class the more he had to study:

S: Well, quite a bit [Referring to how much he relies on studying] – it really depends on the section because you get really boring sections where I start drifting off in class and whatnot and then you get the alright sections where I pay attention more. And with the ones that I don't pay attention, obviously I have to study more. S-PA-274

RC referred to studying more efficiently where work was *understood* from class as opposed to it just being familiar:

R: So for you there's a correlation between understanding, marks and studying – the more you understand in class, the less you have to study?

S: Yes. Because there's no point in studying what you already know.[..] ... if the definition comes up you can give the definition but it doesn't mean you going to understand what you really writing. You'll just get the mark. Whereas if you understand it you can link your thoughts together and get more marks. S-RC-120

PC also raised the issue of understanding:

S: Ja, if I only listen in class I might miss something because I'm distracted, or I might forget things and then studying like reinforces it and going over it like OK. But if I study without listening, then I might not understand stuff. So I'll spend half of my studying trying to understand, whereas in class I listen and ask questions and stuff, that's already finished. S-PC-155

### **Self-efficacy**

All 11 students gave input regarding how satisfied they were with their current strategy. This is regarded as an indicator of self-efficacy. Eight students (all except QE, RE and PE) are content with their current study strategy, saying things like, "it works for me" (QA); "it's the best way" (QC and

SC); “it’s a nine out of 10” (SA). Three were especially confident: RA said he only foresaw the need for more *effort* at university. PA said that nothing about his studying could be improved, apart from his duration of his study. RC said the following, indicating that he too regards time-on-task as pivotal:

R: If you saw something [Speaking of alternative strategies] that was different, it’s not going to [Cuts me off]?

S: No I’m not gonna change.

R: So you feel that you know how to study?

S: I do.

R: And when you get to Varsity is this [Referring to his current strategy] going to work?

S: Probably. I’m sure it will. It will obviously be a lot more studying and a lot more hours I’ll have to put in but I feel the same format could work. S-RC-288

In an unusually stark distinction, based on achievement level, the E-level students said of their strategies: “I would like to change” (QE); “I would do a new method if I knew for sure that it worked” (RE); “I don’t have good study habits” and “It sometimes works for me and sometimes it doesn’t” (PE). QE’s parents have tried various interventions to help her studying and QE herself has occasionally toyed with “something different” and attended the occasional course, but to no avail. QE continually referred to ‘forgetting’ as her ‘problem’ and wanting mediation as the remedy. RE has not and does not ask for help, having been ridiculed – “made to feel like a child” – in Grade 8 when he wasn’t summarising like his peers.

Returning to the eight who were content with their methods, five (that is, excluding PA and RC; and SC, who has dabbled in other methods but found none to work) were nevertheless open to the idea that a better method was possible. Risk, fear of change, and time limitations are given as reasons for not exploring other options. Like PA and RC, SA sees time spent studying as the key ingredient to improved study.

Six students (SA, RC, PA, PC, RE, and QC) believed that they could increase their marks (by increasing their effort.) Despite his belief, QC has a guarded response to changing his ability.

R: Do you think that you can change your ability?

S: I think ability couldn’t be changed but I think that your results could change through very, very hard work but I don’t think that maybe you could get that 100% for the Math’s exam.

PA spoke of purposefully withdrawing effort in LO after receiving a low mark on an assignment that he had worked hard for, and where others had done well in despite making no effort.

Apart from the above six, two others (QA and QE) expressed the idea that past experiences affected their sense of self-efficacy: QA agreed that doing well in a test gave her confidence for the next test; and QE said that she would always want to improve marks-wise, attributing a poor mark to herself and her concentration. QE's comment seemed rooted in a belief that she would always be in a position of wanting to do better by virtue of her always doing badly, rather than wanting to pursue excellence. A few students react to a disappointing mark with more effort next time around.

PE indicated that his study efficacy is hit-and-miss (S-PE-220), adding later that it's the difficulty of the work that is the issue.

At one point PC said that the fact that others can do well with so little effort is not fair.

### **Chapter summary**

This chapter has detailed the themes that arose from the research, and the individual variations within each theme, according to key components of SRL. The components roughly correspond to the three research objectives. Parent and teacher views on strategy changes were included on the basis that they are a vehicle for understanding student's strategy development, and aid in addressing the third research Objective. The findings are now 'made sense of' in light of the SRL literature.

## Chapter 6: Discussion

Chapter 1 painted a picture of the ongoing challenges facing the South Africa Basic Education system, despite many years of effort and many attempts to raise flagging standards, in particular, low pass rates. Attention in the current research was drawn, in light of these attempts, to the field of self-regulated learning (SRL) which is regarded as effectively absent in South African research and policy but attracts vibrant international interest (Duckworth et al., 2010; Hoffman & Nottis, 2008). SRL was shown in Chapter 2 as a meta-theory grounded in the principle that successful life-long learners are behaviourally, metacognitively, and motivationally equipped to exercise ownership over their own learning (Boekaerts, 1999; Duckworth et al., 2009). Studying, of which test-preparation is a context, is a focus of SRL and attracted attention in this study given that tests and examinations form the backbone of achievement in the South African schooling system. Against this backdrop, the lack of exposure to SRL was used to raise questions concerning high school students' exposure to study guidance and, where guidance is lacking, the quality of students' test-preparation. Questions of quality are valid because test-preparation is demanding for students (Pressley et al., 1997) and students left to their own devices may have little more than illusions of competence when it comes to their studying (Karpicke et al., 2009). This study asserts that suboptimal studying contributes to the lacklustre results in schools and the subsequent high drop-out rates at university (John, 2013, 17 May), and represents a touchstone for possible intervention.

The current research aimed for insight into the test-preparation of 'typical' students at university-focussed, South African high schools – in order to draw attention to test-preparation and promote discussion about intervention in test-preparation policy and practice. The context of university-focussed schools was chosen on the assumption that it represented the best-case scenario of test-preparation. The aim translated into three research questions, addressing the study's objectives:

- a) What behavioural strategies do students implement as they prepare for Biology tests?  
(Objective a).
- b) What does students' metacognition reveal about why students prepare for Biology tests as they do? (Objective b).
- c) What are the past and present influences that motivate students to prepare for Biology tests as they do? (Objective c).

The broad scope of the research, as implied by the research questions, necessitated the review of a wide range of concepts, and these were presented in Chapter 2. The review began by drawing on Social Cognitive Theory (Bandura, 1986), which considers from a social perspective how the behaviour of individuals is shaped. Modelling – a key component in the theory – was discussed as a

likely inescapable phenomenon of students' everyday school life, and an important potential shaper of test-preparation strategy. Attention subsequently narrowed to SRL, which is concerned with learning in the educational context, and the model on which our understanding of SRL was based (Boekaerts, 1999). The enduring importance of behaviour, metacognition and motivation in SRL was used to shape the research questions. Achievement Goal Theory falls under the SRL umbrella and provided insights into academic motivation. Further narrowing introduced the topic of studying – 'private reading for learning' – with SHSAs and 'level of processing' as prominent phenomena. Study context was shown to affect the nature of SRL (Hadwin et al., 2001), justifying a review of test-preparation in particular. Studies addressing test-preparation were found to be rare, which placed heavy emphasis on works dedicated to the topic, such as, the model proposed by Broekamp and Hout-Wolters (2007).

A review of the empirical literature (Chapter 3) revealed a lack of evidence pertaining specifically to test-preparation, thus much of the chapter considered 'study' research offering the most insight into test-preparation. The review created an understanding of the factors found empirically to affect test-preparation but also surfaced numerous calls for rich research, in naturalistic, real-time settings, for example, Boekaerts and Corno (2005), which influenced the study's methodological design.

The methodology (Chapter 4) involved 11 students from four university-focussed high schools in the Cape Town metropole, Western Cape, South Africa. The study involved 'typical' students at such schools, and comprised as close as possible to an equal mix of state- and private school students, and girls and boys, from across a marks spectrum. A multiple-case study methodology and, in particular, an exploratory approach, was argued as appropriate, given the state of test-preparation as largely unexplored territory. Case study relies on rich and comprehensive data to understand a phenomenon (Yin, 2014), thus the study drew on those best-positioned to offer insight into test-preparation – the students themselves, their parents and their teachers. Cases were selected within a tightly bounded framework, guided by insights gleaned from the literature review. To ensure that the same phenomenon was being explored in each case, the research was anchored in preparation for a standardised, Biology test. Biology was selected because of its high national enrolment, its significant as a science subject, and its broad test demands. Student diaries and study artefacts produced over the seven days leading up to a test, and interviews lasting 40 minutes to an hour with all individuals, provided rich evidence about test-preparation, and acted as sources of triangulation that contributed to the data's trustworthiness. Students studied in the way they typically prepare for Biology tests thus, despite the focus on the test-preparation instance, their revelations are representative of the way they habitually study for Biology.

Data from a pilot study was pooled for analysis with that of the main study. Within-case analysis, based on a system of coding text according to its perceived meaning, provided a sound basis for cross-case analysis thanks to the high degree of corroboration between the triangulated sources. The detailed study design, which included the use of semi-structured interview protocols, meant that data from the various sources was sufficiently compatible to enable ‘analytic generalisation’ (Yin, 2014). Cross-case analysis surfaced the themes – phenomena common to most students or virtually absent among students. The themes were presented in Chapter 5 (Results), arranged using the principal dimensions of SRL. Quotes were provided to illustrate researcher interpretations.

This chapter discusses the themes in light of other studies from the field of the SRL in order to address the research questions. The intention of the discussion is to reveal the meaning inherent in the results themselves rather than one imposed, thus a more flexible approach is taken to the ordering of the themes than was taken in Chapter 5. The current chapter returns to the research questions and arranges the themes in a manner that most clearly answers the research questions and elicits a holistic understanding of test-preparation. The chapter concludes the body of this thesis, that is, there is no Conclusion chapter, and ends with reflection of the study’s strengths and weaknesses, and recommendations for the future.

### **What students do in their test-preparation**

The answer to the first research question centres on the physical aspects of students’ test-preparation behaviour. In Chapter 5, behavioural strategies were reported along with their meanings from the student’s perspective. In the current chapter, meanings are separated from their behaviours and assimilated into the discussion around the second research question. This section derives its ordering from the process model approach, starting with study preparations and ending with the day of the test.

Cox (2011) found students to choose location predominantly on its effectiveness in limiting distraction, and to a lesser extent, on its level of resourcing. Preferred locations were quiet, restricted social interaction, and were well-resourced, such as the library late at night, with home generally regarded as one of the ‘better spaces’. High school students have not arrived at the same level of independence as university students, and in that respect it was not surprising to find all students studying only at home in the lead up to their tests, and ten preferring their bedrooms. Generally, both parents and students referred to the preference in terms of ‘privacy’, suggesting avoidance of distraction as a factor, as found in studies by Cox (2011) and Van Etten et al. (1997), and this was confirmed by a number student accounts. Four students study in silence while six listen to music while they studied; and four had cell phones on hand. Students’ listening to music is not

unusual (Rogers & Hallam, 2006) and students had clear opinions on the matter, thus this discussion resumes as one of metacognition. Parents were mindful of distraction, for example, in the manner they avoided interrupting their child's studying; and they afforded privacy when studying occasioned in a public area of the home. Parents, however, mostly spoke of privacy in a manner that conveyed students wanted a sense of 'personal privacy'. This desire would align with that of Aubrun and Grady (2000) who see teens as needing to establish a sense of autonomy, and Bennet (2005), who sees territorial needs affecting the choice of study location. That ten students habitually study at a work surface seems to confirm Cox's (2011) finding that resourcing is a factor in students' choice of study location. Photographs of the students' rooms show evidence of desks generally well-equipped for studying, though not necessarily neat. Students always studied at their desks wherever writing was involved, but most moved to a more comfortable location when it did not. Some occasionally moved to other locations about the home, but most simply migrated to their beds. The desk is therefore understood as a practical decision. There were no indications that 'the bed' compromised students' concentration.

Chapter 5 detailed study duration in terms of total number of hours and number and length of study sessions (Table 1), made possible by the keeping of time logs, which is reasonably popular in studies involving test-preparation (e.g. Kember, Jamieson, Pomfret, & Wong, 1995; Plant, Ericsson, Hill, & Asberg, 2005). Differing levels of log accuracy and level of precision within and between students compromised aggregations and direct comparisons; we commented on studies (e.g., Burns, 2008) with apparently similar difficulties. What logs reveal of *habits* is also rather ambiguous given that they are apparently subject to the prevailing demands – especially external time constraints, which most students seemed to be under. Logs cannot reveal if what students did do in *this* case represents what they *would* have done given different or fewer constraints, and asking students would risk invoking a hypothetical situation. Logs then are taken as *indicators* of what typically happens. The logs for the current test revealed a wide variation in study times, ranging from 80 minutes of logged time over the diary period to upwards of eight hours. Eight hours seems a great deal for a single test and it would be interesting to know how this compares to teachers' time expectations of students. While two students (PA and RE) were constrained to study only the night before the test, the remaining students all studied over between four and nine sessions, with five students starting as early as on Day 3. Results are difficult to compare with the literature, given their sensitivity to context, and especially because other studies were university-based, where demands for self-regulation are greater (McMillan, 2005). Nevertheless, the results represent a clear exception to studies showing cramming to be common (e.g., Berry et al., 2010; Dunlosky et al., 2013; Hong et al., 2006; Howard, 1993; Plant et al., 2005; Tomes et al., 2011) and popular assumptions

that might assume cramming the norm. The two instances of cramming that did occur were not of the students' causing, and instead studying typically follows a distributed pattern, a feature also witnessed by Warkentin and Bol (1997). Understandably, the amount of time each student studied on Day 7 equalled or exceeded their studying on any earlier day. A casual inspection of Figure 7 does not see students clearly studying more on weekends, as was found by Innis and Shaw (1997). Overall, the log measures appear to be comparatively healthy, given that cramming is generally regarded as sub-optimal (Dunlosky et al., 2013), and students appear to take their tests seriously.

Most students studied until they sensed the need for a break, suggesting a subconscious tuning to waning concentration rather than studying to a fixed time, though QC did stick to timed sessions having been told it was 'right'. QA was a prime example of studying till concentration gives in, getting so engrossed in her work that refreshments surreptitiously delivered by her parents are often cold before they get noticed. Session durations varied per student and between students but most students had at least one session exceeding 1.25 hours, with one student exceeding two hours. Evidence points to some of these figures being constrained by other commitments rather than being preferences. Whether constraints make students study longer when they have available time, or confines them to shorter sessions than they would have liked, is unclear. The figures approach Innis and Shaw's (1997) observations of one to two hours, and is evidence that students are comfortable with reasonably long sessions, contrary to opinion that sometimes advocates studying in 'shorter' sessions based on the brains' ability to concentrate (e.g., Williams, 1997).

Sources were treated as part of study strategy. The students thoroughly studied all their declarative content, matching the findings of Theophilides and Koutselini (2010). Source texts varied: at one school students were made to rely on the textbook; at another the teacher appeared<sup>27</sup> to have partially replaced the textbook with notes; but most students faced a mixture of texts. Pressley et al. (1997) drew attention to poor textbooks as an obstacle to successful exam preparation in the university context and advised students to source simpler or alternative texts as necessary. It is assumed that contemporary high school textbooks have addressed many of the points of concern of Pressley et al. (1997). However, that some teachers issue their own 'replacement' summaries suggests some concerns remain. Pressley et al. (1997) advises teachers to issue guidelines rather than comprehensive notes and the current research shows there may be merit to this, with some students at a loss for how to process their teachers 'perfect' notes in a meaningful way. This brings to mind the view of Boekaerts (1999) that teachers, in trying to help, may merely shore up the

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<sup>27</sup> Teachers sometimes issues photocopied extracts from a textbook which made it a matter of opinion whether a student 'used a textbook' or not.

students' shortcomings. As with Narciss et al. (2007), students only stuck to using hard-copy texts, explained here by students not having to source their own texts.

The students demonstrated a strong preference for summarising as their means of engaging with the course content – nine, versus QA who writes out verbatim, and QC who uses review only. While summarising is generally regarded as beneficial (Dunlosky et al., 2013), Bednall and Kehoe (2011) see the benefit at least partially depending on students' approach to, and engagement with, the task, finding their study participants' summaries to vary considerably in comprehensiveness and accuracy. Saying that nine students 'summarise' creates an impression of summarising as a uniform activity when it is probably more accurate to regard summarising as a family of related strategies.

Roughly half the students began their summarising with a full read-through of the content, followed by summarising on a sentence-by-sentence basis<sup>28</sup>. Whether it is better to summarise smaller chunks more often, or larger chunks less often is ambiguous (Dunlosky et al., 2013), but the granular strategy appears compatible with 'memorising' the content detail, which Van Etten et al. (1997) see as implying a rote perspective, and indeed students' all admitted to memorising as their aim. Holding this aim explains why QA wrote the content verbatim and why all bar one of the remaining summaries amounted to little more than précis, many albeit in bullet point format.

Dunlosky et al. (2013) see summarising as a method of distilling important information to-be-learnt from padding or repeated content, and synthesising linked ideas into a coherent structure, its benefit supposedly derived from the enforced attention and discriminative selection involved. This does not match the précis approach being used. The view seems to assume, however, that texts have padding or repeated content to begin with. Biology is regarded as a factually dense domain (Holschuh, 2000), a view found shared by the teachers, especially with regards to terms. Dense texts may give some legitimacy to the students' précis approach, especially in cases where teachers issue their own 'dense' versions. The précis approach, however, diminishes the chances that selective attention and synthesis will come into play, and indeed, very few students showed any evidence of such. Those that did synthesise (e.g. RC) showed evidence of some conscious reasoning, thus these examples are more appropriate to the second research question.

Rote processes are shown to work by repetition (Carey, 2014), and indeed students do go over their work as many times as time permits. One teacher commented that students need to go over and over the work, which, unqualified, certainly suggests support for a rote approach. Repetition is not regarded as beneficial for long-term retention (McCormick, 2011), thus it is not surprising to find

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<sup>28</sup> The review of Dunlosky et al. (2013) would regard this as note-taking, and summarising a more after-the-fact activity.

most students discarding their summaries and doing new ones for examinations. Discarding summaries after the test is taken as tacit evidence that students only see value in the *producing* of the artefact. This view would only seem to be valid where summaries were perceived not to offer additional value, such as, where they lack the synthesis that Dunlosky et al. (2013) assert they should display, as we know was the case. It seems then that the summary artefact is proxy for the amount of studying done and a means of 'enforced attention', a strategy recounted by Dunlosky et al. (2013). The summary is tangible evidence that learning 'must have' occurred, and is more concrete than the behavioural or competence-based affirmations reported by Hong et al. (2006), though there is no indication the students are cognitively aware of it as a strategy. Summaries did, however, form the basis of subsequent review, and in that sense they at least offered immediate utility.

The appropriateness of a limited, rote approach depends on its suitability to test demands. On paper, Biology tests carry a 40% 'knowledge' weighting (Department of Basic Education, 2011c), suggesting that the approach should be ineffective for high overall marks on the grounds that it is inappropriate for scoring well in the remaining questions that should tax higher cognitive processes (Cordón & Day, 1996). Yet the three 'A' students, who all use rote, seem to be living testimony to the effectiveness of the approach, which seems to add credence to the assertion about standards being low (Jansen, 2012). Students are known to align their study strategies to the cognitive processing demands of testing (Abd-El-Fattah, 2011), active alignment being taken as a sign of high SRL (Winne, 2010). Whether the rote approach seen here can be taken as a judicious selection of the most appropriate strategy from among others possessed by the students, and thus high SRL, or 'all' that students have at their disposal (limited SRL) is impossible to distinguish given the consistent test format. Under SRL, a memorising approach does not necessarily reflect a limit of an individual's capability (Winne, 2010), nor does it mean that students cannot change (Zeegers, 1999). The incidental observation that many students use the same strategy for other content subjects, and do the same for examinations but with greater intensity, points to a limited repertoire, but does not conclusively resolve the matter. The observation is informative in that it demonstrates a milder effect of context that might have been anticipated (Pintrich et al., 1991; Winne, 2010). More insight is needed into what the rote strategy means, agreeing with Bednall and Kehoe (2011) that summarising is a promising avenue of research.

Biology is rich in diagrams and the seven students who spoke of diagrams showed that here too they follow rote principles, that is, they copy (or trace) and redraw the full diagram from memory. That one diagram can take so many forms, yet students do not earnestly seek out the variations, may suggest low endeavour on the students part, but more likely that students expect a near-original in

the test. The latter is acceptable if the diagram is rated cognitively low, but if not it amounts to compromising the intended test demands (Broekkamp & Hout-Wolters, 2007) which is ethically undesirable (Miyasaka, 2000).

The summaries either mimicked the paragraph-style format of the source or saw paragraphs converted to bullet points, one of a number of summary formats seen to help students discriminate pieces of content (Van Meter, Yokoi, & Pressley, 1994), and articulated as helpful by QA. It is noted that bullet point answers (in full sentences) are expected in the LO examinations (Department of Basic Education, 2011b). Mind-mapping was conspicuous in its absence as an implemented strategy, despite all students being familiar with the concept. Curiously, it was also absent in Dunlosky et al.'s (2013) review, suggesting that any prominence as a strategy (Department of Basic Education, 2011b, 2011c) may have more to do with a local enthusiasm. Students reacted with immediate resistance to the notion of mind mapping, suggesting that they had reached a saturation point rather than it being a matter of effort. The comment that you "can't mind map a whole book", suggest the resistance has to do with misunderstanding the principles.

Once complete, students reviewed their summaries as many times as time would allow, and mnemonic aids became relevant. Seven students made comments relating to the utility of mental imagery and some recounted instances of memory being triggered by summary content written in a particular colour, or image-based phenomena. Dunlosky et al. (2013) see the use of imagery as a complicated and multifaceted field, and utility relying on students being familiar with the objects and ideas to which the words refer and that without it, students cannot produce internal images. Many students attested to the importance of class for understanding, which seems to agree with this statement. Yet the understanding of the mechanism seems to be primitively assimilated by students, evidenced by some students using colour indiscriminately, some with abandon, or scantily. Underlining, highlighting, and other forms of text mark-up, that is, text decoration, are seen as equivalent attempts to make important material stand out from the unimportant (Dunlosky et al., 2013). Among the eight summarisers', there was an overwhelming preference for highlighting and even QC, who did not summarise, highlighted in his source text. Highlighting is common practice among students, the understanding being that it is simple to do, does not require extra expenditure of effort, and does not require special expertise (Dunlosky et al., 2013). Students not wanting to highlight the source text may be yet another reason for summaries. Some students reported highlighting already emboldened terms, as observed by Feldt (1990), or text identified by the teacher, which suggests a somewhat mechanistic approach. Whether the prominent use of highlighting in some students' summaries, as found elsewhere (e.g. Hadwin et al., 2001; Van Etten et

al., 1997), amounted to over-marking, which is the tendency (Dunlosky et al., 2013), is subjective. As with summarising, the effectiveness of highlighting depends on the students' underlying discretionary processes. One student remembered a chunk encircled in green highlighter in the test; whether one of many individual words highlighted a particular colour could be recalled is another matter. Four students used mnemonics devices (acronyms, rhymes) in their summaries to aid recall; two routinely. The students' accounts show their mechanism aid recall, but partially in an auditory manner by their 'beat'. The use of such devices is not unusual in test-preparation settings (Dunlosky et al., 2013; Hadwin et al., 2001; Van Etten et al., 1997), and can be a sign of both memorising, which we have come to expect and deeper processing (Van Etten et al., 1997). Dunlosky et al. (2013) regard acronyms in particular to only work for short retention spans and when limited in number, but RC's account shows he uses them both liberally and to good effect.

This brings us to processing approach. Students' processing approach is known to be affected by learning environment (Abd-El-Fattah, 2011; Ning & Downing, 2011), and in particular, we saw surface processing induced by heavy workloads and lack of freedom (Entwistle & Tait, 1990), and factually-based examinations (Van Etten et al., 1997). In the students' test, 60% of the marks presumably came from questions weighted as 'recall' and 'comprehension' (Department of Basic Education, 2011c) on Bloom's (1956) scale of cognitive demands, which strongly suggests demands favouring rote. The teachers' input suggests they largely encourage the same. Thus it seems that the students are principally using a surface level of processing approach, seen as a shallow, rote, rehearsal-based approach (Boekaerts, 1999) that shuns integration and is aimed at basic understanding (Broekkamp & Hout-Wolters, 2007) and reproduction (Cano-Garcia & Justicia-Justicia, 1994). There are exceptions, which will be discussed later. Finding students to have surface processing is not uncommon (e.g. Theophilides & Koutselini, 2010; Thomas & Rohwer, 1986) and though it was long held as less desirable than deeper processing, more recent studies show that surface processing may well be more suited to the demands of particular tasks and thus appropriate (Senko, Hulleman, & Harackiewicz, 2011). Given the students' current circumstances, surface processing seems a 'good' approach. Later, it will be argued that students hold performance approach goals, which can accommodate surface processing (Elliot et al., 1999; Kirby & Downs, 2007). Midgley et al. (2001) feel, however, that a declaration of being good needs qualification: Is a strategy good when it has instrumental value for performance in the immediate context but not in another? In the participants' case, the other context would refer to decreases in achievement in the university context where students have to self-regulate their own learning process (Kurtz & Weinert, 1989) in light of the higher demands (McMillan, 2005). Biggs, Kember, and Leung (2001, p. 6) see teaching and assessment methods as often encouraging a surface approach when they are "not

aligned to the aims of teaching the subject”, and the approach to “tell us something about the quality of the teaching environment”. If a surface approach is rewarded with high marks, it seems the students are being told that surface is ‘good’ and the aims are purely about getting high marks, again material for another objective.

Completion of the rote test-preparation phase saw some students involving supplementary materials, such as worked examples and class exercises, but to a far lesser extent than texts. Two mothers played a role in their children’s test-preparation by quizzing them on their summaries, but the isolated incidence of this is taken as a sign of the students’ growing independence as teens (Bennet, 2005). It is clear however that students’ test-preparation does not suffer from lack of moral support on the part of parents. Most other studies showed scant use of practice examples – just the emphasis on memorising (e.g., Feldt, 1990; Hadwin et al., 2001; Karpicke et al., 2009; Theophilides & Koutselini, 2010) but the use of practice tests and examples warrants closer attention. The Departmental requirements for moderation (Department of Basic Education, 2011c) seemed to result in the teachers recovering students’ tests for safekeeping, sometimes as early as the lesson in which the test was handed back for review, accounting for why the students did not have their own old tests to study from. The impact of their non-possession could be downplayed on the basis that test content is likely to change between tests, but the action nevertheless prevents students reviewing the skills, that are an important in Biology tests (Department of Basic Education, 2011c), and from using tests in exam-preparation. Regardless of whether past papers were in the library or not, it seems student were not pushed to use exemplar tests, with the result that none use past papers<sup>29</sup>. The closest was five students who review class examples as part of their test-preparation, and QA who occasionally looked online for an extra couple of short-answer questions. Hong et al. (2006) found students also selecting short questions, but that seems a given in their Maths context. One would expect redoing familiar examples to offer limited value unless, as with diagrams, the test examples are only superficially different. A number of studies extoll the merits of self-testing (Kirby & Downs, 2007; Pressley et al., 1997; Williams, 1997). Indeed, Pressley et al. (1997) see practicing test items that mirror the format and content of an upcoming test as the most helpful way of preparing students to meet test demands; doing badly is a sure sign that preparation is incomplete, and doing well boosts self-confidence. This absence of doing practice tests seems a serious shortcoming. That said, the findings are not unusual: Karpicke et al. (2009) found most students to not use practice tests, and metacognitively unaware of the benefits of repeated testing in particular, and Dunlosky et al. (2013) reported this pattern at a meta-analytic level. Kirby and Downs (2007) found that students can be ‘overwhelmingly’ deficient when it came to self-assessing, as did

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<sup>29</sup> Some students remarked that they do use practice papers in exam preparation.

(McMillan, 2005) in her South African school graduates, suggesting that when tests are available they should be accompanied by *sound* memoranda at the very least. Only one teacher advocated doing old questions and one wonders if teachers prefer to recycle old questions and keep old papers back, which would be contrary to best practice (Miyasaka, 2000; Rubenstein, 2004). It seems that the benefits of practice testing are not known by students and are under-rated by teachers.

It is noted that students apparently did not receive any particulars or cues regarding the upcoming test, apart from that it would follow the usual format. Boekaerts and Minnaert (1999) see cues as giving students the information on which to make strategy adjustments, but it seems that this is more relevant where the test format is unpredictable. If one assumes Biology tests to adhere to a standard format and static content, it partly explains why cues are redundant and are maybe not given. However, RC was clear that he is sensitive in class to where the teacher puts emphasis; to RC, the emphases are cues. RC is a deeper processor and perhaps seeing these otherwise invisible cues is the reward.

The nine students who spoke of test day all revised on the morning of the test, almost exclusively at school. On test day students huddle in fervent, 'last-minute' exchanges about their work. This represents the only real OCAC encountered in the study, and one rarer and less formal than encountered by Innis and Shaw (1997) and Boehler et al. (2001). Dependence on parents likely plays a part, though there was no indication that students wanted to get together but were prevented from doing so, but it is likely that there is simply no suitable time for OCAC. While Crookall et al. (2000) found OCAC to promote understanding, the urgent nature of the school exchanges does not seem conducive for creating 'understanding', and five (sometimes six) students instead see themselves benefitting in other ways, for example, through tips they pick up. The exchanges seem to boost students' confidence, that is, they help students 'know if they know' the work, which we saw as a driver of self-efficacy (Bandura, 1977), and something students do pursue (e.g., Hong et al., 2006). If this is the purpose, then the need could well derive from students omitting practice tests in their preparation (which would have performed this role, and hopefully in a better manner). Interestingly, the 'A' students, who used rote most intensely<sup>30</sup>, totally avoid these exchanges because of the anxiety they invoke. They use "frantic" and "confusing" to describe them, and speak of "stress", being "nervous", and needing to "cram" at the last minute. There is a sense that they exhibit the low-competence anxiety identified by Credé and Kuncel (2008), and are trying to cushion whatever confidence they have from challenge, that is, to maintain their 'illusion of competence' (Karpicke et al., 2009). The profile of these students seems to fit the view of Thomson and Falchikov

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<sup>30</sup> PA wrote out verbatim; and RA devoted by far the greatest number of hours to rote

(1998), namely that students fixated on performance have surface preparation, higher anxiety levels, and a lack of strategic approach.

In general, the results point to students implementing a single, rote strategy that uses summaries as a first step, possibly as a sign of study progress, followed by recall, aided by some mnemonic devices, and incidental use of supplementary material. There is strong evidence that students are relying on surface processing (with signs of deeper processing in some individuals). The approach apparently suits the perceived test demands from the perspective of teachers and students. That tests follow consistent demands makes the extent to which students are actively selecting rote as the appropriate strategy from a wider strategy set an unknown. This answers what students do in their test-preparation.

### **The thinking behind students' test-preparation**

The second research question was directed at the extent to which student behaviours were guided by thinking versus subconscious processes, that is, the extent to which they were metacognitive. For this, we must look for evidence of strategic thinking, under the component perspective of test-preparation (Boekaerts, 1999); and of forethought, monitoring and reflection under the process perspective (Zimmerman, 1998). Students were specifically asked to include their thoughts and reasons in their test-preparation diary entries on days they did study, and to reflect on their test-preparation and their feeling towards it on days where they did not. Very few did the former and none did the latter, demonstrating the value of interviews.

However, a large number of statements showed students regarding test-preparation, as opposed to Biology class, as *the* key ingredient for success in tests. For one thing, students recognise their need to make up for what they do not understand in class; a number of students said they either don't concentrate in class or lose concentration. There is no indication of students having to make up for inadequate teaching. Another reason was isolated but seems quite valid: that classwork gets forgotten by the time the test comes around. This would apply especially if understanding was low on the agenda, and knowledge was high, which we have seen is the case. And then perhaps there is some hyperbole. Even RC, who sees studying contributing "100%" of his test result, says he needs to rely on class learning. The correct interpretation seems to be that studying is very important, in order to cope with what teachers say is a largely factually orientated test, in which case it is an example of students preparing according to test requirements (Abd-El-Fattah, 2011).

Students invariably interpreted planning in terms of 'time' and revealed no use of planning test-preparation according to timetables<sup>31</sup>. While McMillan (2010) did find university students planning their study time, Van der Meera et al. (2010) found students to be more aware of the *need* to plan, but struggling to cope with load, which can influence study behaviour (Berry et al., 2010; Thomas, 1988). Struggling with load was a common complaint among the students who generally regarded themselves as under pressure, though accounts of different individuals showed load to be highly subjective, varying widely, and sometimes self-induced. Whether students could benefit from better planning, as Van den Hurk (2006) found in first-year students, seems doubtful: A number of the busier students reported being faced with last minute demands over which they had no control, which would have scuppered any plans anyway. In most cases, students had already begun studying by Day 3 for their test, suggesting a subconscious factoring for the unanticipated based on past experiences, if this can be called planning. Students generally also seemed to make good use of time available, evidenced in the reasonable total number of study hours that most put in and their studying in a distributed manner. Most students spoke of struggling to get down to study, but this seems to indicate a lack of self-discipline and motivation rather than a need for better planning.

Evidence of formal planning, in the sense of adapting strategy for upcoming test demands (Broekkamp & Hout-Wolters, 2007), was totally absent, though such planning seemed uncalled for given that: a) no study sessions seemed compromised by a lack of planning, such as, by not having the correct books; b) cognitive test demands do not vary (Department of Basic Education, 2011c) and are supposedly familiar to students; and c) test cues, important for adaptiveness (Boekaerts & Minnaert, 1999), seem to be absent. Ultimately, no students facing foreseen events ran out of time, and the suggestion that students could benefit from better planning (McMillan, 2010; Van den Hurk, 2006) seems unfounded.

Certain students showed signs of self-monitoring during their test-preparation. Monitoring evidenced principally as students taking study breaks when they become aware of a drop in their concentration. QC's monitoring the clock is more matter-of-fact. The second instance is a mixture of self-awareness, or 'mindfulness' (Dweck, 1986), and self-monitoring: PC is sensitive to how memorising is proceeding; if she senses she is struggling she moves to physical gestures, and then to making up poems to help her remember. In the current test she stumbled into the 'revelation' of how much teaching her teddy helped her to understand the work and toyed with it as something to try in the future, illustrating a rare example of self-discovery and that it can be beneficial. However, the most common form of monitoring involved music. Nine students were found to prefer listening

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<sup>31</sup> Those who spoke of timetables do not use them for exams either

to music while studying because in their experience silence makes a distraction of every sound; music moderated this effect. The prevalence of listening to music agrees with one publication, albeit dated, showing that most adolescents prefer to study to music while studying (Patton, Stinard, & Routh, 1983), though there was no obvious indication<sup>32</sup> that boys preferred to study to music more than girls, as was found by Rogers and Hallam (2006). Students were apparently strategic, listening 'occasionally' and to 'soft music', indicating an awareness of the pitfalls.

Parents saw music quite differently, and four enforced silent study. Teens can be seen to pursue individualism, and independence from family and social authority (Aubrun & Grady, 2000), and technology may increase their power and freedom to do so. However, there is a danger that certain views may arise based on 'acculturation', especially in the modern era of mass communication (Bandura, 2001), and the parental negativity to music may be such a view. Anderson and Fuller (2010) report the effect of music on studying as generally inconclusive (though in their study it did significantly compromise reading performance in high school students). In the eyes of Aubrun and Grady (2000), the more people's views of teens are informed by 'face time' rather than the media, the better teens will be understood. It seems this approach could apply when it comes to music. That said, PC did allow music to become a distraction, and QE found herself singing along near the end of her sessions, showing *strategic* use the key decider. What is said of music cannot be said of social networking; all four students who study with cell phones at hand are conscious of the distraction they cause, yet they continue to allow them to invade. In this regard, students may be willing to entertain social distractions invading their study location after all (Cox, 2011)

The remaining evidences of metacognition are reflections of test-preparation because they are used to make statements and judgements of test-preparation after the event (Zimmerman, 1998). The first of these relates to student's views on effort. The students evidently regard time as the critical ingredient in their studying: eight students said they didn't have enough time, with RA implying it by attempting to study at every available opportunity over the week. Credé and Kuncel (2008) and Dweck (1986) report the obsession with time as widely held. There seems to be little consideration for the *quality* of time spent however, which McMillan (2010) sees as having greater gravity. Perhaps quality is harder to assess by more abstract measures. SA was generally aware that every little bit helped and in that sense she demonstrated using a wider variety of tactics (see Figure 7). Time is, however, convincingly shown to be largely unrelated to achievement (Credé & Kuncel, 2008) and Schunk and Zimmerman (1994) see the importance attached to time as a 'naïve' belief. Studies have found students to judge their need for effort based on their most recent test experience (Thomas,

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<sup>32</sup> This study did not make intentional comparisons; some were merely self-evident.

1988; Van Etten et al., 1997) and a number of students spoke of increasing effort (that is, they studied longer) in the current test based on a disappointing prior mark. The importance of time may be promoted by teachers: Prominent viewpoints included that studying was crucial for test success; that it was necessary to go over and over the work; and in one case that 'time is the biggest issue'. In the absence of students hearing anything to the contrary, or of any strategy alternatives (due to be discussed), students may be forgiven for overrating its importance.

Few students reflected on their test-preparation beyond 'knowing' that they used a memorising strategy, used as a basis for interpreting students' following a generally surface approach (see p. 104). However a few students evidenced more strategic thinking in particular areas and being consciously aware of the reason for their choices (see p. 82). QA is *aware* of the usefulness of rhymes to aid recall, and also that 'the dirtier the better'; students addressing verbatim demands are known to use such techniques (Broekkamp & Hout-Wolters, 2007). PA is *aware* of his preference for lists and flow diagrams, though he was constrained from using them in the current research, which prevented further insight. This supports the finding that image-based mnemonics have widespread power to improve memory (Dunlosky et al., 2013; Rummel, Levin, & Woodward, 2003). Overall RC demonstrated the most strategic approach (see p. 104). RC second-guessed what his teacher would ask and how it would be asked, and used this to summarise his work into a comprehensive set of likely questions. He omitted work that he anticipated would not be asked, demonstrating a use of selective summarising (Dunlosky et al., 2013). He used acronyms liberally and reported being aware of the sound in their patterns. He was aware of the limitations of reviewing his questions in their summarised order and so had his mother quiz him on them in a jumbled order. All these cases represent indications of deeper processing, an approach that looks for underlying meanings and strives to make sense of current material in light of existing knowledge (Boekaerts, 1999). That evidence of deeper processing is relatively rare agrees with other studies (e.g., Berry et al., 2010; Hong et al., 2006; Kirby & Downs, 2007). RC studied less than most of the other students, and his sense of being strategic may have facilitated this. His teacher, however, regarded him as lazy and demanding, but SRL principles, and with the benefit of the inside view seen here, it may be that he is more efficient, selectively attentive, and on the alert for cues. Another teacher held a somewhat tautological view of their students, basing it purely on their marks: students were regarded as working hard and diligent when they did well. According to Pajares (2002), marks offer no inherent causal properties for such deductions. These examples illustrate the importance of a close professional student-teacher relationship and the importance insight into the individuals' perspective. SA synthesised her multiple sources into a single, coherent monologue which seems evidence of deeper processing until she reveals it was mostly for the sake of neatness.

The final metacognitive perspective on test-preparation concerns what students felt about their test-preparation in reflection. A result that jumped out as apparent was that the three 'E' students all expressed dissatisfaction with their current study method. Despite this, none sought help from their teachers or parents – a common theme for all students – which included not asking questions in class. Help-seeking behaviour can be very helpful in learning (Pintrich, 2004), though it may be more common in high-achievers (Kitsantas, 2002). One student said it was “unfair” that others could do so well, hinting at an entity formulation of intelligence (Dweck, 1986). All said they would change their current strategies if they knew a better way. Five students expressed at least superficial contentment with their methods. Contentment seems to equate to healthy self-efficacy, until we recall that two of the most content (RA and QA) also found test day discussions unsettling, suggesting an internal conflict. Students high in self-efficacy are found to engage in greater metacognition and a greater range of cognitive strategies than those low in self-efficacy (Greene & Azevedo, 2007; Thomas, 1988); and are more generative and proactive in their study activities (Thomas et al., 1993). Self-efficacy 'ratings' were not part of the current study, but the *tendency* for greater metacognition and generativity apparent in students also more content with their methods, suggests a degree of agreement with these findings.

Five of the eight students who spoke of being content with their strategies were nevertheless open to the idea that strategies unknown to them could exist to offer greater benefit. That they had so little awareness of other strategies – also witnessed by certain teacher accounts – adds credence to the idea that their SRL adaptability is indeed limited. Students cited risk of being worse off, fear of change, and no time to experiment as reasons for not exploring other study strategy options. Most acknowledged that greater demands lay ahead at university, but as with dealing with tests, effort was seen as the panacea. It was clear that QA had not given coping at university much thought, first saying that her verbatim method would suffice, but later returning to it with less conviction. Her comment after the interview revealed how little students have perhaps thought beyond their immediate circumstance, and that help may finally be entertained:

I have to think about other methods to use now... Got my mind working. Definitely got me thinking. I think also ... um... I have friends that are in university and are first year students so ... and I know that they ... they sitting until 2 in the morning ... you know trying to study and maybe I can ask them, 'Well, OK – how do you cope?'

That some students perform well under the prevailing conditions may indeed be creating illusions of competence (Karpicke et al., 2009) that will only be shown up when challenged, for example, at

university. It seems that the students are caught in a cycle of test-preparation that they prefer not to ponder because they see no alternatives to their current preparation. If studying for one test yields disappointing marks, it seems a case of upping the effort in the next, but otherwise, from a metacognitive point of view, just doing it all again.

### **Influences and motivations behind students' test-preparation**

As with metacognitive effects, the influences and motivations behind students' test-preparation were all derived from student interviews, and showed the ineffectiveness of the diaries in this regard.

External influences on test-preparation took four forms: junior school itself; mothers (mostly in the junior school years); peers at high school; and teachers at high school (see Table 2). Mass media, which represents a popular medium for the spread of ideas (Bandura, 2001), and printed media, did not feature as conscious influences, though textbook structuring, for example, can represent subconscious influences (Pressley et al., 1997). Students were vague on what had influenced their test-preparation in junior school itself, some recalling being exposed to an idea over 'a lesson or two'. All accounts were of strategies discounted, such as, listening to self-recorded notes. Mind mapping received frequent mention but was broadly shunned by the students. If it was as highly rated by schools as its mention suggests, then the low adoption rates deserved interrogating. Despite the rarity of students' accounts, it is quite likely that junior schools were influential and that it is more a matter of faded memories or less cognitive influences.

Some students did, however, adopt strategies from their mothers (fathers evidently played no role). Mothers apparently made significant effort – "weekend after weekend" – at 'helping' with studying, for example, QA. In QA's case, her mother imparted the reproductive, rehearsal techniques that had worked for her. The mothers' influences generally felt less characterised by modelling than enforced behaviour. However achieved, all students seem to have arrived at high school with a single, entrenched strategy.

Two students were influenced by peers on entering high school. In Grade 8, both switched to summarising, based on seeing summaries their peers brought to school. Whether the switch was due to perceived value in the technique or social pressure to conform is unknown. Either way, this is evidence of modelling, and the power of the models' perceived, rather than actual, credibility in the eyes of the observer, as theorised by Bandura (1986). Teacher-induced effects on students' test-preparation at high school were limited to two past instances involving tactics, namely, to use colour. These appear to have been casual remarks, and whether misconstrued or misrepresented, both pieces of advice persist in the students' test-preparation a manner that does not appear

helpful<sup>33</sup>. QC also learnt about colour (highlighting) on his two-day course but also the “45-minute rule” he now adheres so strictly to. Students may so readily embrace such tactics in that they seem easy to implement and require very little effort (Dunlosky et al., 2013), and because ‘using colour’ is a clear criterion reference for self-assessing goal attainment. The students recounted their changes with the air of a job well done.

Teachers, by their own accounts, are not trying to influence test-preparation by implicit means, but this may not prevent some of their beliefs about memorising and repetition, mentioned earlier, from being communicated to their students. We know that explicit teaching can be helpful from the students’ perspective (Postholm, 2011), though the literature shows a didactic approach to skills development unlikely to be truly adaptive, even in the short term (e.g., Radovan, 2011). In the current research, two main accounts of explicit teaching were recounted (p. 89). Of these, only the account of T1, who built up a mind map with the help of the students, had an element of modelling: “We did it as a class and we came up with this whole thing.” The remaining account, along with some minor others, is closer to a demonstration, and instruction to use a particular strategy. The current findings concur with research showing the explicit teaching of SRL skills to often be rare (Hamman et al., 2000; Kistner et al., 2010). Two teachers spoke of too little time for anything but core content, and of explicit attempts compromised by the need to maintain good marks. Thus the teacher at School S tried to ‘teach’ summarising but proceeds to issue her own already summarised versions: “I do spoon-feed them a little: I actually do it them ... for them...many times – the key-word summaries.” The students merely précis her summaries. Teacher Q’s habit of issuing summaries caused QC to quit summarising completely (though this is no real excuse). These accounts do suggest agreement with Boekaerts (1999) that teachers’ efforts may be compensating for student shortcomings. The explicit teaching of study skills could be seen as covered in LO (Department of Basic Education, 2011b), but the students in the current study were found to discount what they were exposed to there, echoing the findings of Jacobs (2011). The teaching of study skills in LO seems to have occurred, as with junior school, over a ‘couple of lessons’ near exams – perhaps an inappropriate time to introduce any changes – and one student was particularly scathing of the teacher who, in his eyes, had lost all credibility. These do not resonate as circumstances conducive to Bandura’s (1977) notion of modelled behaviour, where, for example observers ‘identify’ with the models.

Three teachers declared quite openly that they make no attempt to influence their students’ test-preparation. What worked for them might not work for others, and they expect their students to

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<sup>33</sup> RE uses colour at random; PE studies the clock and, along with QE, highlights liberally.

find their own way. Thus, as far as influences go, it seems that mothers played an important role in bedding down initial strategy, after which students made whatever minor adjustments caught their attention. Together with not seeking assistance, the student's test-preparation ultimately seems to be largely of their own devising.

All students cited marks, either directly or in terms of wanting to fulfil university entrance criteria, as their motivation for studying as they do. This suggests an achievement goal orientation, as opposed to a mastery goal orientation, which is to be expected of competence-based settings (Dweck, 1986; Elliot et al., 1999). Achievement goal theory relates primarily to academic settings, and students may have other goals, such as intrinsic goals (Lai et al., 2006), or those involving self-efficacy (Schraw et al., 2006) or psychological factors (Boekaerts & Corno, 2005), such as, related to fear of failure (Watters & Watters, 2007). The latter seem apparent in the accounts of QE and RE, who seem to pursue marks to fulfil an overarching need for parental approval. According to Deci and Ryan (1985), students aware of gaps in their basic psychological needs in a specific learning context will not identify with the goals and values of that context, and QE and RE also both struggle to study. Parents all held high regard for marks, and RA says it was thanks to his parents who "sat him down" in Grade 10 that he now works so hard for marks. RA was also the most visibly anxious student.

The phenomenon of wanting to please others was reported by Cliff (1995) in university students, and sometimes individuals want to please teachers (Broussard, 2002), adults (Morgan, Busch-Rossnagel, Barrett, & Wang, 2009); authority figures (Jacobs, 2011), and researchers (Dellbridge & Lubbe, 2012). However, in speaking of marks, most students spoke of aspiring to an 'A', even those for whom an 'A' seemed to be immediately unrealistic. This suggests that students see an 'A' as the only mark with the power to please. In mentioning their parents, these students' responses all suggest a deeper layering to their motivations, or perhaps one apart from marks. No students made mention of wanting to please teachers or any others, thus in this study, parents are the only significant others.

If an achievement goal adequately describes the students' motivation for test-preparation, then under Elliot et al.'s (1999) framework, the students' particular orientation seems one of performance-approach. Performance-approach would predict strategies orientated to test expectations, as found by Abd-El-Fattah (2011), and would account for the rote strategy observed (Doe & Fox, 2011). Effort has been demonstrated to mediate the effect of motivation on achievement (Schwinger, Steinmayr, & Spinath, 2009), and performance-approach motivation in particular as a positive predictor of effort (Elliot et al., 1999). These could explain the students' esteem for effort. Performance-approach goals are evidently more facilitative in competitive

environments (Midgley et al., 2001), making it an understandable choice for the students. However, when speaking about motivation, students may merely have cited marks because of their pre-eminence: Wolters (2003) regards students as largely unaware of their underlying motivational processes. Performance-approach can include a dimension of performance relative to others rather than achievement of a particular standard (Elliot et al., 1999). Apart from RA, who aspired to remain top of his particular class, the students were unconcerned with relative performance. Most students were not told their position in class rankings, and only one school publicised the top few positions in each grade, suggesting there is mostly no ready basis for students to compare. PA and his friend maintained a comradely banter for who was better in each test.

Despite seeing the students as generally performance-approach oriented, aspects of two students' accounts (QE and RE) hinted at performance-avoidant tendencies. QE spoke of serial forgetfulness as her reason for not achieving the marks she desires and of trying to account for it through various 'alternative' remedies. She appears to want to shift blame for her marks onto something apart from herself. This, according to Baumeister and Scher (1988), amounts to self-handicapping behaviour, which some literature sees as frequently associated with low SRL ability, for example, (Abar & Loken, 2010). RE 'blamed' apparently self-induced and non-mandatory sport commitments and his parents being away for a few days for his running out of time to study. Self-handicapping involves having a 'ready excuse' (Martin, Debus, & Marsh, 2003), and considering that his poor marks make him feel "stupid" and a disappointment to his parents, his sport seems to fit that role.

Compared to achievement goals and performance motivation, mastery goals and motivation tend to transcend external expectations and influences; mastery motivation is associated with life-long learning, self-betterment, upskilling and growth, and persistence (Yukselturk & Bulut, 2007), and is regarded overall as offering the more benefit of the two forms (Senko et al., 2011). Jansen (2012) believes that students who shun mastery goals at school and make it to university have to work extremely hard to meet the demands of they find there. The only glimpse of mastery in the current research involved PA, who comes from a family of academics where academic debate is commonplace and regard for intellectual growth is sought for its own sake. Mastery goals can prevail in the appropriate context (Lai et al., 2006). The current context explains the existence of performance motivation as due to the high regard attached to marks primarily as a vehicle to further studies, but the literature shows that performance and mastery need not, and ought not, to be an either-or choice, and that multiple goals can co-exist (Hulleman et al., 2010; Midgley et al., 2001). The transition from performance goals to mastery goals can be a matter of maturation (Gow & Kember, 1990), but one would hope to see it being nurtured given the purported value of mastery

beyond school. The discussion of teachers' input, and hearing accounts of the ongoing challenges teachers face, explains why this is unlikely to happen soon or spontaneously. Teachers appear to be constrained in their efforts by performance needs, which is not ideal (Lubbe et al., 2006).

The categorisation of motivation usually derives from the use of a validated tool, such as, the Study Process Questionnaire (Biggs, 1987; Zeegers, 1999) or the Achievement Goals Questionnaire (Elliot & Church, 1997). Nevertheless, Hulleman et al. (2010), in their meta-analysis of the achievement goal field, warn that categorisation hinges on the particular instrument being used and they caution against any simple acceptance of categorisation. Given the ambiguity even when such tools are used, the choice in the current research to infer motivation based on rich data is seen as a simply another method of derivation. Indeed, rich accounts are precisely what some studies have called for, for example, McMillan and Schumacher (2001)

The final angle on motivation involves the extent to which students' operating according to performance motivation amounts to them actually *invoking* motivational *strategies* as part of their test-preparation. According to Wolters (2003), to be a motivational strategy, students must make a deliberate and purposeful attempt to influence their level of motivation or the processes that determine their motivation, in a way that promotes improvements in motivation and subsequent performance on academic tasks. There is no evidence of students invoking motivational strategies, defined in this way, as part of their test-preparation. Pintrich et al. (2003) point out that achievement goals are essentially cognitive – which in the current research translates to students being aware of their pursuit of marks and university entrance – while motivations are more implicit, affective and less conscious, which may account for their absence observation. Further research is needed to understand the students' lack of motivational strategies.

Thus far, the students apparently have a motivation 'to do well'. However, for students on track for an 'A' (and capable of a high 'A') the surprising revelation was that none aspired to anything *above* the 80% threshold. The suggestion is an 'A' represents an ultimate achievement, and that an 'A' is enough.

University entrance in South Africa is highly competitive (Jansen, 2012) and it is in students' interest to offer their best results. The university admission points scoring (APS) system on which entrance is based has, however, transformed in recent years from a symbol-based system to one sensitive to actual marks from school (e.g., University of Cape Town, 2015) and marks in the National Benchmarking Tests (NBTs) administered by the Universities South Africa. The latter assess academic readiness for prospective university students, and supplement reports of marks achieved in the

school exit exams by assessing Academic Literacy, Quantitative Literacy, and Mathematics (National Benchmarks Test Project, 2015). NBTs can be seen as challenging and geared at uncovering evidence of deeper processing. According to Jansen (2012, p. 2), the education authorities have set the national school pass level so low that it is “completely normal” for students to obtain four or five distinctions out of six subjects, and is “why you find students easily obtaining 7 distinctions with averages in the 90s with hundreds of other students from our top schools.” If university-hopefuls are content with 80% at school, then it suggests that they are either complacent, misguided, or both. This finding refines the earlier motivation, concluding students to be motivated ‘to do well *enough*’.

### **Summary**

The discussion paints a picture of students investing high effort into rehearsal and reproduction-based strategies, mostly dependent on summarising. Processing was surface-orientated with little evidence of synthesis taking place, though a few instances of processing were understood as being deeper. Students did not use practice examples, which are useful to prepare for tests, apparently due a lack of availability and perhaps ignorance of their benefit. The students’ strategies were interpreted as having merit given that they suited the anticipated test conditions, which are predictable and familiar, but they do not appear to have been selected from a battery of strategies possessed. The students did not collaborate, explained by their limited independence. Students studied in private and did not seek assistance, appropriate to their life-stage as adolescents.

Students gave little forethought to their test-preparation, possibly again due to their familiarity with the anticipated conditions. Test-preparation was monitored mostly in terms of time and concentration, with prevention of distraction a key factor. Students saw effort as the main determinant of marks, and in keeping with a rote approach, students gravitated towards surface processing. Test-preparation was regarded as vital for good marks, a notion shared by the teachers. Students were generally content with their strategies but open to the possibility that better methods existed, though a number of reasons prevented them pursuing this. They could be seen to be thinking that they must just ‘do it all over again’.

Students were mostly conscious of their mothers’ influence in junior school years, and to some extent peers. Teachers seemed to have incidental effects at high school, any explicit efforts they made being frustrated by time constraints, mark standards-based dilemmas, or notions that students must find their own way. LO was not found to serve any meaningful role as far as test-preparation went. Ultimately students’ test-preparation was found to be mostly a matter of intuition. Students were interpreted as achievement orientated in a performance-approach manner, attributed to the marks-based culture of the curriculum. No signs of mastery motivation were

uncovered, which was regarded as questionable given the university focus. Students mostly shared high marks aspirations but none aimed for higher than 80%, suggesting that students were motivated to 'Do well enough'

### **Significance**

There is an abundance of SRL studies concerned with studying as a general concept, especially in the university context. Studies based on test-preparation as a particular context of test-preparation, were found to be rare, even more so in the high school context. This study adds to the understanding of test-preparation at high school. Much of the empirical understanding of test-preparation and other 'studying' phenomena, was revealed to emanate from quantitative studies involving the use of surveys and questionnaires, such as, LASSI Weinstein et al. (1988) in laboratory-based settings, often to investigate the relationship between variables. Despite the insight afforded through such studies, many called for research of a richer nature (McMillan, 2010), occurring in naturalistic settings (Thomas, 1988), in close to real time (Boekaerts & Corno, 2005), and sensitive to the voices of individuals (Postholm, 2011), which points to a qualitative approach. The current research is significant in that it has addressed these calls. Diaries were used in this research based on them being seen as particularly useful for capturing work patterns (Zimmerman, 2008). Diary use is extremely rare in SRL (Dinsmore et al., 2008); in adopting diaries, this study adds to an understanding of their use as a research tool in this context and among teenagers.

Standardised testing is prevalent and important in the South African Basic Education, thus the same goes for test-preparation. This study investigated cases of test-preparation in schools where test-preparation should be approaching optimal. Test-preparation and SRL literature in the South African context are rare, thus this study offers a valuable window on test-preparation and adds to the understanding of test-preparation as a possible solution to ailing standards.

### **Strengths and limitations**

The research aimed to discover 'what was going on' in relation to test preparation, hence it followed an exploratory approach. That the research was not limited in its scope is considered as a strength. A multiple-case study approach was chosen based on its ability to provide cross-case analysis; the approach is considered a strength compared to single-case study, and the involvement of eleven participants is seen as promoting trustworthiness.

Diaries were used to mitigate the shortcomings often attached to studies relying on retrospective recall. In the interview stages, diaries (and artefacts) acted as useful triggers and anchors that possibly elicited more understanding than might otherwise have been achieved. The diary design

neither limited nor guided the length of diary entries, and did not influence students' free expression.

The study featured strong data triangulation, both internal between the diaries, artefacts and student accounts, and externally through the involvement of teachers and parents.

The volume of data is regarded as substantial for the permitted time frame: Apart from the data from diaries and artefacts, the study collected nine hours of student audio data (approximately 50 minutes per interview), nearly six hours of parent audio data (roughly 31 minutes per interview) and three hours of teacher audio data (roughly 35 minutes per interview).

The case study approach introduced some limitations: Multiple-case study supports cross-case analysis and internal comparison between cases (Darke et al., 1998), and in that sense supports analytical generalisation (Yin, 2014). However cases are not sampling units, or statistically representative of a larger population, thus the findings cannot be seen as representative of 'all' individuals fitting the case profile. Though the findings are not *predictive* of other contexts, they can, however, offer valuable *insight* into similar contexts (Walsham, 1995 in Darke et al., 1998). Case criteria are useful in defining what a 'similar context' would look like, which in this case restricts applicative value to students at schools considered to be well-resourced and privileged by South African standards, largely ex-Model C and 'top' private schools. These schools would have a predominantly Western culture. Students may be influenced by curriculum, thus the applicability is limited to schools following the CAPS curriculum. The research was conducted with reference to standardised Grade 11 Biology tests, thus it does not necessarily apply to students' preparation in other grades, taking other subjects, or preparing for other types of assessment types, even though students reflected on these. The study did however include boys and girls, from both single-sex and co-ed schooling models, from across a spectrum of marks, including 'A' achievers, excluding these factors as limitations.

The need for exploration in the limited time available necessitated the need for semi-structured interview protocols. This influenced the direction of interviews and may have affected both the scope and depth of the results that may have appeared differently with more time and questions of a more open-ended nature, such as 'Tell me about ...' (Borgers et al., 2000). Finally, despite an attempt in the data collection phase to achieve 'complete' data, scrutiny of the data in the analysis phase revealed the occasional piece of data that could have benefitted from clarification. On the basis of maintaining trustworthiness, such issues were not followed up with participants.

### **Implications for further research**

The research drew attention to mothers playing a significant role in their children's study strategy formulation at junior school. Further research should investigate the prevalence of this finding and how maternal input compares to the inculcation of skills on the part of schools. The origin of students strategy formulation at junior school needs to be better understood. The finding suggests an opportunity for parent-school partnerships in supporting the development of study skills at junior school level.

A large number of students disregarded skills input that they were exposed to, especially in LO. Research that investigates what elements of study skills exposure, from the students' perspective, lead to it being ignored (or adopted), is required. Possible areas of investigation from the findings are the degree to which teachers model SRL skills and test-preparation, cover them explicitly, and provide authentic but risk-free opportunities for experimentation with study strategies. Studies that follow up on students who participate in externally-run courses may be of value to numerous parties. A number of studies point to the potential effectiveness of study skills interventions. These represent opportunities for interested teachers to participate in action research, for example, the degree to which mastery can exist symbiotically with a marks focus. Students' metacognition during their test-preparation and their motivation could benefit from additional insight. The extent to which schools are concerned with their students' future academic welfare and are prepared to invest in it is unknown, but one presumes and hopes it is high. Schools with real concern for their students' future academic welfare might be encouraged to find ways to promote SRL.

## Appendix I: Strategy List of Hadwin et al. (2001)

Scale	Subscale	Items
<b>TACTICS</b> (8 subscales; 26 items)	<b>Structuring Content</b>	Making an outline of content; Creating charts, tables, or diagrams; Changing the order or structure of ideas
	<b>Selecting</b>	Highlighting, underlining, circling, starring ; Ignoring or removing details
	<b>Making Deeper Links</b>	Making concept maps; Using mental imagery; Writing out a summary; Creating mnemonics; Creating analogies; Making up examples
	<b>Planning</b>	Setting objectives for oneself; Planning a method for the task; Planning time
	<b>Rehearsing</b>	Rehearsing information; Talking things through with oneself
	<b>Questioning</b>	Making up questions; Predicting questions that might be on the exam; Answering questions that students make up
	<b>Collaborating</b>	Assisting peers; Asking peers for assistance; Asking the instructor or teaching assistant about course content
	<b>Note-Taking</b>	Taking notes; Recopying notes; Creating a glossary Making small additions to notes or text
<b>RESOURCES</b> (7 subscales; 20 items)	<b>Personal Resources</b>	Notes made outside lectures; Content remembered from lectures
	<b>Provided Resources</b>	Course outline; Instructor handouts; The marking scheme; Tapes of classes
	<b>Text resources I: Organisers</b>	Table of contents; Index; Section headings; Chapter objectives
	<b>Text resources II: Summary Items</b>	Chapter summary; Questions for reflection
	<b>Text resources III: Applications</b>	Cases to consider; Research-at-work; Implications for teachers sections
	<b>Text resources IV: Illustrations</b>	Illustrations; Photographs; Tables in the text
	<b>Text resources V: Types of Print</b>	Bold; Italicised
<b>GOALS for studying</b> (8 subscales; 30 items)	<b>Cognitive Selection I: Depth</b>	Focusing on information related to principles; The most important ideas
	<b>Cognitive Selection II: Surface Selection</b>	Focusing on information related to facts; Details; Terms
	<b>Cognitive Selection III: Other Types</b>	Focusing on information related to what one wants to learn; Gaps in one's knowledge; Things one finds challenging; Things one finds easy; What counts for marks
	<b>Cognitive Processing I: Understanding</b>	Focusing on not missing anything; Getting the big picture; Understanding specific points; Figuring out what the task was
	<b>Cognitive Processing II: Storing</b>	Focusing on creating a record to refer to Reproducing information verbatim
	<b>Cognitive Processing III: Monitoring</b>	Making predictions; Seeking out feedback; Checking progress while working; Seeking better ways to do one's work
	<b>Cognitive Processing IV: Integrating and Translating</b>	Focusing on translating content into one's own word; Linking new ideas with one's prior knowledge; Different sources from the course; Or one another; Activating relevant prior knowledge; Drawing conclusions; Applying concepts and ideas; Evaluating content for contradictions; Evaluating content on the basis of one's prior knowledge
	<b>Cognitive Processing V: Memorising</b>	Focusing on remembering

## Appendix II: Teacher Interview Schedule

- Tell me your impression of each of these students' academics (referring to the cases).  
Prompt: Think of it as writing a report comment. The answer to this question offers some insight into how well the teachers know their students, or 'relatedness'. It offers the teacher's perspective on the students and allows the researcher to corroborate the student version of events.
- Tell me anything that has indicated to you how these students may be studying.  
The answer to this question addresses each student's studying as accurately as a teacher might be expected to know it.
- Tell me about your own study experiences and how this may have impacted your views about studying, and how it should occur.  
This answer helps to understand the degree to which the students' study practice is shaped by philosophies and strategies of the teacher.
- Who's responsibility is it to help students with their student's study practice and how should 'they' go about it?  
This question seeks to understand the extent to which the teacher sees themselves as responsible for influencing study practice.
- Are there things that you do that you consider helpful for improving study practice? This answer allows a comparison of the version of events. For example is the teacher giving good advice but the student is not hearing it, or does the student want advice that is not forthcoming.
- What influence do you see the school ethos having on the way the students approach studying?  
The answer to this question investigates the extent to which broader philosophies impact the student's study practice.

### Appendix III: Parent Interview Schedule

Interviewee \_\_\_\_\_ Case: \_\_\_\_\_

Venue: \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

Type: PARENT School: Q P R S Test date: \_\_\_\_\_

---

Preamble:

*Thank you for agreeing to participate in this research. While you are not the focus of the research, please know that your input as an observer of studying at home is valuable.*

*As you know this research is to find out what students do when they study and why they do it. Studying means preparation specifically for an upcoming test. The research is focussed on the test ..... wrote on the ..... so it would be helpful if you could keep this test in mind as much as possible when you answer.*

---

Schedule:

1. Has ... said anything about what it feels like to be part of this research?
  2. The test on ... was unusual in that this research was in the background. Would you say that the research had an effect on the way ... studied?  
Fo: In what way?
  3. What can you tell me about the way x studies for tests? How do Life Sci tests compare to this way, and this last one in particular?
  4. What has influenced the way ... studied for this last test?  
Fo: Teachers/friends/peers/courses?  
Fo: Has the way .... study's evolved? Any significant steps?
  5. What role did you play in ... studying for this last test?  
Fo: Intended vs unintended effects?
  6. How did ... feel about his/her studying for the last test?
  7. Did ... express any obstacles/challenges in the way of studying for this last test?
  8. Anything you would like to see that did not happen, or would like to see continuing?
- 

Notes:

## Appendix IV: Student Interview Schedule

Case \_\_\_\_\_ School: Q P R S

Venue: \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

---

Preamble:

*Thank you for agreeing to participate in this research and for doing what you done already.  
Remember that everything you say today is totally confidential and cannot be linked to you.*

*As you know this research is to find out what students do when they study and why they do it. I have a set of standard questions to ask you. I'd like you to answer these with your last LS test in mind as much as possible, but you can generalise if it feels relevant. You may feel that some questions overlap with each other. If you feel you have already answered, just say so, but please give more input if you have it. Then we'll go through your diary so I can clarify some things.*

---

Schedule:

1. Did being involved in this research affect the way you studied?  
In what way?
2. Was the way you studied typical for the way you study for Life Science tests? How long have you studied this way?
3. What *words* come into your head when I mention the word studying?
4. How did studying for your last test make you feel about yourself?
5. Is your mark or your position in a test important?
6. Generally, what motivates you to study?
7. Did your past achievements affect the way you studied for your last test?
8. What % of your test result do you put down to how well you studied?
9. How have you landed up studying as you did? Influences? Have you thought about or tried other methods/tactics/strategies? Deliberate choice? Tell me. Has LO helped? What effect do test results have on your studying?
10. How confident are you that you knew the best way to study for your test?
11. How well would you say you studied for this test? What are you most happy with?
12. Was studying for this test a challenge? In what way?
13. What sources did you study from? What do you intend to do with the notes you made?
14. DIARY

Notes:

## Appendix V: Research Pack Title Page



### Student Research Pack

Name: [Write your alias here]

**CONFIDENTIAL**

If found please contact [jamesb874@gmail.com](mailto:jamesb874@gmail.com)

## Appendix VI: Student Diary Instructions

Thank you for agreeing to give of your time, energy and thoughts. Your input, whatever it is, is of great value, possibly to many others.

### Things to REMEMBER:

- Be totally **HONEST**: What you say is confidential, will not be judged, and will not be used against you.
- Be **NATURAL**: Study just as you normally would. Try not to let the fact that you are being 'watched' affect what you do.
- Be **CLEAR**: Write until you have said all you want to say. To save writing too much, think carefully about what you are trying to say, and then write it in as few words as you can.
- Be **THOROUGH**: What you say is more important than how it looks.

### INSTRUCTIONS

1. Complete the Study Habits section before you do your first entry. Spaces are deliberately not provided to give you as much space as you feel is necessary.
2. You will receive a reminder on the day before the diary period starts. Please reply so that I know you have not forgotten. You will receive no further prompts.
3. Complete the diary each day for the 10 days before your test, as follows:
  - a. Tear the correct header from the Daily Diary Header sheet. Paste it on the next new right hand page. The first day is already done for you.
  - b. Complete the header. Note that a commitment is any activity, including other school work, that you feel prevents you from studying Life Science.
  - c. Study as you normally would. Remember that a break of at least 30 minutes or doing some focussed activity divides studying into more than one session. If you do not study, please say why, and record any current thoughts about studying.
  - d. Describe your session. I have no idea what studying is for you; you have to tell me exactly what you did. Describe what you did **PHYSICALLY** (refer to examples where this helps), what was going on in your **THOUGHTS**, and **WHY** you did or thought what you did.
  - e. Did you study for more than one session **AND** you feel that there was something different about a later session? Rule a line after the previous session, and describe what was different.
  - f. Keep **EXAMPLES**: PHOTOGRAPH and PRINT, PHOTOCOPY, or submit ORIGINALS of material that demonstrates what you did. Paste these into your diary on the correct day. Only one example of a piece is needed, but you may paste in more.
4. Is it the last day? Add anything about studying that is likely to occur between the end of your last study session and the start of the test.
5. Place the diary in the Research Pack envelope, and seal it.
6. Hand your sealed Research Pack to your Life Science Teacher.

For any queries at all, please contact me at: 084 296 5359 or [jamesb874@gmail.com](mailto:jamesb874@gmail.com)

## Appendix VII: Study Habits and Test Details

### Your Typical Study Habits

The purpose of this section for me to understand what you see as being 'typical of you' when it comes to your studying for Life Science tests.

COMPLETE THIS ONCE ONLY, BEFORE YOUR FIRST ENTRY. You can add to your responses later, or include more detail as part of a daily entry. Being clear in these answers will save you repeating explanations as part of in your daily entries.

Think back to your last Life Science test and use it to write down the things about the way you typically study for Life Science tests. If you feel that there is no such thing as a 'typical' answer for a question, please explain why.

1. Describe the physical setting in which you study. Describe where it is, what it looks like, what you can hear, and what is around you.
2. Imagine that I took a single photograph of you in typical study mode during your last Life Science test. What would the picture show you doing?
3. Imagine I watched you studying for one of your typical Life Science study sessions and I took notes of things you did. What would I typically see you doing, and what would you tell me about what was going on in your mind?
4. How much time did you spend studying for your last Life Science test, and how was this time divided up?
5. What has influenced the way you study for Life Science?
6. Briefly, how does your studying for Life Science compare to the way you study for other subject tests?
7. Write down anything else about your studying that you think is typical of you but has not come out in any of your previous answers.
8. Complete the following fields if you know the details:

Date of test: \_\_\_\_\_

Topic of Test: \_\_\_\_\_

Test Length: \_\_\_\_\_ marks/\_\_\_\_\_ minutes

Amount of material to be learnt:

\_\_\_\_\_

\_\_\_\_\_

Write down ANYTHING else you know about the test at this point, and roughly when you received this information.

## Appendix VIII: Example of Diary Entry Headers

**Diary Entry 1**      Date: \_\_\_\_\_ Day: \_\_\_\_\_  
 Commitments that affected my studying (Event and time):

Number of sessions I studied today: \_\_\_\_\_  
 Session details:

No. (1, 2, 3, ...)	Start time	End time	Venue

**Diary Entry 2**      Date: \_\_\_\_\_ Day: \_\_\_\_\_  
 Commitments that affected my studying (Event and time):

Number of sessions I studied today: \_\_\_\_\_  
 Session details:

No. (1, 2, 3, ...)	Start time	End time	Venue

**Diary Entry 10**      Date: \_\_\_\_\_ Day: \_\_\_\_\_  
 Commitments that affected my studying (Event and time):

Number of sessions I studied today: \_\_\_\_\_  
 Session details:

No. (1, 2, 3, ...)	Start time	End time	Venue



ADD ANYTHING RELEVANT TO STUDYING THAT IS LIKELY TO OCCUR BETWEEN YOUR LAST ENTRY AND TOMMORROW'S TEST

## Appendix IX: School Permission to Conduct Research

3 September 2012



To: [Name of head teacher]: Principal  
[Name of Life Science Head]: Head of Life Science

### Request to allow Masters research: 'What students do when they study, and why?'

I am a former Life Science teacher and Examiner conducting research towards a Master's degree in Education through the University of Cape Town. This letter seeks your permission to approach select students and interview the Head of Life Science for research purposes.

The research seeks to shed light what the 'typical' student does when they study, and why, with a view to promoting learning and academic achievement. Three Grade 11 students preparing for a standardised Life Science test, preferably from a class taught by the Head of Life Science will be asked to participate. Participants will complete a diary for 10 days prior to the test, and participate in a 30-minute follow-up interview on school premises. The students' teacher will be asked to help identify potential participants, and to participate in a 30-minute, recorded interview relating to their views on study practice, and the academic dispositions of the participants. Research will take place entirely outside of school hours. Participants will be selected based on their latest Life Science examination result, of which only their symbol needs to be disclosed.

Six schools are participating in this research. The identity of schools and participants, and the source of interview material will remain strictly confidential. Access will however be given to the completed thesis. Schools are encouraged to recognise student participation through the awarding of Life Orientation or Community Service credits.

Your willingness to participate would be greatly appreciated. Please inform me of your decision using one of the contact details below. Should you agree, please complete the attached form and either forward it or arrange for collection. I understand that agreement does not oblige students to participate; prospective participants and their parents will be approached for separate consent.

Please contact me for further clarification or access to the full proposal.

Yours sincerely

A handwritten signature in black ink, appearing to read 'James Buchanan', with a long horizontal line extending to the right.

**James Buchanan** : Researcher

Cell: 084 296 5359

Tel: (W): (021) 658-7923

(H): (021) 685-7754

Email: [james.buchanan@gmail.com](mailto:james.buchanan@gmail.com)

**Rudiger Laugksch** : Head of Department and Co-supervisor

Tel: (021) 650 2777

Email: [Rudiger.Laugksch@uct.ac.za](mailto:Rudiger.Laugksch@uct.ac.za)

## School Consent to Conduct Master’s Research on Study Practice

I hereby give my consent for James Buchanan (researcher) to proceed with research on Study Practice at [school name].

I understand that the school’s participation consists of the following:

- Assisting the researcher to identify potential participants through consultation with the Head of Life Science, as laid out above
- Allowing the researcher to approach the parents of potential participants, and to liaise with participants.
- Access to a venue after school in which to conduct the three student interviews in private.
- Notifying the researcher of documents ready for collection.
- Allowing the researcher to interview the Head of Life Science, outside of school hours.

I understand that

- the identity of the school and students will remain anonymous, and sources of all information will be treated as confidential
- the school has the right to withdraw their endorsement and consent at any point.

Signed: \_\_\_\_\_ at \_\_\_\_\_ on \_\_\_\_\_.  
Headmaster      School      Date

## Appendix X: Invitation to Participate in Research

3 September 2012

Dear [parent titles and names] and [student name]



### Invitation to participate in Research

I am a former Life Science teacher and Examiner conducting research towards a Master's degree in Education through the University of Cape Town. The research has been endorsed by [school], and this letter invites your [son/daughter] to participate as one of a select group of Grade 11 students drawn from six different schools. The research investigates the study practice of high school students: what students do when they study, and why, and seeks to understand the extent to which study guidance may be of benefit to learning and academic achievement.

The following is required of participants:

- Access to your latest Life Science examination symbol.
- Attendance at a once-off, after school briefing session of approximately 45 minutes with the researcher and other participants at your [son/daughter]'s school.
- Completion of a diary on each of 10 days leading up to a designated Life Science test. The time and length of completion is up to participants, though full descriptions are ideal. Diary entries comprise what you do when you study (physically and mentally) and why you do it (your motivations). The submission of exemplar notes and other materials is encouraged. Completion is anticipated to take about 20 minutes each day.
- Consent for your teacher to discuss your academic disposition.
- Attendance at a one-on-one, 30-minute, follow-up interview with the researcher. The interview will be recorded using a Dictaphone.

Should you agree, your input will remain entirely anonymous, and will not be discussed your teacher/school. You will receive feedback in the form of access to the completed thesis. Please return the attached forms completed according to your decision to the Head of Life Science within the next three days. While your selection has been careful and would be greatly appreciated, you are under no obligation to participate, and you may withdraw from the research at any point. Please contact me for further clarification or access to the full proposal.

Yours sincerely

A handwritten signature in black ink, appearing to read 'James Buchanan', with a long horizontal line extending to the right.

**James Buchanan**

Researcher

Cell: 084 296 5359

Tel: (W): (021) 658-7923

(H): (021) 685-7754

Email: [james.buchanan@gmail.com](mailto:james.buchanan@gmail.com)

A handwritten signature in purple ink, appearing to read 'Rudiger Laugksch'.

**Rudiger Laugksch**

Head of Department and Co-supervisor

Tel: (021) 650 2777

Email: [Rudiger.Laugksch@uct.ac.za](mailto:Rudiger.Laugksch@uct.ac.za)

## Appendix XI: Letter of Parental Consent

### Parent Letter of Consent to Participate in Research

I, \_\_\_\_\_ (Full names), hereby *consent /decline consent* (delete not applicable) for my child, \_\_\_\_\_ (First name and Surname) to participate in research conducted by James Buchanan on Study Practice.

I understand that

- participation is entirely voluntary
- I or my child can withdraw from the research at any point
- all parties will remain anonymous and, where necessary, will be referred to by alias
- information will not be discussed with any third party
- I have the right to ask for clarification, or to ask questions of the researcher at any stage using the contact details provided.
- I am granted access to the completed thesis
- my child's Grade 11 June Life Science examination symbol can be disclosed
- my child's Life Science teacher will discuss my child's academic disposition with the researcher

#### Should you have accepted the invitation, please complete the following details:

I confirm that my child is a first-time Grade 11 student, has attended \_\_\_\_\_ (name of current school) for at least one full year, and has their own room in which to study.

My child can in principle attend the briefing session on the following day(s) of the week directly after school. (Please circle available):

Mon Tues Wed Thurs Fri

I can be contacted at: \_\_\_\_\_ (email)  
\_\_\_\_\_ (cell)

Signed: \_\_\_\_\_ (Signature of parent) on \_\_\_\_\_ (date)  
at \_\_\_\_\_ (Place).

## Appendix XII: Letter of Student Assent

### Student Letter of Assent to Participate in Research

I, \_\_\_\_\_ (Full names), agree to participate and in the research being conducted by James Buchanan on Study Practice.

I understand that

- my participation is voluntary
- I can withdraw from the study at any point
- I will remain anonymous and my input will not be discussed with anyone at the school. Where necessary, I will be referred to by alias.
- I can ask questions about things I do not understand and I have the right to more information where I need it.
- I have access to the completed thesis
- my Grade 11 June Life Science examination symbol will be revealed
- my teacher will discuss my academics with the researcher

I agree to the following:

- Attendance at a briefing session with the researcher and other students at my school after school on one of the days indicated by my parents.
- Daily completion of a diary to the best of my ability on each 10 days up to an agreed upon Life Science test. I will try my best to detail what I do when I study (physically and mentally) and why I do this. I am happy to provide evidence of materials where I can. I am prepared to spend at least 10 minutes a day on this.
- I will attend a 30-minute, audio-recorded, follow-up interview with the researcher.
- My input can be subject to individual analysis and pooled for group analysis. .

I can be contacted at: \_\_\_\_\_ (email)

\_\_\_\_\_ (cell)

Signed: \_\_\_\_\_ (Signature of student on \_\_\_\_\_ (date)

at \_\_\_\_\_ (Place).

## **Appendix XIII: Student Briefing Meeting Agenda**

### Student Briefing Meeting Agenda

1. Welcome and thanks.
2. Who I am and purpose/importance of research.
3. Discussion about what is meant by studying, and how it is meant in the study.
4. The methodology.
  - a. Distribute Research Packs and introduce the diary concept
  - b. Explain how diary is to be used.
    - i. Explain how to complete the typical section. Explain the logistics of daily entries. In particular illustrate how to fulfil what and why requirements, using a sports practice for analogy.
  - c. Explain what construes 'examples' and how/when to submit such.
5. Logistics. When to do things, and who to hand what to. Decide on aliases.
6. Communication: Confirm communication channel and commitments to communication.
7. Importance of doing this properly. Reminder of terms.
8. Further questions/concerns.

## References

- Abar, B., & Loken, E. (2010). Self-regulated learning and self-directed study in a pre-college sample. *Learning and Individual Differences, 20*, 25-29.
- Abd-El-Fattah, S. M. (2011). The effect of test expectations on study strategies and test performance: A metacognitive perspective. *International Journal of Experimental Educational Psychology, 31*(4), 497-511.
- About School Assessment. (2015). *ieb : Assessment Matters*. Retrieved 2 August, 2015, from <http://www.ieb.co.za/School/about.php>
- Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*, 261–271.
- Anderson, S. A., & Fuller, G. B. (2010). Effect of music on reading comprehension of junior high school students. *School Psychology Quarterly, 25*(3), 178–187.
- Ary, D., Jacobs, L. C., Razavieh, A., & Sorensen, C. (2006). *Introduction to research in education* (7th ed.). Belmont, CA: Thomson Wadsworth.
- Aubrun, A., & Grady, J. (2000). How Americans understand teens: Findings from cognitive interviews Frameworks Institute
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. *Psychological Review, 84*(2), 191-215.
- Bandura, A. (1986). *Social foundations of thought and action: a social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (2001). Social cognitive theory of mass communication. *Media Psychology, 3*, 265–299.
- Barber, L. K., Bagsby, P. G., Grawitch, M. J., & Buerck, J. P. (2011). Facilitating self-regulated learning with technology: Evidence for student motivation and exam improvement. *Teaching of Psychology, 38*(4), 303-308.
- Baumeister, R. F., & Scher, S. J. (1988 ). Self-defeating behavior patterns among normal individuals: Review and analysis of common self-destructive tendencies. *Psychological Bulletin, 104*(July), 3-22.
- Bednall, T. C., & Kehoe, E. J. (2011). Effects of self-regulatory instructional aids on self-directed study. *Instructional Science, 39*, 205–226.
- Bennet, S. (2005). *Righting the balance*. Retrieved 17 August 2015, from <http://www.clir.org/pubs/reports/pub129/bennett.html>
- Berry, T., Cook, L., Hill, N., & Stevens, K. (2010). An exploratory analysis of textbook usage and an exploratory analysis of textbook usage and study habits: Misperceptions and barriers to success. *College Teaching, 59*, 31-39.
- Biggs, J. B. (1987). *The Study Process Questionnaire (SPQ) manual*. Melbourne: Australian Council for Educational Research.
- Biggs, J. B., Kember, D., & Leung, D. Y. P. (2001). The Revised Two Factor Study Process Questionnaire: R-SPQ-2F. *British Journal of Educational Psychology, 71*, 133-149
- Binet, A., Simon, T., & Kite, E. S. (1916). *The development of intelligence in children (The Binet-Simon scale)*. Baltimore, MD: Williams & Wilkins.
- Bloom, B. S., (Ed), Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). *Taxonomy of educational objectives, Handbook I: The cognitive domain*. New York: David McKay.
- Boehler, M. L., Schwind, C. J., Folsie, R., Dunnington, G., Markwell, S., & Dutta, S. (2001). An evaluation of study habits of third-year medical students in a surgical clerkship. *The American Journal of Surgery, 181*, 268-271.

- Boekaerts, M. (1999). Self-regulated learning: Where we are today. *International Journal of Educational Research*, 31, 445-457.
- Boekaerts, M., & Corno, L. (2005). Self-regulation in the classroom: A perspective on assessment and intervention. *Applied Psychology: An International Review*, 54(2), 199-231.
- Boekaerts, M., & Minnaert, A. (1999). Self-regulation with respect to informal learning. *International Journal of Educational Research*, 31, 533-544.
- Boekaerts, M., Otten, R., & Simons, R. J. (1997). Een onderzoek naar de bruikbaarheid van de ILS leerstijlen in de onderbouw van het voortgezet onderwijs [Exploring the usefulness of the ILS-learning style construct for high school students]. *Tijdschrift voor Onderwijsresearch*, 22(2), 15-36.
- Bong, M. (1996). Problems in academic motivation research and advantages and disadvantages of their solutions. *Contemporary Educational Psychology*, 21, 149-165.
- Boote, D. N., & Beile, P. (2005). Scholars before researchers: On the centrality of the dissertation literature review in research preparation. *Educational Researcher*, 34(6), 3-15.
- Borgers, N., De Leeuw, E., & Hox, J. (2000). Children as respondents in survey research: Cognitive development and response quality. *Bulletin de Methodologie Sociologique*, April(66), 60-75.
- Borges del Rosal, Á., Hernández-Jorge, C. M., & Sierra, M. A. G. (2012). Achievement predictors in a secondary students' sample. *Quality & Quantity*, 46(6), 1687-1697.
- Bothma, F., & Monteith, J. L. d. (2004). Self-regulated learning as a prerequisite for successful distance learning. *South African Journal of Education*, 24(2), 141-147.
- Broekkamp, H., & Hout-Wolters, B. H. (2007). Students' adaptation of study strategies when preparing for classroom tests. *Educational Psychology Review*, 19, 401-428.
- Broussard, S. C. (2002). *The relationship between classroom motivation and academic achievement in first and third graders*. (Master of Science thesis), Louisiana State University, Baton Rouge, LA.
- Burger, D. (2011). *A paradigm shift for South Africa's model of governance, education becomes first priority*. Retrieved May 15, 2012, from <http://www.politicalanalysis.co.za/2011/11/19>
- Burns, D. J. (2004). Anxiety at the time of the final exam: Relationships with expectations and performance. *Journal of Education for Business*, November/December, 119-124.
- Burns, D. J. (2008). Will I do as well on the final exam as I expect? An examination of students' expectations. *Journal of the Scholarship of Teaching and Learning*, 8(3), 1-19.
- Butler, D. L. (1998). The Strategic Content Learning approach to promoting self-regulated learning: A report of three studies. *Journal of Educational Psychology*, 106, 1729-1758.
- Campbell, P. B., & Sanders, J. (2002). Challenging the system: Assumptions and data behind the push for single-sex schooling. In A. Datnow & L. Hubbard (Eds.), *Gender in policy and practice: Perspectives on single-sex and co-educational schooling* (pp. 31-46). New York: RoutledgeFalmer.
- Cano-Garcia, F., & Justicia-Justicia, F. (1994). Learning strategies, styles and approaches: An analysis of their interrelationships. *Higher Education Research & Development*, 27, 239-260.
- Caprara, G. V., Fida, R., Vecchione, M., Giannetta Del Bove, Vecchio, G. M., Barbaranelli, C., & Bandura, A. (2008). Longitudinal analysis of the role of perceived self- efficacy for self-regulated learning in academic continuance and achievement. *Journal of Educational Psychology*, 100(3), 525-534.
- Carey, B. (2014). *How we learn: The surprising truth about when, where and why it happens*. Oxford: Macmillan.
- Carr, M., & Claxton, G. (2002). Tracking the development of learning dispositions. *Assessment in Education*, 9(1), 9-37.

- Cerrito, P. B., & Levi, I. (1999). An investigation of student habits in mathematics courses. *College Student Journal*, 33(4), 584-588.
- Changeiywo, J. M., Wambugu, P. W., & Wachanga, S. W. (2011). Investigations of students' motivation towards learning secondary school physics through mastery learning approach. *International Journal of Science and Mathematics Education*, 9, 1333-1350.
- Ciani, K. D., Sheldon, K. M., Hilpert, J. C., & Easter, M. A. (2010). Antecedents and trajectories of achievement goals: A self-determination theory perspective. *British Journal of Educational Psychology*, 81, 223–243.
- Claxton, G. (1999). *Wise up: The challenge of lifelong learning*. London: Bloomsbury.
- Cliff, A. (1995). A qualitative review of study behaviour before and during the first year of engineering studies. *Higher Education*, 29(2), 169-181.
- Cohen, L., Manion, L., & Morrison, K. (2007). *Research methods in education* London; New York: Routledge.
- Cordón, L. A., & Day, J. D. (1996). Strategy use on standardized reading comprehension tests. *Journal of Educational Psychology*, 88(2), 288-295.
- Cox, A. M. (2011). Students' experience of university space: An exploratory study. *Journal of Teaching and Learning in Higher Education*, 23(2), 197-207.
- Credé, M., & Kuncel, N. R. (2008). Study habits, skills, and attitudes: The third pillar supporting collegiate academic performance. *Perspectives on Psychological Science*, 3(6), 425-453.
- Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among the five approaches* (2nd ed.). Thousand Oaks, CA: Sage.
- Crookall, D., Lopez-Nerney, S., Jessie, T. S. M., Mei, W. S., Toh, J. E., Ismail, N. B. M., . . . Jacobs, G. M. (2000). *Student-initiated, out-of-class academic collaboration among students at a Singapore university*. Washington, DC: Distributed by ERIC Clearinghouse.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper Perennial.
- Darke, P., Shanks, G., & Broadbent, M. (1998). Successfully completing case study research: Combining rigour, relevance and pragmatism. *Journal of Information Systems*, 3, 273-289.
- Davies, P. (2006). Exploratory research. In V. Jupp (Ed.), *The SAGE dictionary of social research methods* (1st ed.). London: SAGE.
- Davis-Kean, P. E. (2005). The influence of parent education and family income on child achievement: The indirect role of parental expectations and the home environment. *Journal of Family Psychology*, 294-304.
- Davis, O. C. (2010). *Why the workplace needs positive psychology*. Boston, MA: Quality of Life Laboratory.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.
- Dellbridge, C.-A., & Lubbe, C. (2012). An adolescent's subjective experiences of mindfulness. *Journal of Child & Adolescent Mental Health Policy and Planning*, 21(2), 167-180.
- Department of Basic Education. (2011a). *National protocol for assessment grades R - 12*. Pretoria, South Africa: Government Printers.
- Department of Basic Education. (2011b). *Grades 10-12 Life Orientation Curriculum and Assessment Policy Statement (CAPS)*. Pretoria, South Africa: Government Printers.
- Department of Basic Education. (2011c). *Grades 10-12: Life Sciences Curriculum and Assessment Policy Statement (CAPS)* Pretoria, South Africa: Government Printers.
- Department of Basic Education. (2012). *Report on the 2012 National Senior Certificate Examination*. Pretoria, South Africa: Government Printers.

- Department of Basic Education. (2013). *Strategic plan 2010-2013*. Pretoria, South Africa: Government Printers.
- Dignath, C., & Büttner, G. (2008). Components of fostering self-regulated learning among students. A meta-analysis on intervention studies at primary and secondary school level. *Metacognition Learning, 3*, 231-264.
- Dinsmore, D., Alexander, P., & Loughlin, S. (2008). Focusing the conceptual lens on metacognition, self-regulation, and self-regulated learning. *Educational Psychology Review, 20*, 391-409.
- Diseth, A., & Martinsen, O. (2003). Approaches to learning, cognitive style, and motives as predictors of academic achievement. *Educational Psychology, 23*, 195-207.
- Doe, C., & Fox, J. (2011). Exploring the testing process: Three test takers' observed and reported strategy use over time and testing contexts. *The Canadian Modern Language Review, 67*(1), 29-54.
- Duckworth, A. L., Quinn, P. D., & Samantha, G. (2010). *What no child left behind leaves behind: A comparison of the predictive validity of self-control and IQ for standardized test scores and report card grades*. 24. Retrieved from: <http://www.sas.upenn.edu/~duckwort/images/Microsoft%20Word%20-%20SelfDisciplineandAcademicPerformance.042408.pdf>
- Duckworth, K., Akerman, R., MacGregor, A., Salter, E., & Vorhaus, J. (2009). *Self-regulated learning: A literature review*. London: University of London: Centre for Research on the Wider Benefits of Learning.
- Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. *Psychological Science in the Public Interest, 14*(1), 4-58.
- Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41*, 1040-1048.
- Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 72*, 218-232.
- Elliot, A. J., McGregor, H. A., & Gable, S. (1999). Achievement goals, study strategies, and exam performance: A mediational analysis. *Journal of Educational Psychology, 91*, 549-563.
- Entwistle, N. (1987). A model of the teaching-learning process. In J. T. Richardson, M. W. Eysenck & D. W. Piper (Eds.), *Research in education and cognitive psychology* (pp. 3-12). Milton Keynes: Open University Press.
- Entwistle, N., & McCune, V. (2004). The conceptual bases of study strategy inventories. *Educational Psychology Review, 16*(4), 325-345.
- Entwistle, N. J., & Tait, H. (1990). Approaches to learning, evaluation of teaching and preferences for contrasting academic environments. *Higher Education Research & Development, 19*(2), 169-194.
- Evers, C. W., & Wu, E. H. (2006). On generalising from single case studies: Epistemological reflections. *Journal of Philosophy of Education, 40*(4), 511-526.
- Feldt, R. C. (1990). Test expectancy and performance on factual and higher-level questions. *Contemporary Educational Psychology, 15*, 212-223
- Fleisch, B. (2008). *Primary education in crisis: Why South African schoolchildren underachieve in reading and mathematics*. Cape Town, South Africa: Juta.
- Fontana, A., & Frey, J. (1994). Interviewing: The art of science. In N. Denzin & Y. Lincoln (Eds.), *Handbook of qualitative research*. Thousand Oaks, CA: Sage Publications.
- Foroohar, R. (2010, August 16). How we ranked the world. *Newsweek*, 48-52.

- Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in childrens' academic engagement and performance. *Journal of Educational Psychology, 95*(1), 148-162.
- Golafshani, N. (2003). Understanding reliability in qualitative research. *The Qualitative Report, 8*(4), 597-607.
- Gow, L., & Kember, D. (1990). Does higher education promote independent learning? *Higher Education Research & Development, 19*(3), 307-322.
- Gravett, S. (2011, 14 Jan, 14 Jan). Private good; public not so bad, *Mail & Guardian*. Retrieved from 2 August 2015
- Greene, J. A., & Azevedo, R. (2007). A theoretical review of Winne and Hadwin's model of self-regulated learning: New perspectives and directions. *Review of Educational Research, 77*(3), 334-372.
- Guba, E. G., & Lincoln, Y. (1998). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The landscape of qualitative research: Theories and issues*. Thousand Oaks, CA: Sage.
- Hadwin, A., & Oshige, M. (2011). Self-regulation, coregulation, and socially shared regulation: Exploring perspectives of social in self-regulated learning theory. *Teachers College Record, 113*(2), 240-264.
- Hadwin, A. F., Winne, P. H., Stockley, D. B., Nesbit, J. C., & Woszczynna, C. (2001). Context moderates students' self-reports about how they study. *Journal of Educational Psychology, 93*(3), 477-487.
- Hamman, D., Berthelot, J., Saia, J., & Crowley, E. (2000). Teachers' coaching of learning and its relation to students' strategic learning. *Journal of Educational Psychology, 92*(2), 342-348.
- Hammond, L.-D., Austin, K., Orcutt, S., & Rosso, J. (2001). *How people learn: Introduction to learning theories. The learning classroom: Theory into practice*. Retrieved 15 March 2012, from <http://www.stanford.edu/class/ed269/hplintrochapter.pdf>
- Harris, T. L., & Hodges, R. E. (1995). *The literacy dictionary: The vocabulary of reading and writing*. Newark, DE: International Reading Association.
- Hays, P. A. (2004). In K. deMarrais & S. D. Lapan (Eds.), *Foundations for research: Methods of inquiry in education and the social sciences* (pp. 217- 234). Mahwah, NJ: Lawrence Erlbaum.
- Hoffman, L. M., & Nottis, K. E. K. (2008). Middle school students' perceptions of effective motivation and preparation factors for high-stakes tests. *NASSP Bulletin, 92*(209-223).
- Hofmeyr, J., McCarthy, J., Oliphant, R., Schirmer, S., & Bernstein, A. (2013). *Affordable private schools in South Africa*. Johannesburg, South Africa.
- Holschuh, J. P. (2000). Do as I say, not as I do: High, average, and low-performing students' strategy use in Biology. *Journal of college Reading and Learning, 31*(1), 94-108.
- Hong, E., Sas, M., & Sas, J. C. (2006). Test-taking strategies of high and low mathematics achievers. *The Journal of Educational Research, 99*(3), 144-155.
- Hopkins, G. (2005). *How can teachers develop students' motivation and success?* Retrieved May 16, 2012, from [http://www.educationworld.com/a\\_issues/chat/chat010.shtml](http://www.educationworld.com/a_issues/chat/chat010.shtml)
- Howard, J. R. (1993). *Study behaviours of undergraduate and graduate students*. (Master of Science thesis), Fort Hays State University, Hays, CA.
- HSRC. (2011). *HSRC concerned about state of SA's education*. Retrieved April 12, 2012, from <http://www.hsrc.ac.za/News-1533.phtm>
- Hulleman, C. S., Schrager, S. M., Bodmann, S. M., & Harackiewicz, J. M. (2010). A meta-analytic review of achievement goal measures: Different labels for the same constructs or different constructs with similar labels? *Psychological Bulletin, 136*(3), 422-449.

- Innis, K., & Shaw, M. (1997). How do students spend their time? *Quality Assurance in Education*, 5(2), 85 - 89.
- Jacobs, A. (2011). Life Orientation as experienced by learners: A qualitative study in North-West province. *South African Journal of Education*, 31, 212-223.
- Jansen, J. (2012). *I would seriously consider not sending my child to school in SA*. Retrieved 14 March, 2013, from <http://www.moneyweb.co.za/archive/i-would-seriously-consider-not-sending-my-child-to/>
- Jansen, J., & Taylor, N. (2003). *Educational change in South Africa 1994-2003: Case studies in large-scale education reform Country studies, education reform and management publication II (1)*. Washington, DC: World Bank.
- Jeynes, W. H. (2003). The learning habits of twelfth graders attending religious and non-religious schools. *International Journal of Education and Religion*, 145-167.
- John, V. (2013, 17 May). *Dropout rate points to lack of support*. *Mail&Guardian*. Retrieved 20 August 2015, from <http://mg.co.za/article/2013-05-17-dropout-rate-points-to-lack-of-support>
- Kadri, H. M. F. A., Al-Moamary, M. S., Elzubair, M., Magzoub, M. E., AlMutairi, A., Roberts, C., & Vleuten, C. v. d. (2011). Exploring factors affecting undergraduate medical students' study strategies in the clinical years: A qualitative study. *Advances in Health Science Education*, 16, 553-567.
- Karpicke, J. D., Butler, A. C., & Roediger III, H. L. (2009). Metacognitive strategies in student learning: Do students practise retrieval when they study on their own? *Memory*, 17(4), 471-479.
- Kember, D., Jamieson, Q. W., Pomfret, M., & Wong, E. T. T. (1995). Learning approaches, study time and academic performance. *Higher Education*, 29(3), 329-343.
- Kirby, N. F., & Downs, C. T. (2007). Self-assessment and the disadvantaged student: Potential for encouraging self-regulated learning? *Assessment & Evaluation in Higher Education*, 32(4), 475-494.
- Kistner, S., Rakoczy, K., Otto, B., Dignath-van Ewijk, C., Büttner, G., & Klieme, E. K. (2010). Promotion of self-regulated learning in classrooms: Investigating frequency, quality, and consequences for student performance. *Metacognition Learning*, 5, 157-171.
- Kitsantas, A. (2002). Test preparation and performance: A self-regulatory analysis. *The Journal of Experimental Education*, 70(2), 101-113.
- Kurtz, B. E., & Weinert, F. E. (1989). Metamemory, metaperformance, and causal attributions in gifted and average children. *Journal of Experimental Child Psychology*, 48, 45-61.
- Kvale, S., & Brinkmann, S. (2009). *Interviews: Learning the craft of qualitative research interviewing* (2nd ed.). Thousand Oaks, CA: SAGE Publications.
- Lai, P., Chan, K., & Wong, K. (2006, November). *A study of intrinsic motivation, achievement goals and study strategies of Hong Kong Chinese secondary students*. Paper presented at the Australian Association for Research in Education Conference, Adelaide, Australia.
- Letseka, M., & Maile, S. (2008). *High university drop-out rates a threat to South Africa's future* (pp. 7). Pretoria: Human Sciences Research Council.
- Ley, K., & Young, D. B. (1998). Self-regulation behaviors in underprepared (developmental) and regular admission college students. *Contemporary Educational Psychology*, 23, 42-64.
- Lincoln, Y., & Guba, E. G. (1985). *Naturalistic enquiry*. Beverly Hills, CA: Sage.
- Lubbe, E., Monteit, J., & Mentz, E. (2006). The relationship between keyboarding skills and self-regulated learning. *South African Journal of Education*, 26(2), 281-293.
- Mamlok-Naaman, R. (2011). How can we motivate high school students to study science? *Science Education International*, 22(1), 5-17.

- Marks, G. N., McMillan, J., Jones, F. L., & Ainley, J. (2000). *The measurement of socioeconomic status for the reporting of nationally comparable outcomes of schooling*. Australian Council for Education Research, Canberra, Australia.
- Martin, A. J., Debus, R. L., & Marsh, H. W. (2003). Self-handicapping and defensive pessimism: A model of self protection from a longitudinal perspective. *Contemporary Educational Psychology, 28* (January), 1-36.
- Martin, L. A. (2007). What middle school students have to say about strategy use in social studies. *Theory & Research in Social Education, 35*(4), 631-645.
- Märton, F., & Saljo, R. (1976). On qualitative difference in learning: Outcome and process. *British Journal of Educational Psychology, 46*, 1-11.
- Masitsa, M. G. (2006). Student motivation: The study approaches of Grade 12 learners in township schools. *South African Journal of Higher Education, 20*(3), 486-500.
- Maxwell, J. A. (2008). Designing a qualitative study. In A. Bickman & D. Rog (Eds.), *The Sage handbook of applied social research methods* (pp. 214-253). London: Sage.
- McCormick, A. C. (2011, Winter). It's about time: What to make of reported declines. *Liberal education, 30-39*.
- McMillan, J. H., & Schumacher, S. (2001). *Research in education: A conceptual introduction* (5th Ed.). New York: Addison Wesley Longman.
- McMillan, W. J. (2005). "We are not in the least bit used to these ways of studying": Developing academic competence in all students. *Journal of Dental Education, 69*(1123-1132).
- McMillan, W. J. (2010). 'Your thrust is to understand' - how academically successful students learn. *Teaching in Higher Education, 15*(1), 1-13.
- Midgley, C., Kaplan, A., & Middleton, M. (2001). Performance-approach goals: Good for what, for whom, under what circumstances, and at what cost? *Journal of Educational Psychology, 93*(1), 77-86.
- Miyasaka, J. R. (2000, 24-28 April). *A framework for evaluating the validity of test preparation practices*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.
- Mohlala, T. (2011, 13 December). *Revamped assessment methods in 2012*. *Mail and Guardian Online*. Retrieved 17 April 2012, from <http://mg.co.za/article/2011-12-13-revamped-assessment-methods-in-2012>
- Moloi, K., Dzvimbo, K., Potgieter, F., Wolhuter, C., & Van der Walt, J. (2010). Learners' perceptions as to what contributes to their school success: A case study. *South African Journal of Education, 30*, 475-490.
- Moonsamy, S. (2011, February). *Learners' perspectives on metacognition in the classroom*. Paper presented at the International Association for Cognitive Education in Southern Africa Conference, Cape Town, South Africa.
- Morgan, G. A., Busch-Rossnagel, N. A., Barrett, K. C., & Wang, J. (2009). *The Dimensions of Mastery Questionnaire (DMQ): A manual about its development, psychometrics, and use*
- Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2002). Verification strategies for establishing reliability and validity in qualitative research. *International Journal of Qualitative Research, 1*(2), 13-22.
- Motshekga, A. (Writer). (2012). 7 o' clock news report. Cape Town, South Africa: 567 Cape Talk News and Talk Radio.
- Muller, J. (1998). The well-tempered learner: Self-regulation, pedagogical models and teacher education policy. *Comparative Education, 34*(2), 177-193.

- Nairn, K., Higgins, J., Thompson, B., Anderson, M., & Fu, N. (2006). 'It's just like the teenage stereotype, you go out and drink and stuff': Hearing from young people who don't drink. *Journal of Youth Studies*, 9(3), 287-304.
- Narciss, S., Proske, A., & Koerndle, H. (2007). Promoting self-regulated learning in web-based environments. *Computers in Human Behaviour*, 23, 1126-1144.
- National Benchmarks Test Project. (2015). *Welcome*. Retrieved 23 August, 2015, from <http://www.nbt.ac.za/>
- Ning, H. K., & Downing, K. (2011). The interrelationship between student learning experience and study behaviour. *Higher Education Research & Development*, 30(6), 765-778.
- Organisation for Economic Co-operation and Development. (2008). *Reviews of national policies for education: South Africa*. Paris, France: OECD Publishing.
- Pajares, F. (2002). *Overview of social cognitive theory and self-efficacy*. Retrieved 27 Feb 2015, from <http://www.emory.edu/EDUCATION/mtf/eff.html>
- Parker, F. (2012, 5 January). *Worrying trends hamper high matric pass rate*. *Mail and Guardian*. Retrieved 17 April 2012, from <http://mg.co.za/article/2012-01-05-worrying-trends-hamper-high-matric-pass-rate>
- Parliament of the Republic of South Africa. (1996). *South African Schools Act (Sasa), (Act 84 of 1996)*. Pretoria, South Africa: Government Printers.
- Patton, J. E., Stinard, T. A., & Routh, D. K. (1983). Where do children study? *Journal of Educational Research in Science Education*, 76, 280-286.
- Perels, F., Guertler, T., & Schmitz, B. (2005). Training of self-regulatory and problem solving competence *Learning and Instruction*, 15(2), 123-139.
- Perlman, C. (2004). Practice tests and study guides: Do they help? Are they ethical? What is ethical test preparation practice? In J. Wall & G. R. Walz (Eds.), *Measuring up: Assessment issues for teachers, counselors and administrators* (pp. 387-396). Austin, TX: Pro-Ed.
- Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review*, 16(4), 348-407.
- Pintrich, P. R., Conley, A. M., & Kempler, T. M. (2003). Current issues in achievement goal theory and research. *International Journal of Educational Research*, 39, 319-337.
- Pintrich, P. R., Smith, D. A., Garcia, T., & McKeachie, W. J. (1991). *A manual for the use of the Motivated Strategies for Learning Questionnaire*. Ann Arbor, Michigan: National Centre for Research to Improve Post-secondary Teaching and Learning.
- Plant, E. A., Ericsson, K. A., Hill, L., & Asberg, K. (2005). Why study time does not predict grade point average across college students: Implications of deliberate practice for academic performance. *Contemporary Educational Psychology*, 30, 96-116.
- Pocock, J. (2012). Leaving rates and reasons for leaving in an Engineering faculty in South Africa: A case study. *South African Journal of Science*, 108( 3/4 ), Art. #634, 638 pages.
- Postholm, M. B. (2011). Self-regulated learning in teaching: Students' experiences. *Teachers and Teaching: Theory and Practice*, 17(3), 365-382.
- Pressley, M., Yokoi, L., Meter, P., Van Etten, S., & Freebern, G. (1997). Some of the reasons why preparing for exams is so hard: What can be done to make it easier? *Educational Psychology Review*, 9(4), 1-38.
- Radovan, M. (2011). The relation between distance students' motivation, their use of learning strategies, and academic success. *The Turkish Online Journal of Educational Technology*, 10(1), 216-222.
- Richardson, J. S., Robnolt, V. J., & Rhodes, J. A. (2010). A history of study skills: Not hot, but not forgotten. *Reading Improvement*, 47(2), 111-123.

- Richardson, J. T. E. (1993). Gender differences in response to the Approaches to Study Inventory. *Studies in Higher Education, 18*, 3-13.
- Robinson, K. (2001). *Out of our minds: Learning to be creative*. West Sussex: Capstone Publishing Limited.
- Rogers, L., & Hallam, S. (2006). Gender differences in approaches to studying for the GCSE among high-achieving pupils. *Educational Studies, 32*(1), 59–71.
- Rothbart, M. K., & Jones, L. B. (1998). Temperament, self-regulation, and education. *School Psychology Review, 27*(4), 479-491.
- Rowland, B. (2011). *The influence of high stakes testing and test preparation on high school students' perspectives on education and lifelong learning*. (PhD), Walden University, Ann Arbor, Michigan.
- Rozalski, M. E. (2008). Practice, practice, practice: How to improve students' study skills. *Beyond Behavior, 17*(2), 17-23.
- Rubenstein, J. (2004). Test Preparation: What makes it effective? In J. Wall & G. R. Walz (Eds.), *Measuring up: Assessment issues for teachers, counselors and administrators* (pp. 387-396). Greensboro, NC CAPS Press.
- Rummel, N., Levin, J. R., & Woodward, M. M. (2003). Do pictorial mnemonic text-learning aids give students something worth writing about? *Journal of Educational Psychology, 95*(2), 327–334.
- Rustenburg Girls' High. (2015a). FAQs. Retrieved 2 August, 2015, from <http://www.rghs.org.za/faqs/>
- Rustenburg Girls' High. (2015b). *Matric results 2014*. Retrieved 2 August 2015, from <http://www.rghs.org.za/matric-results-2014/>
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*, 54-67.
- Salomone, R. (2002). The legality of single-sex education in the United States: Sometimes "Equal" means "Different". In A. Datnow & L. Hubbard (Eds.), *Gender in policy and practice: Perspectives on single-sex and co-educational schooling* (pp. 47-71). New York: Routledge Falmer.
- Schraw, G., Crippen, K. J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning. *Research in Science Education, 36*, 111-139.
- Schraw, G., Wadkins, T., & Olafson, L. (2007). Doing the things we do: A grounded theory of academic procrastination. *Journal of Educational Psychology, 99*(1), 12–25.
- Schunk, D. H., & Zimmerman, B. J. (Eds.). (1994). *Self-regulation of learning and performance: Issues and educational applications*. Hillsdale, NJ: Erlbaum.
- Schwinger, M., Steinmayr, R., & Spinath, B. (2009). How do motivational regulation strategies affect achievement: Mediated by effort management and moderated by intelligence. *Learning and Individual Differences, 19*, 621–627.
- Senko, C., Hulleman, C. S., & Harackiewicz, J. M. (2011). Achievement Goal Theory at the crossroads: Old controversies, current challenges, and new directions. *Educational Psychologist, 46*(1), 26-47.
- Sitzmann, T., & Ely, K. (2011). A meta-analysis of self-regulated learning in work-related training and educational attainment: What we know and where we need to go. *Psychological Bulletin, 137*(3), 421-442.
- South African Government. (2015). *Education*. Retrieved 2 August, 2015, from <http://www.gov.za/about-sa/education#basic>

- Strydom, J. F., Kuh, G. D., & Mentz, M. (2010). Enhancing success in South Africa's higher education: Measuring student engagement. *Acta Academica*, 42(1), 259-278.
- Tasnimi, M., & Maftoon, P. (2014). Application of self-regulation in reading comprehension. *Humanising Language Teaching*, 16(3).
- Theophilides, C., & Koutselini, M. (2010). Study behavior in the closed-book and the open-book examination: A comparative analysis. *Educational Research and Evaluation*, 6(4), 379–393.
- Thinking Schools International. (2012). *South Africa*. Retrieved April 19, 2012, from <http://www.thinkingschoolsinternational.com/tsi-community/international-community/south-africa>.
- Thomas, J. (1988). Proficiency at academic studying. *Contemporary Educational Psychology*, 13, 265-275.
- Thomas, J. W., Bol, L., Warkentin, R. W., Wilson, M., Strage, A., & Rohwer, W. D. J. (1993). Interrelationships among students' study activities, self-concept of academic ability, and achievement as a function of characteristics of high-school biology courses. *Applied Cognitive Psychology*, 7, 499-532.
- Thomas, J. W., & Rohwer, W. D. (1987). Grade-level and course-specific differences in academic studying: Summary. *Contemporary Educational Psychology*, 12, 381-385.
- Thomas, J. W., & Rohwer, W. D., Jr (1986). Academic studying: The role of learning strategies. *Educational Psychologist*, 21(1&2), 19-41.
- Thomson, K., & Falchikov, N. (1998). "Full on until the sun comes out": The effects of assessment on student approaches to learning. *Assessment and Evaluation in Higher Education*, 23(4), 379-390.
- Tomes, J. L., Wasylikiw, L., & Mockler, B. (2011). Studying for success: Diaries of students' study behaviours. *Educational Research and Evaluation*, 17(1), 1-12.
- University of Cape Town. (2015). *Eligibility for admission*. Retrieved 25 August, 2015, from <https://www.uct.ac.za/apply/criteria/eligibility/>
- Usher, E. L. (2009). Sources of middle school students' self-efficacy in mathematics: A qualitative investigation. *American Educational Research Journal*, 46(1), 275 -314.
- Van den Hurk, M. (2006). The relation between self-regulated strategies and individual study time, prepared participation and achievement in a problem-based curriculum. *Active Learning in Higher Education*, 7, 155-169.
- Van der Meera, J., Jansen, E., & Torenbeek, M. (2010). 'It's almost a mindset that teachers need to change': First-year students' need to be inducted into time management. *Studies in Higher Education*, 35(7), 777–791.
- Van Etten, S., Freebern, G., & Pressley, M. (1997). College students' beliefs about exam preparation. *Contemporary Educational Psychology*, 22, 192-212.
- Van Meter, P., Yokoi, L., & Pressley, M. (1994). College students' theory of note-taking derived from their perceptions of note-taking *Journal of Educational Psychology*, 86(3), 323-338.
- Veenman, M. V. J., Hout-Wolters, B. H. A. M., & Van Afflerbach, P. (2006). Metacognition and learning: Conceptual and methodological considerations. *Metacognition Learning*, 1, 3-14.
- Warkentin, R. W., & Bol, L. (1997, 24 April). *Assessing college students' self-directed studying using self-reports of test preparation*. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.
- Watters, D. J., & Watters, J. J. (2007). Approaches to learning by students in the biological sciences: Implications for teaching. *International Journal of Science Education*, 29(1), 19-43.
- Weinstein, C. E., Zimmerman, S. A., & Palmer, D. R. (1988). Assessing learning strategies: The design and development of the LASSI. In C. E. Weinstein, E. T. Goetz & P. A. Alexander (Eds.),

- Learning and study strategies: Issues in assessment, instruction and evaluation* (pp. 25-39). San Diego, CA: Academic Press.
- Western Cape Education Department. (2012). *Criteria for the National Senior Certificate (NSC) Awards for 2011*. Retrieved 4 August 2014, from [https://www.westerncape.gov.za/other/2012/1/school\\_awards\\_2011.pdf](https://www.westerncape.gov.za/other/2012/1/school_awards_2011.pdf)
- Williams, J. E. (1997, 24-28 March). *Relating affective and cognitive study strategies to self-regulated learning for rural at-risk students* Paper presented at the Annual Meeting of the American Educational Research Association Chicago, IL.
- Wilson, K. L., Smart, R. M., & Watson, R. J. (1996). Gender difference in approach to learning in first year psychology students. *British Journal of Educational Psychology*, 66, 59-71.
- Winne, P. H. (2010). Improving measurements of self-regulated learning. *Educational Psychologist*, 45(4), 267-276.
- Wirth, J., & Leutner, D. (2008). Self-regulated learning as a competence: Implications of theoretical models for assessment methods. *Journal of Psychology*, 216(2), 102 –110.
- Wolters, C. A. (2003). Regulation of motivation: Evaluating an underemphasized aspect of self-regulated learning. *Educational Psychologist*, 38(4), 189-205.
- Wong, M. M.-h., & Csikszentmihalyi, M. (1991). Motivation and academic achievement: The effects of personality traits and the duality of experience. *Journal of Personality*(59), 539-574.
- Wong, M. S. (2005, September). *Self-regulation of learning: Exploring the self-regulated learning practices of pre-service teachers*. Paper presented at the 3rd International Seminar on Learning and Motivation, Pulau Langkawi, Malaysia.
- Yin, R. (2014). *Case study research: Design and methods* (5th ed.). Los Angeles, CA: SAGE.
- Yin, R. K. (1994a). *Case study research: Design and methods* (2nd ed.). Beverly Hills, CA: Sage Publishing.
- Yin, R. K. (1994b). Discovering the future of the case study method in evaluation research *Evaluation Practice*, 15(3), 283-290.
- Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Beverly Hills, CA: Sage Publications.
- Younger, M. R., & Warrington, M. (2006). Would Harry and Hermione have done better in single-sex classes? A review of single-sex teaching in coeducational secondary schools in the United Kingdom. *American Educational Research Journal*, 579-620.
- Yukselturk, E., & Bulut, S. (2007). Predictors for student success in an online course. *Journal of Educational Technology and Society*, 10(2), 71-83.
- Zeegers, P. (1999, July). *Student learning in science: A longitudinal study using the Biggs SPQ*. Paper presented at the Higher Education Research and Development Society of Australasia (HERDSA) Annual International Conference, Melbourne, Australia.
- Zhu, J. (2009). Early childhood education and relative policies in China. *International Journal of Child Care and Education Policy*, 3(1), 51-60.
- Zimmerman, B. J. (1989). A social-cognitive view of self-regulated academic learning *Journal of Educational Psychology*, 81(3), 329-339.
- Zimmerman, B. J. (1998). Developing self-fulfilling cycles of academic regulation: An analysis of exemplary instruction models In D. H. Schunk (Ed.), *Self-regulated learning. From teaching to self-reflective practice*. London: Guildford Press.
- Zimmerman, B. J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments and future prospects. *American Educational Research Journal*, 45(1), 166–183.

- Zimmerman, B. J., & Martinez-Pons, M. (1986). Development of a structured interview for assessing student use of self-regulated learning strategies. *American Educational Research Journal*, 23(4), 614-628.
- Zimmerman, B. J., & Martinez-Pons, M. (1990). Student differences in self-regulated learning: Relating grade, sex, and giftedness to self-efficacy and strategy use. *Journal of Educational Psychology*, 82(1), 51-59.
- Zimmerman, B. J., & Schunk, D. H. (1989). *Self-regulated learning and academic achievement: Theory, research, and practice*. New York: Springer.