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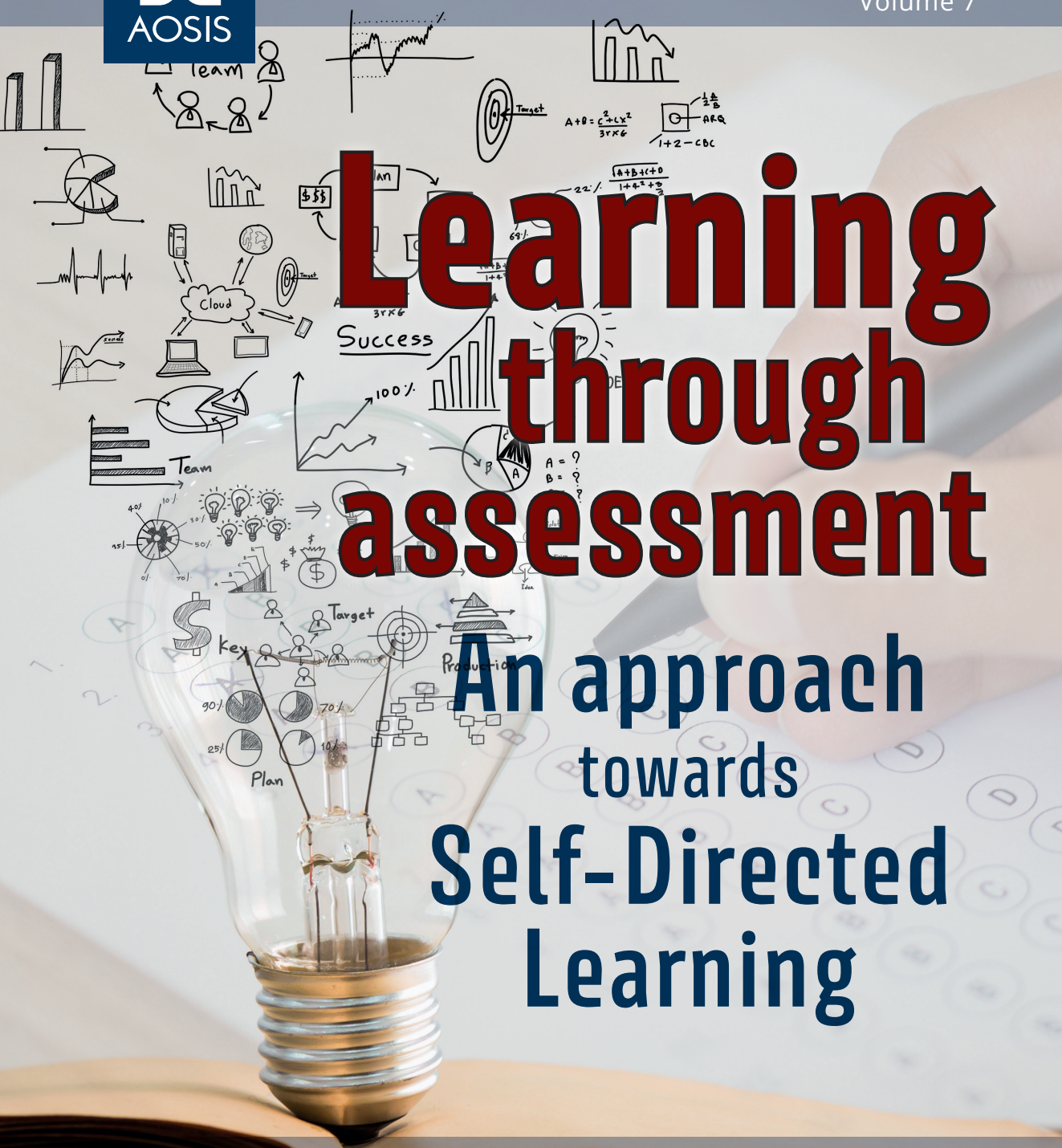

Learning through assessment

An approach towards Self-Directed Learning

Edited by

Elsa Mentz & Anitia Lubbe

NWU Self-Directed Learning Series
Volume 7

Learning through assessment

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EDITORS
Elsa Mentz
Anitia Lubbe

Peer review declaration

The publisher (AOSIS) endorses the South African 'National Scholarly Book Publishers Forum Best Practice for Peer Review of Scholarly Books'. The manuscript was subjected to rigorous two-step peer review before publication, with the identities of the reviewers not revealed to the author(s). The reviewers were independent of the publisher and/or authors in question. The reviewers commented positively on the scholarly merits of the manuscript and recommended that the manuscript be published. Where the reviewers recommended revision and/or improvements to the manuscript, the authors responded adequately to such recommendations.

Research Justification

This book aims to contribute to the discourse of learning through assessment within a self-directed learning (SDL) environment. It adds to the scholarship of assessment and SDL within a face-to-face and online learning environment.

As part of the NWU Self-Directed Learning Book Series, this book (vol. 7) is devoted to scholarship in the field of SDL, focusing on ongoing and envisaged assessment practices for SDL through which learning within the 21st century can take place. It is important to change the way we think about assessment, not only in higher education institutions but also in the school context, and for assessment practices to be aligned with SDL. This book acknowledges and emphasises the role of assessment as a pedagogical tool to foster SDL during face-to-face as well as online learning situations. The way in which higher education conceptualises teaching, learning and assessment has been inevitably changed because of the coronavirus disease 2019 (COVID-19) pandemic. Now more than ever, we need learners to be self-directed in their learning. Assessment plays a key role in learning and, therefore, we have to identify innovative ways in which learning can be assessed and which are likely to become the new norm even after the pandemic has been brought under control. The goal of this book, consisting of original research, is to assist with the paradigm shift regarding the purpose of assessment, as well as to provide new ideas on assessment strategies, methods and tools appropriate to foster SDL in all modes of delivery.

Although all the chapters focus on assessment within a SDL environment, different foci in each chapter contribute to the rich knowledge bank in this field. The 10 chapters, although eclectic in approach and based on different methodologies (conceptual chapters and chapter using mixed-method or qualitative methodologies) – contribute to the broader knowledge base in the field of assessment and SDL.

The target audience of the book includes academics and researchers in the field of SDL in the education landscape.

After a call for contributions to this book, the two editors undertook a screening process from submitted abstracts to select the chapters for this book. After submission of the final chapters, the editors were responsible for reviewing the content and then provided feedback to authors in order to make amendments where necessary before final submission to the publisher, AOSIS. Thereafter an independent and rigorous peer review process was administered by AOSIS and amendments were again made where applicable. We are confident that the chapters in this book will contribute to the academic scholarship in the field of SDL and assessment.

In accordance with the requirements of the Department of Higher Education and Training, this book contains more than 50% of original research content not published before and no part of the book has been plagiarised.

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Contents

Abbreviations, Boxes, Figures and Tables Appearing in the Text and Notes

List of Abbreviations

AaL	Assessment as Learning
AfL	Assessment for Learning
AI	Artificial Intelligence
AoL	Assessment of Learning
BICS	Basic Interpersonal Communication Skills
CAA	Computer Assisted Assessment
CALP	Cognitive Academic Language Proficiency
CALT	Computer Adaptive Language Testing
CAPS	Curriculum and Assessment Policy Statement
CAT	Computer Adaptive Test
CBT	Computer-Based Test
CDL	Center for Distance Learning
CEEA	Canadian Engineering Education Association
CHAT	Cultural-Historical Activity Theory
CL	Cooperative Learning
CLMoA	Cooperative Learning Method of Assessment
CRESST	Centre for Research on Evaluation, Standards, and Student Testing
CTT	Classic Test Theory
DBE	Department of Basic Education
EAL	English Additional Language
EASA	Education Association of South Africa
EFAL	English First Additional Language
EHL	English Home Language
EP	Evidence of Performance
EX	Examinations
FET	Further Education and Training
GA	General Assessments
GIG	Group–Individual–Group
HEI	Higher Education Institutions
ICEP	International Conference on Engaging Pedagogy

ICLS	International Conference of the Learning Sciences
IL	Information Literacy
IRT	Item Response Theory
ITS	Intelligent Tutoring Systems
LMS	Learning Management System
LOA	Learning-Oriented Assessment
LoLT	Language of Learning and Teaching
MDCA	Multimodal Digital Classroom Assessments
MDT	Measurement Decision Theory
ML	Metaliteracy Learning
MOOC	Massive Open Online Courses
NDA	Non-Disposable or Renewable Assignments
NILOA	National Institute for Learning Outcomes Assessment
NRF	National Research Foundation
NS	Natural Sciences
OER	Open Educational Resources
PDF	Portable Document Format
PLA	Prior Learning Assessment
PRO	Personal Responsibility Orientation
QFT	Question Formulation Technique
RU	Rubrics
SDL	Self-Directed Learning
SDLI	Self-Directed Learning Instrument
SDLT	Self-Directed Learning with Technology
SDLTS	Self-Directed Learning with Technology Scale
SDMA	Self-Directed Multimodal Assessment
SDML	Self-Directed Multimodal Learning
SES	Supplemental Educational Services
SLOA	Self-Directed Learning-Oriented Assessment
SRL	Self-Regulated Learning
SRSSDL	Self-Rating Scale of Self-Directed Learning
TALiP	Teacher Assessment Literacy in Practice
TE	Tests
TEFL	Teaching English as a Foreign Language
ZPD	Zone of Proximal Development

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Foreword

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An enduring educational challenge is to design assessment so that it functions both as a productive learning tool and a reliable measuring one. This edited collection by scholars at North-West University makes a useful contribution to contemporary debates by analysing and exemplifying the linkages between SDL and learning-oriented assessment approaches.

In SDL, students take ownership of their own learning with the guidance of the teacher. Learners formulate goals, choose appropriate learning strategies and self-evaluate progress towards learning outcomes. Self-directed learners often work in teams because complex learning can rarely be achieved in isolation. Through SDL, students develop many of the capacities needed for lifelong learning.

Assessment drives the content and approaches of student learning. If assessment tasks are not seen to encourage or promote SDL, then students may choose surface or passive approaches to learning. Self-directed learning implies a need for participative assessment practices which involve collaboration, peer feedback and student self-evaluation.

I have previously suggested that learning-oriented assessment involves three interlocking components: well-designed assessment tasks, students' development of self-evaluative capacities, and active student involvement in feedback processes (Carless 2015a). This learning-oriented assessment framework coheres well with ideas on SDL because it highlights the importance of student self-assessment and a proactive role in feedback interactions.

A key teacher's role is to design summative assessment tasks which promote student learning behaviours resonating with SDL principles. Case studies of assessment designs by expert university teachers illustrated a

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number of key features of such approaches (Carless 2015b). Effective assessment designs are supported by the following 10 principles:

1. promotes deep rather than surface approaches to learning
2. spreads student cognitive engagement consistently over the duration of a course
3. mirrors authentic real-life applications of the discipline
4. impedes malpractice, such as contract cheating or plagiarism
5. develops student connoisseurship by appreciation of key disciplinary concepts
6. designs feedback processes for student involvement and uptake
7. involves some student flexibility or choice
8. exploits digital possibilities for synthesis and interaction
9. provides opportunities for peer feedback and student self-evaluation
10. produces worthwhile learning outcomes, aligned with course objectives.

These guidelines for effective assessment design represent an ideal to be targeted whilst acknowledging that inevitable compromises arise from disciplinary and contextual features. It is not envisaged that any course assessment design will meet all of the features but they can be used as a checklist for enhancement purposes.

The COVID-19 pandemic also brings to the fore new imperatives of how to organise assessment and feedback in a socially distanced world. Although there are obvious challenges, the pandemic also prompts us to question some of our conventional practices, such as closed book examinations in a large hall. These may now be replaced by richer, more authentic assessment tasks resonating with the 10 principles above.

The pandemic also encourages us to re-consider digital possibilities for feedback processes. If less face-to-face oral feedback is feasible, we need to consider options, such as audio and video feedback. Digitally enabled feedback does, however, need to avoid some of the trappings of teacher transmission pedagogy. Self-directed feedback approaches highlight the value of student peer review, for example, peer-to-peer audio or video feedback. Within these approaches, the development of teacher and student feedback literacy are important elements (Carless & Boud 2018).

This collection of papers also represents a tribute to the legacy of our dear colleague, the late Kobus Lombard. Kobus made pioneering contributions to assessment in support of SDL both in South Africa and further afield. The impressive achievements of the SDL research unit at North-West University are a fitting continuation of his work.

Preface

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A central theme of this book is learning through assessment to enhance self-directed learning (SDL). Chapter 1 sets the scene by providing a framework for SDL-oriented assessment and assessment literacy as essential components of learning in the 21st century. This chapter explains the rationale for the emphasis on SDL when studying the role of assessment in learning.

Chapter 2 emphasises the importance of context for SDL when exploring situated SDL and the need to consider its social context. This chapter then indicates how language should be used in order to support situated SDL-oriented assessment. The practices regarding the language of assessment within selected university modules are explored and a progressively individualised conceptual-theoretical framework to understand assessment as a tool for SDL is proposed.

In the light of the rapid move to online learning, the next three chapters position SDL and assessment within the online learning environment.

Chapter 3, a conceptual chapter, explores the scholarship around self-directed multimodal assessment in order to provide recommendations which would make equitable and differentiated assessment possible. It suggests a framework for self-directed multimodal assessment for individual modal needs of students for technological access and skills, also paying attention to students with special needs or disabilities.

In Chapter 4, the interconnections between metaliteracy as a holistic model that prepares individuals to participate constructively in social information environments and SDL were explored. Assessment methods within SDL most appropriate for determining progress towards metaliteracy were indicated. The chapter also provides two examples of how the intersection of metaliteracy, SDL and assessment might be addressed in practice.

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Chapter 5 advances the establishment of an online tutoring system, integrating several state-of-the-art online education systems geared towards helping students to be more self-directed, maximising their learning and raising their self-efficacy through integrated ipsative assessments.

Assessment as an epistemological tool to facilitate metacognitive awareness and to promote SDL is the focus of Chapter 6. The chapter offers a philosophical analysis of the conceptions of assessment and metacognitive awareness in light of the theory of an epistemology of engagement. A framework is offered that can serve as a model for exploring metacognition and SDL in assessment practices.

The next four chapters offer empirical investigations into assessment practices. Chapter 7 reports on a qualitative interpretivist investigation about the value of assessment feedback during the implementation of a specific cooperative learning method of assessment. The evaluation was done within a sustainable assessment perspective.

Chapter 8 critically explores the English for Education teaching, learning and assessment practices of a selected institution to establish how teaching, learning and the curriculum can be structured to enhance quality assessment and SDL. A variety of assessment tasks and assessment that encourages critical thinking and problem-solving is discussed as components that enhance quality assessment and SDL.

In Chapter 9, the consequences of online marking and feedback in a school-wide community of practice project, utilising teaching strategies for the development of SDL, are explored. With sufficient practice and support, the future looks promising for online feedback, as the responses from students indicate positive trends with regards to the quality of the feedback they received. The authors argued that the paradigm shift towards online feedback is in the best interest of developing SDL.

Chapter 10 bridges the gap between schooling and higher education by reporting on qualitative research, utilising cultural-historical activity theory (CHAT) as a research lens and aimed at understanding the influence of teachers' assessment beliefs on learners' SDL behaviour. As a result, this chapter advocates for higher education to include more structured programmes for teachers that would support them in becoming cognisant of their assessment beliefs and changing negative belief systems that work against appropriate learner developmental needs.

In conclusion, this book emphasises the key role of assessment within learning to support and enhance SDL and how it should be implemented within a face-to-face and online environment. With theoretical as well as empirical methodologies applied in the different chapters, it covers a wide range of foci connected to assessment and SDL.

Chapter 1

Self-directed learning-oriented assessment and assessment literacy: Essential for 21st century learning

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Abstract

In the two decades since the year 2000, because of the mobilisation of learners and learning, there has been a call for more self-directed learners (Hussey & Smith 2010; Teo 2019). The ability to take responsibility for one's

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own learning, such as identifying learning needs, setting learning goals, monitoring and evaluating the learning process and goal achievement are key characteristics of a self-directed learner (Brockett & Hiemstra 1991, 2012; Brookfield 2009; Kasworm 1983; Knowles 1975; Nepal & Stewart 2010; Nicol 2009). The development of these self-directed learning (SDL) skills, like many complex skills, not only takes time but requires a paradigm shift away from other-directed teaching and learning. Self-monitoring and evaluation processes needed to determine goal achievement, according to Earl and Katz (2006), are not instinctive processes and need to be supported. One of the ways in which learners can be supported in such processes of becoming more self-directed is through participative assessment practices (Lubbe 2020; Sambell, McDowell & Montgomery 2013). Despite the fact that a number of educational assessment features have been identified to support SDL, educational assessments that foster SDL are limited (Coombs, DeLuca & MacGregor 2020; Kvale 2007). This conceptual chapter sets the scene for this book on SDL assessment and involves a review of relevant literature on SDL-oriented assessment and assessment literacy and is informed by social constructivism. This chapter presents practical guidelines in terms of requirements for assessments towards SDL, as well as the assessment literacies required for effective SDL through assessment.

Introduction

In its broadest sense, assessment is the process of gathering information. The type of information gathered is influenced by the assessor's intention. Therefore, the purpose of assessment influences the assessment strategies, tools and methods. One's approach to assessment is also influenced by lack of training or professional development (Shepard et al. 2005; Stiggins 1999; Tierney 2006), the presence of a testing or learning culture (Shepard 2000; Stobart 2008), as well as one's 'implicit beliefs about learning' (DeLuca, Coombs & LaPointe-McEwan 2019:159). Therefore, one's mindset towards learning influences the way in which assessment is approached. In order to be a successful learner within the 21st century, possessing SDL skills is vital for not only learning but for *unlearning* and *relearning* as well (Toffler 1991; [*authors' added emphasis*]). Although a paradigm shift towards more social constructivist educational settings is noticeable, assessment practices are still predominantly driven from a behaviourist and cognitivist school of thought. Within a social constructivist driven educational environment, 'the construction of knowledge and not the reproduction of knowledge is paramount' (Pritchard 2014:35). Therefore, assessment is central to the learning process. Using assessment to promote learning, instead of only testing knowledge, provides a platform for more participative and dialogic assessment practices. Such practices will also likely enable students to learn 'many things that are not intended and/or not formally assessed' (Hay, Tinning & Engstrom 2015:32).

Students learn from the pedagogical practice itself (Evans, Davies & Penny 1999:10), and also learn aspects about themselves (Redelius & Hay 2009:289). 'The reality is that assessment is pedagogical whether or not pedagogy is intended. That is, the way assessment is conducted has consequences for student engagement and learning' (Hay et al. 2015:41). The authors of this chapter believe that assessment is a fundamental constituent of the teaching and learning process. This chapter advocates a learning-oriented approach to assessment. Firstly, we will discuss the conceptualisation of assessment from a social constructivist perspective, after which we will indicate the importance of learning-oriented assessment (LOA). Finally, we will discuss the value of self-directed learning-oriented assessment (SLOA), which is the core of what this book is all about.

Conceptualisation of assessment within a social constructivist learning perspective

The Latin verb *ad sedere* or *assidere*, meaning 'to sit down beside', is the origin of the term 'assess' and, according to Bachman and Palmer (2010), as well as Hodges, Eames and Coll (2014), involves feedback regarding students' learning processes. According to Lubbe (2020):

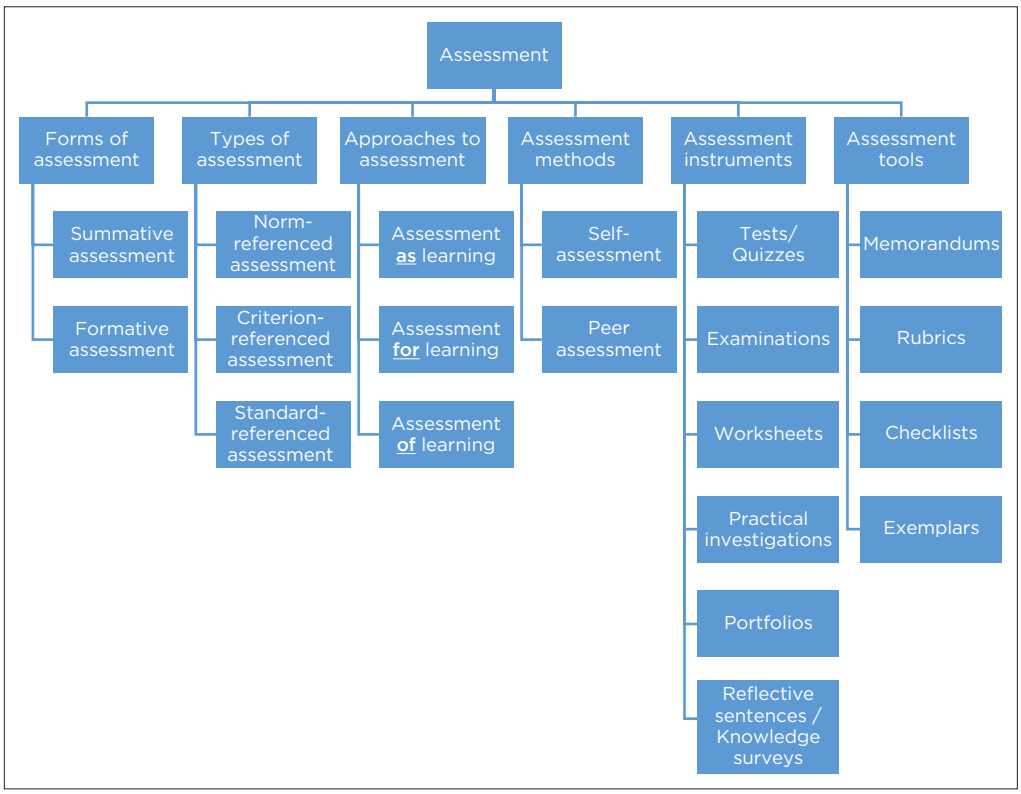
> [*T*]he active role that students must play in the process of assessment is highlighted by the fact that assessment is rooted in a verb ('sit'), which implies students' active involvement during the assessment process. (p. 30)

Not surprising is the fact that assessment has a major influence on the lives of students and educators alike (Boud & Falchikov 2007). Consequently, the design and development of assessment should be focused on supporting students' learning processes (Gibbs & Simpson 2004; Quesada-Serra, Rodríguez-Gómez & Ibarra-Sáiz 2016). The fact remains, however, that the relationship between learning and assessment is often still perceived by students as only a grade (McMorran, Ragupathi & Luo 2017).

According to Shepard, Penuel and Pellegrino (2018), the contribution of social interactions to what students can know, do and become, is not acknowledged by behaviourist and cognitive learning theories. A further limitation of the behaviourist and cognitive learning theories is their inadequacy in clarifying the way in which students become more skillful at thinking and doing (Shepard et al. 2018). Social constructivism 'offers a powerful, integrative account of how motivational aspects of learning are completely entwined with cognitive development' (Shepard et al. 2018:23). Student engagement in teaching, learning and assessment processes are encouraged, and thus peer- and self-assessment methods are frequently used (Baird et al. 2014). Within social constructivist theory, students are responsible for their own meaning-making and knowledge construction in collaboration with others, through being involved in participative and

engaging activities. Per implication, the role of the student is active and independent in nature. However, as soon as educators rely on traditional assessment regimes, despite the implementation of participative and engaging teaching-learning activities, students' intrinsic motivation decreases (Flint & Johnson 2011:8). This decrease can be related to the loss of learner autonomy and control over the learning process and progress when assessments are rigid and rooted within a testing culture. According to Boud (2015:6), '[a]cts of assessment must be designed to leave learners better equipped to learn further'.

Even though a detailed discussion of relevant assessment terminology is not within the scope of this chapter, a brief outline aimed at clarifying possible confusion with regards to conceptual knowledge of assessment types and forms of assessment is necessary. Figure 1.1 contains a brief outline of assessment nomenclature; however, it is not exhaustive but rather informative as an introduction to this book.



Source: Authors' own compilation, based on Chapman and King (2013), Carless (2015a), Earl (2013), Falchikov (2005), Mok (2009), Reddy et al. (2015) and Wiliam (2011).

FIGURE 1.1: Mind map of assessment nomenclature.

In the following discussion of LOA and SLOA, only assessment terms that pre-eminently apply to LOA and SLOA will be elaborated upon and, therefore, we will not pay attention to the clarification of all the different assessment terms in this chapter.

Learning-oriented assessment

Because LOA refers to the notion that all assessment ought to support the enhancement of student learning (Carless 2015a), the key elements of LOA will be elaborated upon. According to Carless, Joughn and Mok (2006) and Carless (2014, 2015a, 2015b), the development of LOA came about after identifying the need for the design and implementation of assessment practices that are focused on the learning process, because summative assessment was heavily weighted. The LOA framework conceptualises the importance of, and relationship between, LOA tasks, developing evaluative expertise, as well as student engagement with feedback (Carless 2015a:6). These three key drivers in LOA are conceptualised as a framework pyramid, with the LOA tasks at the top (Carless 2015a). According to Carless (2015a:7), 'the design of the assessment task or tasks impinges on potential prospects for the development of evaluative expertise and engagement with feedback'.

Learning-oriented assessment tasks directly influence the efforts of students; therefore, it is placed at the apex of the LOA framework pyramid (Carless 2015a). Several principles for the design and implementation of LOA tasks are suggested by Carless (2015a:27) and are outlined in Table 1.1.

Although the principles and implications of LOA tasks in Table 1.1 are self-explanatory, their influence when using them to guide assessment development is noteworthy. Vanderlelie and Alexander (2016) made use of the LOA task framework to develop their assessment strategy by placing greater emphasis on formative assessment and online learning and reported a significant improvement in student performance as a result. Similar results were reported by Van Staden (2016), who also used the LOA framework for the development of an LOA task in the form of an electronic portfolio.

Evaluative expertise, the second key driver of LOA, refers to students' ability to evaluate their own and their peers' work (Carless 2015a). According to Carless (2015a), students will develop evaluative expertise when they can generate, analyse and apply criteria. Examples of how students can develop evaluative expertise include peer dialogue, self-assessment of work in progress, as well as analysing and discussing exemplars of quality work (Carless 2015a; Wiliam 2011). Therefore, it is evident that the quality of assessment tasks directly influences the development of students' evaluative expertise.

TABLE 1.1: Principles for design and implementation of learning-oriented assessment tasks.

Principle	Implications
Encouraging students' deep approaches to learning and scaffolding the development of suitable learning objectives.	Tasks that are well designed are likely to capture students' study time and effort, as well as encourage students to spend time studying outside class meetings and hence take a deep approach to learning. Task design should be approached from a programme-wide perspective.
Balancing the formative and summative facets to enable all assessments to be learning-oriented.	Encouraging a variety of assessment tasks may encourage student motivation. The use of portfolios provides the possibility for the useful merging of formative and summative assessment.
Spreading student effort and intellectual engagement evenly through a module.	Tasks should be designed so that student effort is evenly distributed across the module (i.e. topics and weeks). The inclusion of multiple tasks distributes intellectual engagement evenly over a module.
Supporting the development of ways of understanding the nature of quality in the discipline.	Student metacognition is developed by providing students with the opportunity to engage with – and even developing – criteria, standards and exemplars of quality work. Peer dialogues can assist students in engaging with quality.
Involving some personal student investment or choice.	Choice can give students a greater sense of ownership, and summative assessment should give space to individuality.
Facilitating dialogic forms of feedback.	Feedback should be timely, interactive and of good quality. Constructive criticism can open up possibilities for students to advance in their work. At the heart of good feedback, practice is the development of students' self-evaluative capacities. Feedback should be embedded within assessment practices.

Source: Adapted from Carless (2015a:27).

Student engagement with useful feedback is the third key driver of LOA. According to Carless (2015a), students will not be able to use feedback unless they have some conception of what quality work looks like. If students are not engaged in the feedback process – giving and receiving feedback, as well as acting upon feedback – its influence on student learning will be limited (Carless 2015a). Feedback should be integrated with assessment activities, as opposed to being provided only as post-assessment (Carless 2015a).

Evident from the LOA framework is the fact that the purpose of LOA tasks is more formative than summative. Greater emphasis is placed on assessment *for* learning (AfL) and assessment *as* learning (AaL) approaches as opposed to assessment *of* learning (AoL).

Formative assessment

Formative assessments differ from summative assessments based on the function that the evidence from the assessment serves (Wiliam 2011). According to Wiliam (2011):

> An assessment functions formatively to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers to make decisions about the next steps in instruction that are likely to be better, or better founded, than the decisions they would have made in the absence of that evidence. (p. 43)

The aim of formative assessment is to improve teaching and learning as well as to diagnose any difficulties students might be encountering during their learning process (Dixon & Worrell 2016). An important aspect of formative assessment is that it is an ongoing process (Box, Shoog & Dabbs 2015) during which gathered data inform both pedagogy and student learning (Dixon & Worrell 2016; Falchikov 2005). According to Van der Kleij et al. (2015), formative assessment is implemented with the purpose of providing feedback to students and educators. Although the focus of formative assessments is not to improve academic performance, but rather student learning, Quesada-Serra et al. (2016) state that formative assessments have been identified to improve academic performance.

Wiliam (2011:51–158) identified five key strategies of formative assessment involving the educator, the student and the peer. These key strategies are outlined in Box 1.1.

Summative assessment, as opposed to formative assessment, is defined as 'cumulative assessments [...] that intent to capture what a student has learned, or the quality of the learning, and judge performance against some standards' (National Research Council 2001:25). Gardner (2010) opines that summative assessments are predominantly high-stakes assessments used to determine how much learning took place. Because summative assessments occur at the end of a learning period, such as a unit or semester, such assessments are almost always graded (Dixon & Worrell 2016). It is noteworthy, though, to point out that summative assessment tools and instruments (tests) can also be used for formative purposes. Their success, however, is nested in the design and planning of the assessments.

Assessment for and as learning

According to Earl (2013:27), AfL 'shifts the emphasis from summative assessment to formative assessment, from making judgements to creating descriptions that can be used in the service of the next stage of learning'. Therefore, AfL practices seek to close the gap between existing and anticipated learning (Clark 2012). The focus of AfL, as opposed to AoL, is on improving learning and occurs multiple times during the learning process (Earl 2013). Slavin (2012) states that the core aspects of AfL are informing educators about the need for additional instruction, as well as informing students about the need for additional study.

Earl (2013) opines that AaL is an extension of AfL, with self-assessment, self-monitoring, self-regulation, as well as metacognition at the heart of AaL. The active participation of students in AaL practices is highlighted by Reddy et al. (2015), and therefore peer and self-assessment methods are a vital

BOX 1.1: Five key strategies of formative assessment.

Clarifying, sharing and understanding learning intentions and success criteria	Can be accomplished through the following: • Have students look at samples of other students' work – after students have identified the strengths and weaknesses of the samples, they can engage in a discussion. • Provide students with rubrics – this could help the students to develop a sense of quality. • Co-construction of learning intentions – educators can develop learning intentions or success criteria with the students – this will enable students to discuss and develop their own learning intentions and success criteria. • Samples of quality student work can also be used to exemplify outstanding work in a concrete way through engaging feedback. • Have students design test items with a memorandum about the work they have been learning – this will enable students to clarify, share and understand learning intentions, as well as to be informed regarding their own level of understanding.
Engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding	Refers to the importance of determining the students' position in their learning trajectory. This can be accomplished through: • Student engagement through questioning. • Waiting time after posing questions. • Practicing evaluative and interpretive listening.
Providing feedback that moves learners forward.	Highlights the fact that feedback has a formative function only when the information which is fed back to the students is used by the students to improve their learning
Activating students as instructional resources for one another.	When activating students as learning resources for their peers, student learning is increased. Techniques that can be implemented in the activation of students as resources include: • Peer evaluation of work. • End-of-topic questions. • Error classification. • Group-based test preparation.
Activating students as the owners of their own learning	Students learn better when they manage and crucially reflect upon their own learning. Techniques that can be implemented: • Learning logs. • Learning portfolios.

Source: Adapted from Wiliam (2011).

aspect of AaL practices/activities. According to Ferris and Hedgcock (2014), students within an AaL context not only (Lam 2015):

> [*B*]ecome more self-directed in the learning process, but they also develop a better understanding of learning goals, assessment criteria, and quantitative and qualitative feedback that assists them to plan for future learning. (p. 1906)

The 'role of the student as the critical connector between assessment and their learning' is the focus of AaL (Earl 2013:28). It is important, however, not to interpret the role of the educator as being absent or uninvolved. Earl and Katz (2006:41) identify the following roles that educators should fulfil to promote the development of independent students during an AaL approach:

- demonstrate and explain self-assessment skills
- guide students in goal setting and to monitor their progress towards reaching them
- make exemplars and models of good practice and quality work that reflect curriculum outcomes available
- develop clear criteria of good practice in partnership with students
- guide students in the process of developing inner feedback or self-assessment processes
- provide regular and challenging opportunities for students to practice becoming self-assessors who are confident and competent
- monitor the metacognitive processes and learning of students
- provide feedback that are descriptive
- create a safe and supportive learning environment.

Mok (2013) states that feedback practices which contribute to students' metacognition are regarded as AaL. Self-directed learning-oriented assessment has been conceptualised and described by Mok (2013) as assessment practices that are learning-oriented and therefore adhere to AaL criteria and are aimed at developing students' SDL. Because core aspects of AaL, including self-assessment, self-monitoring, metacognition and self-regulation, are key characteristics of a self-directed learner as well (Knowles 1975), SLOA will be discussed next.

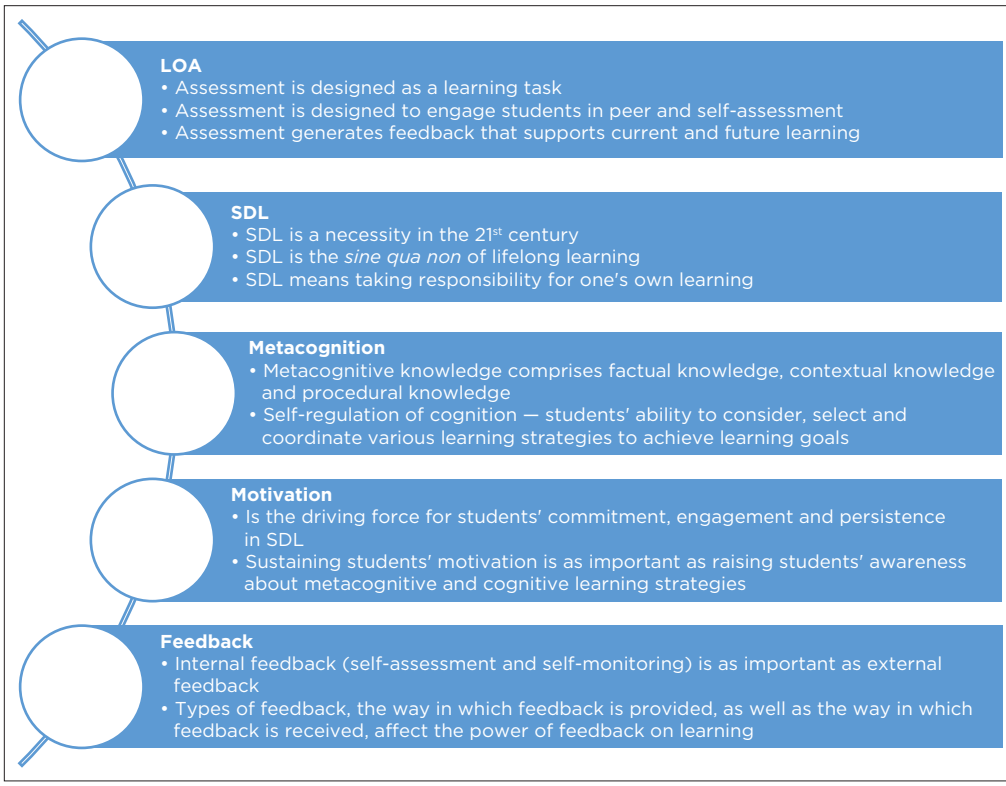
Self-directed learning-oriented assessment

According to Mok (2009), AoL, AfL and AaL are the three integrated components of the SLOA framework. Although several authors (including Dixon & Worrell 2016; Earl 2013; Reddy et al. 2012) connect the memorisation and recalling of a certain body of knowledge with AoL, the SLOA framework justifies its importance in terms of longer-term support for AaL (Mok 2009). According to Brandt (2020:9), 'self-directed learners having limited content

knowledge can implement cognitive strategies for gathering information, but they may lack the content expertise to effectively integrate new information with existing knowledge'. Furthermore, Mok (2009) opines that AoL will support students' development of metacognitive skills, and hence AoL will aid and support AaL. The AfL component of the SLOA framework refers to engaging students in sharing criteria for successful learning, which will generate feedback conducive to learning. The AaL component refers to students taking responsibility for their own learning 'through reflecting on evidence of learning generated from assessment activities' (Mok 2009:26).

Learning-oriented assessment, SDL, metacognition, motivation, as well as feedback are the theoretical underpinnings of SLOA (Mok 2009:7–11) and this is outlined in Figure 1.2. According to Mok (2009:5), the 'extension of LOA to SLOA concerns the self-directed component'.

This section aims to provide a brief overview of the theoretical underpinnings of SLOA.



Source: Adapted from Mok (2009:7–11).
LOA, learning-oriented assessment; SDL, self-directed learning.

FIGURE 1.2: Theoretical underpinnings of self-directed learning-oriented assessment.

Self-directed learning

Guglielmino and Long (2011:1) describe SDL as 'a dynamic combination of attitudes and skills, essential for dealing with the complexity individuals face in all aspects of their lives'. Brandt (2020:3) opines that SDL 'represents a process of learning that is individual, purposeful, and developmental'. The SDL definition, which is most well-known, and possibly the most widely adopted, is that of Malcolm Shepard Knowles (1975) and he describes SDL as:

> A process in which individuals take initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. (p. 18)

Knowles' (1975) definition points towards a self-directed learner being immersed in the following five processes: (1) learning needs diagnosis, (2) goal setting, (3) selection of relevant learning resources, (4) selection and implementation of relevant strategies for learning, and (5) evaluation of learning outcomes. Brandt (2020:5) states that this 'multifaceted definition illustrates its complexity, encompassing cognitive, intrapersonal, and interpersonal skills'. Guglielmino and Long (2011:2) also opine that SDL is 'our most basic, natural response to newness, problems, or challenges in our environment'. At the 34th International Self-Directed Learning Symposium in 2020, the following definition was adopted as the International Society for Self-Directed Learning 2020 definition: 'Self-directed learning is an intentional learning process that is created and evaluated by the learner' (ISSDL 2020).

Developing one's self-directedness in learning demands the development of certain specific skills and competencies. Such skills and competencies are well researched and documented (Dynan, Cate & Rhee 2008; Guglielmino 1978; Knowles 1975; Lord et al. 2010; Roberts 2010; Warburton & Volet 2012). Box 1.2 provides a brief outline of such skills and competencies.

It is quite clear from this lengthy list of characteristics that assessment of own learning plays a key role in the life of a self-directed learner.

According to Jossberger et al. (2010) and Morris (2019), self-directed learners are most capable of adapting to changing social and contextual conditions. Self-directed adult learners are better prepared to acquire new skill sets (Barnes 2016), stay employed (Morrison & Premkumar 2014) and, according to Seibert, Kramer and Crant (2001), nurture their long-term career success.

Often, the terms SDL and self-regulated learning (SRL) are used synonymously. According to Brandt (2020:5), this terminological confusion is referred to as the 'jingle-jangle' fallacies. The 'jingle fallacy' denotes the use of a single term ('self-directed learning') to describe quite a number of different things in various contexts. The 'jangle fallacy' surfaces where different terms

BOX 1.2: Self-directed learning skills and competencies.

A self-directed learner can:

Dynan et al. (2008):

- apply basic concepts to authentic problems or scenarios
- recognise and explain major fundamental assumptions
- build simple models based on principles
- compare the pros and cons of models

Knowles (1975):

- collaboratively relate to peers identify peers as resources for diagnosing learning needs and for planning learning
- provide and accept assistance from peers realistically identify their own learning needs, with the help of others
- translate their identified learning needs into learning goals
- identify various resources
- select appropriate strategies for learning
- gather and corroborate evidence of the achievement of learning goals

Guglielmino (1978):

- take initiative in their learning process
- be independent and persistent in their learning
- accept responsibility for their own learning
- have a high degree of curiosity
- exercise self-discipline
- take joy in learning
- evaluate their own progress
- use basic study skills
- manage their time effectively develop an action plan tolerate ambiguity
- accept and use criticism
- be goal-oriented and able to formulate learning goals
- select and use many learning strategies
- view problems as challenges and discover new approaches for dealing with problems

Lord et al. (2010):

- reflect and analyse
- be flexible, independent and motivated

Roberts (2010):

- utilise a broad range of cognitive and metacognitive skills

Warburton and Volet (2012):

- ask guided questions for enquiry interrogate the assumptions underpinning newly encountered ideas
- identify suitable resources
- use or modify selected resources to achieve learning goals

Source: Authors' own compilation, adapted from Lubbe (2020).

are used to describe the same construct. In order to clarify the relationship between SDL and SRL, a closer look at SRL, although not within the scope of this book, is necessary.

An earlier definition of SRL by Jossberger et al. (2010) is used by Saks and Leijen (2014) to clarify the difference between SDL and SRL:

> A self-directed learner decides what needs to be learned next, diagnoses his learning needs, formulates learning goals, finds suitable resources for learning, monitors and reflects on his learning activities. The first step in learning to self-direct one's learning is the skill to self-regulate learning activities and task performances (Jossberger et al. 2010). Self-regulated learning [...] concerns processes within task execution. Self-directed learning may include self-regulated learning but not the opposite (Jossberger et al. 2010). In other words, a self-directed learner is supposed to self-regulate, but a self-regulated learner may not self-direct. (p. 192)

According to Brydges, Dubrowski and Regehr (2010), effective self-regulation skills are essential for an effective self-directed learner. Furthermore, Gandomkar and Sandars (2018) concur with Jossberger et al. (2010) that an effective self-regulated learner is more often than not, not self-directed in their learning.

Candy (1991:311) opines that '[the] term self-direction has misled many into elevating the individual above the collective – but the nature of knowledge and learning inherently puts learners in relationship with others'. Students develop SDL skills when they interact with others during interpersonal activities (Brandt 2020:8).

The competencies needed to self-assess one's own work as well as those of others are key competencies of a self-directed learner. We thus would like to agree with Mok (2009) that it is important to extend LOA to SLOA.

The role of metacognition, motivation and self-regulation in self-directed learning-oriented assessment

John Flavell (1976) defines the term metacognition as follows:

> In any kind of cognitive transaction with the human or nonhuman environment, a variety of information processing activities may go on. Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective. (p. 232)

Metacognition is characterised by two distinctive components, namely metacognitive knowledge and self-regulation of cognition. Metacognitive knowledge includes factual (knowing *what*), contextual (knowing *when* and *why*), as well as procedural (knowing *how*) knowledge (Flavell 1976). Wiliam

(2011) opines that metacognitive skills will be useful to students only if they are motivated to learn.

According to Mok (2009), sustaining students' motivation is equally important as raising metacognitive and cognitive awareness. Therefore, according to Shraw, Crippen and Hartley (2006) as well as Duckworth et al. (2019), motivation is an essential mediator behind students' commitment, engagement and persistence in SDL. 'Motivation is a prerequisite to exercising both autonomy and self-regulation in learning' (Brandt 2020:17). Current research on motivation and cognition points towards the importance of activating students to take ownership of their own learning (Wiliam 2011).

Self-regulation of cognition refers to the students' ability to monitor and control their thought processes whilst working on a specific task. These thought processes include formulating learning goals, planning, monitoring progress, evaluating the selected learning strategies and re-selecting learning strategies, if necessary (Mok 2009). Such self-regulatory skills are vital for students to evaluate the achievement of their set learning goals.

Feedback to support current and future learning within a self-directed learning-oriented environment

Designing assessment tasks through which quality feedback can be generated is an important feature of the SLOA framework (Mok 2009). Feedback has a central role to play in the relationship between learning and assessment.

The type of feedback provided and the ways in which feedback is provided and received affect the power of feedback in the learning process (Hattie & Temperley 2007). Feedback is defined as (Hattie & Temperley 2007):

> [/]nformation provided by the agent (e.g. teacher, peer, book, parent, self, experience) regarding aspects of one's performance or understanding. A teacher or parent can provide corrective information, a peer can provide an alternate strategy, a book can provide information to clarify ideas, a parent can provide encouragement, and a learner can look up the answer to evaluate the correctness of a response. (p. 81)

According to Hattie and Timperley (2007), the following three questions are addressed through effective feedback:

> *Where am I going*? *How am I doing*? and *Where to next*? The answers to these questions enhance learning when there is a discrepancy between what is understood and what is aimed to be understood. (p. 102)

Therefore, feedback can lead to the restructuring of students' understanding (Evans 2013).

Opportunities for students to engage with feedback, instead of merely receiving a grade, are vital to bringing about any noticeable change in

students' learning (Boud 2015). We concur with Winstone et al. (2017) that feedback without any action is just as unproductive as action without any feedback. Therefore, for feedback to contribute to students' learning gains, student participation should be at the core of feedback practices (Delva et al. 2013). According to Winstone et al. (2017), giving and receiving feedback is a two-way dialogic process to which the receiver responds after deciphering and interpreting the feedback. In instances where higher education students fail to implement assessment feedback effectively, low levels of students' assessment literacy, as well as students' passive role in feedback processes can be to blame (Carless et al. 2011; Winstone et al. 2017). Because assessment literacy 'involves a combination of knowledge, skills and competencies' related to assessment (Price et al. 2012:10), it is not surprising when students with low levels of assessment literacy fail to act upon received feedback, as students will not be able to act on it if they do not understand it (Mulliner & Tucker 2015; O'Donovan, Rust & Price 2016). Moreover, feedback is not acted upon when students perceive it as being provided either too late (Beaumont, O'Doherty & Shannon 2011) or badly timed and unhelpful (Urquhart, Rees & Ker 2014). Consequently, it is vital to provide students with ample opportunities to practise how to identify, appreciate, interpret (Blair & McGinty 2013; Poulos & Mahony 2008) and value feedback (Boud 2015).

Peer and self-assessment methods are useful feedback tools (Brandt 2020). According to Nicol and Macfarlane-Dick (2006), the implementation of peer assessment methods will provide students with opportunities to make objective judgements against specific standards and will also enable students to engage in the evaluation process when assessing the work of others. Therefore, peer assessment will support the development of reflective skills, as well as taking responsibility for students' own learning (Nicol, Thomson & Breslin 2014). Harris and Brown (2013) define self-assessment methods as assessments that encompass monitoring and reflecting on one's own learning progress. Self-assessment methods may include descriptions, such as characteristics of one's work, and evaluation of how good one's work is (Brown, Andrade & Chen 2015). According to Nicol and Macfarlane-Dick (2006) and Tee and Ahmed (2014), self-assessment involves and encourages reflection; however, not all reflection leads to self-assessment. The ability to self-assess, according to Sadler (2013), should be practised independently of peers and educators, whilst the role of the educator is to 'teach students how to judge quality and modify their own work during production' (Sadler 2013:55).

According to O'Donovan et al. (2016), the feedback dilemma can also be overcome by the development of students' and educators' assessment literacy. It seems that the relationship between feedback and assessment literacy is an intricate one. Price et al. (2012) state that a student will become more assessment literate when engaging with feedback. The conceptual clarification of assessment literacy (ALit) and a detailed discussion of its aspects follows.

The important role of assessment literacy within a self-directed learning-oriented assessment environment

Assessment's potential to positively contribute towards students' learning is hindered by low levels of ALit. This is because of educators being involved in several assessment processes and related decision-making, without sufficient assessment-related training (Xu & Brown 2016:2).

Within ALit, there is a lack of consistently used assessment terminology in the literature. Traditional and basic definitions of ALit are provided by scholars such as Stiggins (1991), Popham (2011) and Price et al. (2012), amongst others. Stiggins (1991:535) states that being an assessment literate person implies that one has 'a basic understanding of the meaning of high- and low-quality assessment' and that one is 'able to apply that knowledge to various measures of assessment'. According to Popham (2011:265), '[a]ssessment literacy consists of an individual's understanding of the fundamental assessment concepts and procedures deemed likely to influence educational decisions'. Price et al. (2012:10–11) believe that ALit involves the following:

- an appreciation of assessment's relationship to learning
- a conceptual understanding of assessment (i.e. understanding of the basic principles of valid assessment and feedback practice, including the terminology used)
- understanding of the nature, meaning and level of assessment criteria and standards
- skills in self- and peer-assessment
- familiarity with technical approaches to assessment (i.e. familiarity with pertinent assessment and feedback skills, techniques and methods, including their purpose and efficacy)
- possession of the intellectual ability to select and apply appropriate approaches and techniques to assessed tasks (not only does one have the requisite skills, but one is also able to judge which skill to use when, and for which task).

According to Willis, Adie and Klenowski (2013):

> ALit is a dynamic context-dependent social practice that involves teachers articulating and negotiating classroom and cultural knowledge with one another and with learners, in the initiation, development and practice of assessment to achieve the learning goals of students. (p. 242)

Within the 21st century social constructivist context, however, a more complex and contemporary explanation of ALit is evolving (Deneen & Brown 2016). Therefore, more recent discussions on ALit include its socially negotiated structure (DeLuca, LaPointe-McEwan & Luhanga 2016; Looney et al. 2017; Lubbe 2020).

Assessment's centrality to the learning process, as well as the vital role that educators and students play in the assessment process, necessitates a deeper focus on ALit. Therefore, ALit 'is a core professional requirement across educational systems' (DeLuca et al. 2016:251). Both students and educators need to become more assessment literate not only to address possible dissatisfaction with assessment but also for assessment to be more effective and efficient (Price et al. 2012; Smith et al. 2013). Furthermore, '[w]idespread assessment literacy would inevitably lead to more holistic viewpoints and practice, understanding the interconnectedness of assessment, feedback, community, standards, and self-regulation' (Price et al. 2012:2). A brief discussion of educators' and students' assessment literacy follows.

Educators' assessment literacy

According to Kahl, Hofman and Bryant (2012), a broad definition of educators' assessment literacy entails educators identifying, selecting or creating assessments for various purposes, as well as analysing, evaluating and using the generated assessment evidence to improve students' learning. Edwards (2017) is of the opinion that educators must be assessment literate for assessment to be successfully used to enhance student learning and, according to Popham (2011), educators' assessment literacy will enable them to evaluate students fittingly. Not surprisingly, Gotch and French (2014) identify assessment literacy as an important characteristic of effective educators. Because assessment literate educators support students to become 'critical consumers of feedback' (Stiggins 1991:535), educators' assessment literacy also affects students' motivation and achievement (Kahl et al. 2012).

Stiggins (1991:535) proposes that assessment literate educators ask themselves the following important questions: '*What does this assessment tell students about the achievement outcomes we value?*' and '*What is likely to be the effect of this assessment on students?*' In a later publication, Stiggins (1995) posits that assessment literate educators:

- recognise what to assess
- recognise the reason they assess
- recognise how to assess
- can identify possible problems with assessment and know how to prevent such problems from reoccurring
- are also aware of the possible negative consequences of incorrect/poor assessment.

Volante and Fazio (2007) are of the opinion that assessment literate educators recognise the different purposes of assessment and can use them accordingly.

In 2004, MacLellan did a study to establish the degree to which teacher candidates were ready to assess study learning; the results revealed that compartmentalisation of assessment knowledge leads to low levels of assessment literacy. Educators often 'believe that the assessment training that they received as undergrads did not prepare them to be comfortable with the decisions they are routinely charged to make' (Mertler 2009:101). According to DeLuca and Volante (2016), teacher candidates may not receive enough exposure to assessment pedagogy because of relatively short educational programmes and sporadic work-integrated learning interruptions. The following four assessment principles, rooted in social constructivism are, according to Abell and Siegel (2011:212), at the heart of educators' assessment literacy and much needed to create an 'assessment-centred learning environment':

- educators learn through the process of assessment
- students learn through the process of assessment
- for students to regulate their own learning, assessment ought to support students to be metacognitive about their knowledge and skills development
- assessment tasks need to be unbiased towards all students.

Knowledge of the purpose of assessment, what should be assessed, various assessment strategies, as well as how to interpret assessment data and action-taking are the four types of knowledge and skills related to the above-mentioned principles (Abell & Siegel 2011). These types of knowledge and skills are briefly outlined in Box 1.3.

After reviewing assessment literacy studies over the past three decades, Xu and Brown (2016) conceptualised the Teacher Assessment Literacy in Practice (TALiP) framework. According to Xu and Brown (2016:27–28), TALiP consists of three levels of mastery, namely:

- mastery of educational assessment knowledge – implying that educators should possess knowledge of the following: discipline and pedagogical content ('what', 'why' and 'how' of assessment); assessment purposes, content and methods; grading; feedback; peer- and self-assessment; assessment interpretation and communication; as well as assessment ethics
- an internalised set of understanding and skills of the interconnectedness of assessment, teaching and learning
- a self-directed awareness of assessment processes and one's own identity as an assessor.

ALit is not just based on assessment knowledge but is rather a 'situated, dynamic, and evolving system' (Xu & Brown 2016:27).

It is evident that pre-service teacher programmes need to address assessment literacy as a prerequisite for creating an 'assessment-centred

BOX 1.3: Four types of knowledge and skills relating to educators' assessment literacy.

Knowledge of the purpose of assessment	Such knowledge relates to the educator's purpose with the assessment. According to Abell and Volkmann (2006), the educator's view of learning and assessment values is related to the type of assessment that the educators choose to use
Knowledge of what to assess	Such knowledge is not only related to the stipulated aims in the curriculum, but to the belief of how learning occurs as well. The knowledge of what to assess is associated with the purpose of assessment and deep-rooted in the fundamental assessment values and principles
Knowledge of assessment strategies	Such knowledge refers to the various ways in which an educator assesses student learning, as well as to the knowledge of content-specific assessments. There is an obvious connection between the knowledge of assessment strategies and the knowledge of assessment purposes
Knowledge of assessment interpretation and action-taking	Such knowledge refers to educators' intentions with assessment data. It is believed that a key aspect of assessment literacy is what educators know regarding 'interpreting and acting upon assessment data' (Abell & Siegel 2011:215), as well as what they know about using assessment data to assist students in their learning process

Source: Author's own compilation, based on Abell and Siegel (2011).

learning environment' (Abell & Siegel 2011:212). In order to change the educator-driven summative-focused assessment context, the status quo needs to be challenged. Douglas and Morris (2014:21) found that the actions of educators are largely responsible for creating an environment which promotes – or does not promote – students' SDL. This is because of the fact that teachers' ability to support students in becoming self-directed in their learning is tied to their own self-directedness (Kramarski & Michalsky 2009). Du Toit-Brits (2019:8) states that '[e]ducator expectation is an important factor in enhancing students' self-directedness'. The 21st-century educational landscape needs skillful, self-directed, assessment literate educators who will be able to utilise the power of assessment to reinforce students' learning in both face-to-face and online environments.

Students' assessment literacy

According to Smith et al. (2013), research on students' assessment literacy is limited, despite the fact that numerous researchers emphasise its importance (Carless 2007; DeLuca et al. 2016; Edwards 2017; Smith et al. 2013).

Three dimensions of students' assessment literacy are identified by Smith et al. (2013). Students should:

- understand assessment's purpose, as well as its connection to their learning trajectory
- be conscious of assessment processes
- be exposed to opportunities to develop self-assessment skills.

Price et al. (2012) suggest that the following can contribute towards students becoming assessment literate. Students need to appreciate the relationship between learning and assessment, understand assessment and its processes conceptually, and develop peer and self-assessment skills.

Lubbe (2020) found in a study of first-year Life Sciences students that there is a linear relationship between students' ALit and their SDL readiness. Students' increased understanding of the purpose of assessment to enhance and monitor their own learning also increases their SDL readiness. She found that their SDL readiness improved with an increased understanding of assessment protocols and standards as well as the increased ability to judge their own and their peers' work. Lubbe (2020) also emphasised the influence of peer and self-assessment on students' SDL.

Several studies (Orsmond, Merry & Callaghan 2004; Orsmond, Merry & Reiling 2002; Price et al. 2012; Rust, Price & O'Donovan 2003; Smith et al. 2013;) showed how peer assessment not only enabled students to construct a feedback loop, but also how it improved students' performance. Students believed the timing, quality and the different approaches to a task were useful in their learning process. The ability to use assessments for learning and to make use of peer- and self-assessment methods is also part of a self-directed learner's repertoire and will be discussed in the 'Self-directed learning-oriented assessment and assessment literacy' section.

Self-directed learning-oriented assessment and assessment literacy: Essential for 21st century learning

From the discussions in the previous sections, it is evident that the successful implementation of assessments which will promote student learning is influenced by the educator's and student's ALit.

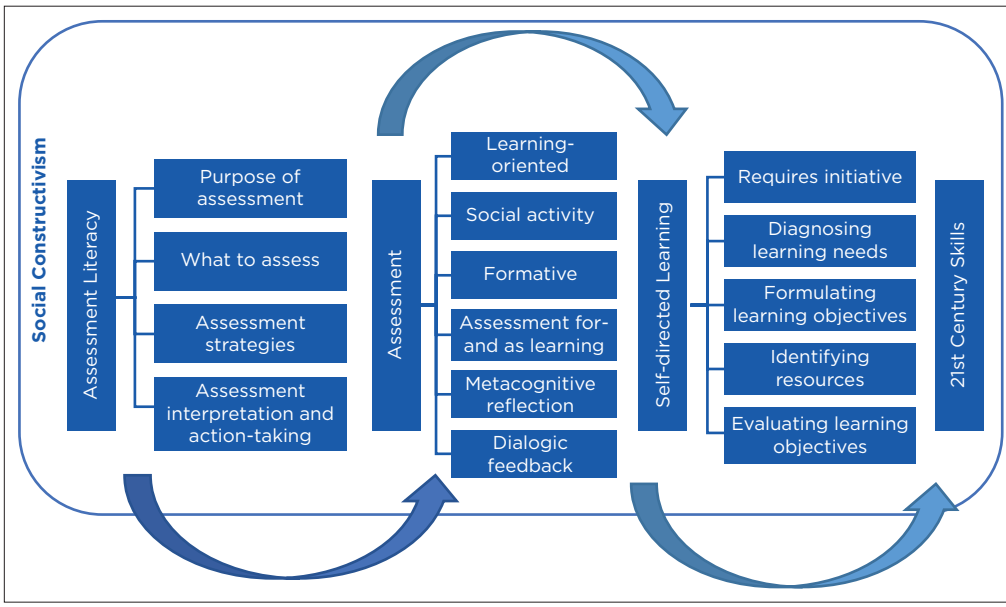
Having a sound knowledge base of assessment, as well as the interrelatedness of teaching, learning and assessment processes are vital aspects of an educator's ALit repertoire. Being an assessment literate educator will enable the planning and implementation of assessment practices which are conducive for student learning. According to Tholin (2008:10), '[s]elf-assessment is a natural element of self-directed learning'. Not only will assessment literate educators design assessments with students' learning trajectories in mind, but also with their SDL skills development in mind.

Within the 21st century higher education context, assessment practices should not only engage students in the learning process and their progress but also support the development of SDL skills. Teaching, learning and assessment should comprise an inseparable collection of processes based on the social constructivist approach. The focus should rather be on the learning processes of students, as opposed to the assessment practices, and therefore assessment should be utilised as a pedagogical tool. According to Binkley et al. (2012), student engagement, persistence in learning, metacognition, as well as self-regulation should be promoted. Once students focus more on the learning process and less on doing well in an assessment task, learning orientation will be promoted. Assessment will further student learning when assessments are planned to provide feedback and not for making comparative judgements (Earl 2013). Even though students are natural-born learners, Kvale (2007) identified the following aspects of assessment as potentially discouraging lifelong 21st-century learning:

- making use of a grade point average as a learning objective
- predominant use of multiple-choice tests
- test anxiety
- absence of feedback
- lack of authentic assessment
- the absence of peer and self-assessment methods.

Falchikov (2005) opines that the use of more traditional types of assessments will cause students to be passive consumers as they will have little or no control over the assessment processes. Not surprisingly, Earl (2013) believes the status quo of assessment should be challenged. Boud and Falchikov (2007:4) state that 'studying in higher education is arguably for [...] providing a foundation for a lifetime of learning and work in which there is little formal assessment or formal instruction'. Therefore, assessment practices within the 21st century should be rethought and redesigned in order to promote SDL and ALit.

Figure 1.3 is an illustration of the summary of the necessity of ALit and its influence on assessment and SDL from a social constructivist teaching-learning philosophy. The influence of an educator's teaching-learning philosophy on the nature of assessment and its implementation (Ertmer & Newby 2013; Reddy et al. 2015) cannot be ignored. Rooted within the social constructivist paradigm is the use of a variety of pedagogical approaches that are collaborative in nature (inquiry-, problem- and project-based learning) because of their ability to support socially mediated learning (Brandt 2020). Assessment from a social constructivist perspective will differ in design and implementation from those from a behaviourist and cognitivist perspective. Students will learn best when they are actively involved in the construction of their own understanding (Pritchard 2014; Slavin 2012). Per implication, social



ALit, assessment literacy; SDL, self-directed learning.

FIGURE 1.3: Summary of the importance of assessment literacy and its influence on assessment and self-directed learning.

constructivist educators will make use of teaching-learning activities that are cooperative and collaborative in nature (Ben-Zvi Assaraf 2011).

An educator's level of ALit will determine to a large extent the types of assessment practices that are designed and implemented. This is not surprising, as an assessment literate educator's repertoire includes the ability to comprehend the purpose of assessment, to understand that assessment is interconnected with the teaching-learning process and the ability to design and implement assessments that are learning-oriented (Popham 2011; Price et al. 2012). An assessment literate educator within a social constructivist paradigm recognises that assessment is not an add-on. Key skills of an assessment literate educator (Abell & Siegel 2011; DeLuca et al. 2016; Kahl et al. 2012; Looney et al. 2017; Popham 2011; Price et al. 2012; Stiggins 1991, 1995) are:

- possessing sound knowledge of assessment nomenclature and functions
- grasping that learning takes place through the process of assessment, therefore, planning assessment with learning in mind
- having a sound knowledge of various assessment instruments and tools
- being skilled in supporting peer and self-assessment methods
- understanding the importance of feedback to students' learning trajectory
- possessing sound knowledge of assessment interpretation.

An assessment literate educator will be able to comprehend the importance of peer and self-assessment methods to support students' motivation and metacognition. Being skillful in the design of LOA tasks, which will provide opportunities for students' development of their evaluative expertise and feedback literacy is yet another characteristic of an assessment literate educator, as a result of their being knowledgeable in the purpose of assessment and assessment strategies (Abell & Siegel 2011).

Because assessment literates will be able to realise the purpose and power of assessment to improve learning, the design and implementation of assessments will be greatly influenced. The power of socially constructing knowledge through assessment tasks was highlighted by Lubbe (2020) through the implementation of cooperative learning-embedded assessment. Not only did the social aspect enable students to learn from their peers through multiple perspectives, but it provided a platform for immediate feedback. Utilising peer and self-assessment methods will enable students to develop sufficient metacognitive insights into their own learning process and progress. Whether or not students will be able to use peer and/or self-assessment methods to accurately assess themselves for summative purposes is not necessarily relevant within an SDL-oriented environment. The focus should rather be on the learning process, as well as on the development of vital SDL skills, as observed by Papert (1998):

> So the model that says learn while you're at school, while you're young, the skills that you will apply during your lifetime are no longer tenable. The skills that you can learn when you're at school will not be applicable. They will be obsolete by the time you get into the workplace and need them, except for one skill. The one really competitive skill is the skill of being able to learn. It is the skill of being able not to give the right answer to questions about what you were taught in school, but to make the right response to situations that are outside the scope of what you were taught in school. We need to produce people who know how to act when they're faced with situations for which they were not specifically prepared. (p. 4)

Because educators are not able to predict what students will learn as a result of a certain pedagogical practice, Wiliam (2011:50) states that conducting assessments for formative purposes 'involves getting the best possible evidence about what students have learned and then using this information to decide what to do next'. Because assessment within a social constructivist environment relies on the shared involvement of educators and students, the dialogic interaction between students will enable students to consider, share and develop ideas (Pritchard 2014). According to Quesada-Serra et al. (2016), peer and self-assessment methods promote students' active learning, whilst Boud and Falchikov (2007) opine that their development into self-directed learners and assessors is also promoted. The ability to provide and receive feedback from peers, possibly because of seeing peers as resources, is a vital SDL skill (Guglielmino 1978; Knowles 1975). Recorded benefits of peer and

self-assessment include the improvement of negotiation and diplomacy skills (Lopez-Pastor & Sicilia-Camacho 2017), the development of critical thinking skills (Hanrahan & Isaacs 2011) and the ability to take responsibility for one's own learning (Ljungman & Silén 2008). Students' ability to take initiative in their own learning process will be promoted through assessment practices which are influenced by the educator's ALit. If the educator is designing and implementing assessments that are not learning-oriented, and for which students have no participative and active role to play, students will less likely be motivated to take initiative in their own learning. As a result, students might also not develop the ability to diagnose their learning needs. If traditional assessments are the norm, students will less likely be expected to collaborate or participate in the assessment process; therefore, students will not be able to give and receive feedback or to see their peers as resources. When students are immersed, via peer and self-assessment, in the process(es) of assessment, they are likely to develop the ability to not only evaluate their learning objectives but also to learn from their peers. Being able to identify resources for learning, not merely relying on the educator, is key to SDL (Knowles 1975). Within a social constructivist approach, dialogic assessment feedback moves beyond being passively transmitted towards being a participative process (Rust et al. 2005). Educators' ability to envision assessment as a 'productive locus of engagement' (Sambell, Brown & Race 2019:46) will enable them to utilise the power of assessment as a pedagogical practice through which students will be supported to gain SDL skills.

Conclusion

This chapter took a learning-oriented approach to assessment, illustrating the importance of assessment literate educators who will utilise assessment as pedagogy within social constructivism. For assessment to not only support students' learning but their SDL as well, educators need to realise that their own teaching-learning philosophies will influence the nature of their assessment practices. Within the 21st century, from a social constructivist perspective, assessment theory and practice should move beyond simply being the 'glue' that holds the teaching and learning processes together, to being the conductor through which teaching and learning take place. Assessment should conduct the flow of teaching and learning in more than one direction. When assessment is used as an agent for teaching and learning, underpinned by social constructivism, students will become co-constructors of knowledge and assessments. Consequently, teaching and learning will not be an individualistic endeavour any longer, but rather a dialogic process that is intertwined with assessment pedagogy. The importance of ALit within the social constructivist paradigm and its direct influence on assessment processes is a vital aspect of assessment within a self-directed learning-oriented

environment. The focus of such assessment processes will be on learning, and especially SDL.

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Chapter 2

Assessing axiologolects: Exploring the language of situated self-directed learning-oriented assessment

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Abstract

In this chapter, the use of language in assessments was researched regarding its role in supporting situated SDL. In this regard, the construct of language was approached as one of the material resources for learning in terms of SLOA. Situated learning emphasises the importance of context in the learning environment, and this ties in with the need to consider the social context for SDL. The problem investigated by this study is how language should be used in order to support situated SLOA. From existing research on situated self-directed multimodal learning, students and lecturers regard language as a

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problematic issue in terms of situated learning. Consequently, it was necessary to determine the nature of the language used in assessments in order to gauge if and how situated SLOA was supported. Hence, the practices regarding the axiologolect or language of assessment within selected university modules were explored by means of an analysis of assessment artefacts as provided by lecturers.

Introduction

The nature of axiologolects, or the language of assessment, is explored in this chapter regarding the manner in which the formulation of assessment texts can relate to situated SDL. In the context of this chapter, the concept 'assessment text' is used to specifically refer to any assessment artefact used within a higher education context, including amongst others: classroom quizzes, written and multimodal assessments, online and written tests, and examinations. A selection of collected assessment texts from the teacher training context at a selected university were used to create a data set of texts used for the analysis of the language of assessment. Furthermore, the purpose of the exploration was to gauge the assessment texts' support of both situated learning (Catalano 2015; Donaldson, Barany & Smith 2020; Lave & Wenger 2008; Priest, Saucier & Eiselein 2016; Yeoman & Wilson 2019) and SDL (Brockett & Hiemstra 2019; Gibbons 2002; Kicken, Brand-Gruwel & Van Merriënboer 2008).

The need to explore axiologolects emanates from challenges experienced by learners in terms of the language used in assessment texts. In this regard, Sambell, McDowell and Montgomery (2012:142) contend that 'students often do not understand the language in which university assessment criteria are typically couched'. Furthermore, previous research on situated self-directed multimodal learning (SDML) at university level (Olivier 2020c) showed the importance of language as a variable. Hence, this chapter aims to contribute to the scholarship of language used in the assessment context.

In this chapter, the term *axiologolect* is used to refer to the language of assessment. This term is derived from the Greek verb αξιολογώ [axiologǒ] which means to 'assess', as well as the suffix '-lect' used in analogy with words such as 'dialect' to refer to a specific form of language. This suffix can, however, also be traced back to its Greek roots through διάλεκτος [diálektos] and ultimately λέγω [légō], which means 'I speak'. Hence, the term proposed here is regarded as an umbrella term for any language related to the assessment process. In addition, the plural form of the term, axiologolects, is preferred in some instances. Depending on the context or part of the assessment process, many forms of this language are used for posing questions, providing context,

responding to assessments, as well as providing feedback. It is essential to note that 'language of assessment' is also used to refer to the metalanguage of assessment, as is used by McDonald (2007), but that is not the focus of this chapter.

Language associated with assessment has wider implications than just the assessment process itself. In this regard, Gipps (1999:382–383) remarks that '[t]he language of assessment and evaluation is one of the defining elements through which young persons form their identity, for school purposes at least'. The quality of questions has an impact on efficient learning supporting SDL (Horsley, O'Neill & Campbell 2009; Horsley et al. 2010). In addition, axiologolects also relate to questioning in class (cf. Cummings 2020); however, despite its relevance to SDL, this type of action and spoken text falls outside of the ambit of this chapter.

In the same manner that language is a social activity, Gipps (1999) regards assessment within a sociocultural perspective. With the lens of situated learning used in this chapter, the social aspects are even more relevant in approaching assessment. Furthermore, this approach links up with the view expressed by Cowie, Moreland and Otrel-Cass (2013) that:

> [*A*] sociocultural view allows us to look beyond the individual student and their teacher to consider more broadly how the classroom as a setting might enable (and constrain), opportunities for learning. (p. 6)

Hence, the need to investigate axiologolects is located within a view of language and assessment as integrated and dynamic social activities.

Furthermore, the role of language and communication in terms of SDL is evident. In this regard, Cheng et al. (2010) identified 'interpersonal communication' as one of the domains explored in their self-directed learning instrument (SDLI). The inclusion of the statement 'I am able to communicate messages effectively in writing' in the SDLI shows the prominence of formulating capacity for SDL (Cheng et al. 2010:1157). However, the focus in this chapter is specifically on formulations in terms of assessment language. Despite the emphasis on teacher-generated assessment texts in this chapter, the need for learner input in this regard also ties in with the view of Cheng et al. (2010).

The research questions driving this chapter, situated in a teacher training context, are as follows:

- What is the nature of axiologolects in selected assessment texts?
- How do axiologolects realised in assessment texts support situated SDL-oriented assessment?

Situated self-directed learning-oriented assessment

Self-directed learning

Central to this chapter's view of assessment is how assessment relates and contributes to SDL. Hence, the concept of SDL needs to be delineated. Brockett and Hiemstra (2019:55) define the concept *SDL* as being 'a process in which a learner assumes primary responsibility for planning, implementing, and evaluating the learning process'. This also relates to learner self-direction or SDL as a characteristic which relates to 'a learner's desire or preference for assuming responsibility for learning' (Brockett & Hiemstra 2019:56).

Costa and Kallick (2004) emphasise that a self-directed person can be considered as being self-monitoring, self-managing as well as self-modifying. According to Kicken et al. (2008:223), '[g]iving students control over the selection of learning tasks they want to perform is an intuitive and appealing instructional method to address their individual differences'. In addition, the relevance of constructive SDL in order to foster SDL skills is emphasised by Beckers et al. (2019).

From the literature, it is clear that language choice, and therefore language abilities of learners, can have an influence on the success of any SDL intervention (Siriwongs 2015). Hence, the role of language in terms of SDL should not only be considered within the context of assessments, but also other aspects of learner activities.

A further aspect relevant to this chapter is the issue of situated learning.

Situated learning

For Lave and Wenger (2008:29), 'situated learning', which is considered part of the legitimate peripheral participation process, implies that students 'participate in communities of practitioners and that the mastery of knowledge and skill requires newcomers to move toward full participation in the sociocultural practices of a community'. This aspect is realised in a form of apprenticeship as learning where this learning is not only situated in a context but is in fact part of 'generative social practice in the lived-in world' (Lave & Wenger 2008:35).

The challenge would be to determine how assessments can be utilised in support of situated learning. If the process is regarded as a move from peripheral participation to community activity and ultimately expertise (Donaldson et al. 2020), assessments can also be scaffolded in a similar fashion. This could be realised through using carefully planned peripheral participation through teacher-led prompts moving to community activity by

means of assessments conducted in groups leading ultimately to expertise which could be assessed in groups or individually. Within the context of this chapter, such assessments should also progress from the general to the more profession-specific, which would entail focusing on the practice of being a teacher.

Within situated learning, concern is expressed regarding generality and its abstracted and decontextualised nature (Lave & Wenger 2008). Hence, learning should be focused on a contextualised and relevant context.

The concept of situated learning also resonates with a drive to a more authentic type of assessment. For Sambell et al. (2012:13), this *authentic assessment* implies 'applying learning to, or learning within, real-world contexts or practices beyond the academy'. Within the context of this chapter, that implies linking assessment with the practice of being a teacher.

Situated self-directed learning and assessment

The term 'SDL-oriented assessment' used in this chapter is derived from the work by Magdalena Mo Ching Mok. The *SDL-oriented assessment framework* is described by Mok (2009) as:

> [*A*] coherent framework of assessment, deliberately designed to capitalise on the integrative impact of metacognition, feedback, motivation, contextual factors, and self-regulation on learning in the construction of assessment activities in order to cultivate self-directed learning capacities in students. (p. 11)

Hence, with the focus on SDL, this framework highlights the integration of a number of supportive aspects. According to this framework, assessment itself should advance learning and SDL and be used to inform the view of assessment in this chapter.

Automatic computer-based question generation from texts in order to support SDL has also been explored within the context of natural language generation (Lindberg 2013). Gibbons (2002:12) observes that 'assessment is an essential means of learning and learning how to learn: improvement flows from students' critical assessment of their own activities'. Consequently, when SDL and assessment are considered together, the emphasis is on formative assessment, and according to Cowie et al. (2013:3) '[f]ormative assessment involves feedback to students on their ideas and informs the differentiated teaching responses that are at the heart of effective teaching and learning'. The use of just-in-time feedback is also highlighted by Beckers et al. (2019) as the immediacy not only has a motivating effect on learners, but it can also benefit the learning process.

Within SDL it might be necessary to expand the concept of assessment to also relate to 'assessment as learning, self-assessment, and peer-to-peer learning' (Bull 2017:64). Furthermore, the importance of self-assessment is

noted in the literature (Costa & Kallick 2004; Gibbons 2002). According to Costa and Kallick (2004):

> Assessing student growth toward self-direction demands alternative and authentic forms of assessment. Students can become more self-directed when they know the intended learning outcomes and receive constructive feedback regarding their progress during the learning process. (p. 3)

Hence, self-assessment should be integral to any concurrence of SDL and assessment within the classroom context.

The assessment process in itself should be supportive for SDL. In this regard, Costa and Kallick (2004) observe that:

> [*T*]he intent of assessment should be to support learners in becoming self-directing and that what matters most in any assessment strategy is whether learners are becoming increasingly more able to self-evaluate. (p. 3)

Learner agency and active participation in the assessment process is essential for SDL. Importantly, within SDL, 'students learn to assess themselves and report on their own achievement because it is an essential part of the self-directing process' (Gibbons 2002:21). Ultimately, this also implies that '[s]tudents learn to assess their goals, plans, and procedures as well as their results or products, and they learn to assess themselves as learners' (Gibbons 2002:21). Furthermore, the role of learners in contributing to the assessment process can be achieved by setting assessment criteria (cf. Lombard 2018), for example including them in other aspects such as setting assessments and drawing up assessment texts.

Situated assessment implies that assessments should be linked to some legitimate peripheral participation process and, by implication, an appropriate context. Within context-situated learning, learning as participation (Lave & Wenger 2008) implies that the student is integrally connected to the whole assessment process and that student agency is also pertinent in this context. This situated approach to assessment supports the notion that neither learning nor assessment can be separated from students' contexts (Cowie et al. 2013).

Because Lave and Wenger (2008:51) believe that 'learning, thinking, and knowing are relations amongst people in activity in, with, and arising from the socially and culturally structured world', it should be considered how assessment is interpreted in this social and cultural context. A view of assessment that relates to situated and SDL also resonates with the concept of 'assessment for learning' by Cowie et al. (2013) where it is defined as follows:

> Assessment for learning encompasses those everyday classroom practices through which teachers, peers and learners seek/notice, recognise and respond to student learning, throughout the learning, in ways that aim to enhance student learning and student learning capacity and autonomy. (p. 9)

This definition emphasises assessment as a continuous process where not only the teacher but also peers and students themselves are equally prominent,

there is two-way communication, and the focus is enhancing learning and ultimately autonomy and not just measuring aspects of learning.

As in this chapter, assessment is regarded as a process of communication, the phenomenon of axiologolects is discussed in the 'Axiologolects: A language of assessment' section.

Axiologolects: A language of assessment

Language and assessment

In the South African context, where not only the wider learner population speak a variety of languages, learners themselves are highly multilingual (Coetzee-Van Rooy 2016; Heugh & Stroud 2019). However, with the hegemony of English within all levels of education (Desai 2016), any discussion on assessment would be a discussion on English-based assessment. Yet, from the literature, the need and the advantages of mother tongue education and, by implication, also assessment in more than one language is recommended (Christiansen & Aungamuthu 2012). In addition, the use of learners' mother tongue for assessment which is different from the language of learning and teaching (LoLT) shows success and benefits for learners (Martín-Chazeaud 2017).

Central to axiologolects is the ability to formulate questions. According to Rothstein and Santana (2011), '[t]he skill of being able to generate a wide range of questions and strategize about how to use them effectively is rarely, if ever, deliberately taught'. It is important to consider the manner in which questions are formulated in order to ensure comprehension as well as effective learning in the classroom. The need for learners to be able to formulate their own questions is also emphasised from what can be expected in their future profession. Within this context, Horsley et al. (2009) have shown the importance of the quality of question formulation for the medical profession.

Furthermore, the discussion on question formulation also relates to supporting student agency as the literature encourages teachers to not only pose questions themselves but also empower learners to be able to formulate their own questions (Rothstein & Santana 2011). This aspect is also highly relevant in contexts where learners are involved in the creation of assessments. This process of students taking charge of their learning can also have a positive effect on the quality of learners' cognitive learning activities (Kicken et al. 2008).

It is key that teachers regard themselves as the mediators or 'facilitators of meaning-making' (Costa & Kallick 2004:79) so that students themselves are active in the meaning-making process. In this regard, the language of assessment is merely an extension of this teacher's role.

In many sources, the issue of language or formulation and assessment focus a lot on feedback (cf. Cowie et al. 2013). However, the data analysed in this chapter were limited to assessment instructions. Consequently, feedback language would warrant further exploration, especially within the context of the appraisal framework by Martin and White (2005).

Variance in the type of language used in assessment texts is essential. In this regard, Tomlinson and Moon (2013) express the possible needs of learners in the following way:

> Some students might benefit from use of more complex language on the assessment because that language is appropriately challenging for their advanced stage of learning. On the other hand, some students might benefit from a version of the assessment that is written in simpler language or in bulleted form because long chunks of prose are problematic for them. (p. 45)

Consequently, only through having sufficient knowledge of learners' language repertoires (cf. Coetzee-Van Rooy 2020) and language skills, teachers can adapt the axiologolects used in assessment texts to attend to the needs of students. Furthermore, teachers need to consider aspects of comprehension in creating assessment texts.

Comprehension

In order for assessment to be effective, some form of comprehension is implied on the part of students. It was found in the literature that the kind of questions, the assessment tool, as well as the type of language influence comprehension (Shohamy 1984). In addition, the formulation itself, which may depend on the assessment literacy of the assessor, such as the choice of verbs, may influence the way questions are answered (Semin & De Poot 1997). Importantly, Shohamy (1984) found in her study on reading comprehension of language tests that using different languages and tools such as multiple-choice and open-ended questions may have a difference in the way in which texts are understood.

Various aspects can have an influence on the comprehension of an assessment text and this includes students' inability to link units of information within such a text; ambiguity in terms of words and sentences having multiple possible meanings; or students having insufficient background knowledge in order to understand aspects of an assessment text (Bailin & Grafstein 2016).

Related to the issue of comprehension is the readability of a text as this provides information of the difficulty level of a text.

Readability

An important aspect of any axiologolect is whether it is understandable. In this regard, this chapter draws on the theoretical background and scholarship of readability. Importantly, readability is influenced by a number of variables

such as 'a variety of linguistic factors, including syntactic, semantic, morphological, and textual (discourse) properties' (Bailin & Grafstein 2016:2).

In this chapter, readability formulas will also be employed in order to determine the level of readability. More on the specific formulas relevant to this study is presented under the data analysis.

The very commonly used Flesch–Kincaid readability tests involve scores for Flesch reading ease and the Flesch–Kincaid grade level (cf. Bailin & Grafstein 2016). The Flesch reading ease scores vary between 0 and 10 for difficult professional texts up to 90–100, which would be easily understood by an 11-year-old learner or basically a learner in Grade 5 (Flesch 1979). In contrast, the Flesch–Kincaid grade level provides a grade level up to Grade 12 and then continuing with 'Grade 13' onwards for years of education after school. These formulas use, amongst other aspects, the total number of words, sentences and syllables.

The Gunning Fog Index also conveys information regarding readability and uses average sentence length in order to determine sentence complexity or consider the number of polysyllabic words to gauge vocabulary difficulty (Bailin & Grafstein 2016). This index is also expressed at a grade level similar to the Flesch–Kincaid grade level.

The SMOG Index created by G. Harry McLaughlin is derived from Edward Fry's Readability Graph and the Gunning Fog Index but implies some simplification (Bailin & Grafstein 2016). In order to determine the SMOG Index, the number of sentences used as well as the number of words of three or more syllables are considered. Finally, the Coleman–Liau Index (cf. Coleman & Liau 1975) created by Meri Coleman and Ta Lin Liau involves the number of letters counted per 100 words as well as the determined average number of sentences counted per 100 words. The Coleman–Liau Index also results in a grade level as with some of the other readability indices mentioned here.

The 'Research methodology' section deals with the research methodology employed in order to address the research question posed at the start of this chapter.

Research methodology

Research design and orientation

This mixed-method corpus-driven research involved both qualitative data generated through an in-depth inductive content analysis as well as quantitative data obtained through corpus linguistic analysis of selected assessment texts in the compiled corpus.

This chapter forms part of research done in order to explore situated and culturally appropriate SDML within a selected university, specifically in terms

of lecturers and distance education students. The findings of the initial part of this study have already been published (Olivier 2020c), and from this part it was evident that language is a significant variable for situated and culturally appropriate SDML. Consequently, it was decided that the language aspect would be explored further with this group.

Despite the focus on documents in this chapter, because university lecturers were involved in providing the texts, this study underwent an ethics review and obtained gatekeeper's permission from the selected university. The identified participants provided written informed consent to take part in this study and to provide assessment documents. Furthermore, participation was totally voluntary and participants were allowed to withdraw themselves and their documents at any point. Confidentiality and privacy were ensured throughout the process and consequently, the reported findings here are phrased as not to overtly expose the modules or lecturers involved. The data used in this chapter were consequently stored securely electronically and will be erased after a period of seven years.

Sampling

For the purposes of this research, the lecturers who were part of the initial part of the wider research project noted above (Olivier 2020c) were approached. Of the 10 university lecturers who took part in the first part of the project, seven consented to continue to take part in the research and to provide data for this project. Hence, the corpus used for this study involved convenience sampling and texts were included as they were supplied by the participants who opted to be part of this research.

Data collection

Some assessment texts were sent directly by email whilst others were provided through access to the learning management system. But no student or student-created texts were involved in this research. Ultimately, a total of 98 documents were used to create the data set used in this analysis (Table 2.1).

These documents were analysed in their original portable document format (PDF) or Word format for the content analysis, whilst they were converted

TABLE 2.1: Summary of the assessment text dataset.

Type	General assessments (GA)	Rubrics (RU)	Tests (TE)	Examinations (EX)	Total
Number of documents	52	6	32	8	98

Note: The abbreviations used to refer to the documents in the rest of the chapter are provided in brackets.

into a simple text format for the corpus and readability analyses. In some cases, content such as the rubrics had to be removed from the general assessment documents and placed in separate text files for the sake of the corpus and readability analyses. In addition, for the purposes of the latter two analyses, all Afrikaans content had to be removed from the texts.

Data analysis

Inductive content analysis

The first phase of the data analysis involved a qualitative approach through which all the collected assessment texts in the data set were inductively analysed (Merriam 2009). In this regard, no theory was tested, but rather qualitative codes were derived from the analysis after which overarching themes were determined which were in turn interpreted in terms of the relevant literature. Furthermore, this process also took on the form of a content analysis (Merriam 2009) in order to determine trends and findings from the various assessment texts.

Corpus linguistic analysis

The corpus analysis involved exploring frequencies and confirming some findings of the content analysis by means of the concordance tool. To this end, *AntConc* (Antony 2020) corpus linguistic software was used and is described as '[a] freeware corpus analysis toolkit for concordancing and text analysis'. In this chapter, version 3.5.8 of *AntConc* was used.

One part of the corpus linguistic analysis involved exploring verb frequency based on the Revised Bloom's Taxonomy Action Verbs. Bloom's revised taxonomy has been used in previous research in relation to question generation in the context of SDL (Lindberg 2013). The choice of verb is also highly relevant as this determines the way a question is answered (Semin & De Poot 1997). This was done by adding the verbs from the verbs list in separate text files and loading them as search terms and displaying them under the Concordance function. In this way, the concordance hit count could be determined and each of the items checked whether they were indeed used as action verbs. The final counts were then normalised to a count per 1000 words in order to allow for comparison.

Readability analysis

Part of the data analysis involved readability of the collected texts, and for this purpose the software *Libro* (cf. Cavalcanti 2017) was used. According to Cavalcanti (2017), this software can be described as follows and all the tests listed here were conducted:

> Libro is a cross-platform text analysis program written in Python and Free Pascal/ Lazarus which scans a whole text file (in plain text, HTML, EPUB, or ODT formats) and ranks all used words according to frequency, performing a quantitative analysis of the text using Shannon-Weaver information statistic and Zipf power law function. It counts words, chars, spaces, and syllables. Also computes readability indexes (Gunning Fog, Coleman–Liau, automated readability index (ARI), SMOG grade, Flesch–Kincaid grade level and Flesch reading ease). (n.p.)

In this chapter, in addition to some general characteristics of the texts as derived from the software, the following scores are reported: Flesch reading ease, Flesch–Kincaid grade level, Gunning Fog Index, SMOG Index and the Coleman–Liau Index.

Results

Results of the inductive content analysis

The main trends of the inductive content analysis are presented below with references to the different assessment documents in brackets. The content is presented verbatim as it appeared in the source documents; however, where certain words could make the relevant module and consequently the lecturer identifiable, that was redacted.

Situated learning

There was some evidence of situating the learning in the dataset. In this regard, some questions would require students to link their answer to a real-life situation or case. Examples of this include:

- '[…] propose a model for your school, based on the DBE's [Department of Basic Education's] guidelines' (GA3)
- 'Write an advertisement for the appointment of an educator […]' (GA6)
- 'Read the following extract and then answer the questions with proof of your school's or departmental policies based on it' (GA6)
- 'Summarise by providing a narrative story about the impact of the various […] study units on your own career and development.' (GA16)
- 'Which strategy will you implement to ensure that […] in your school?' (GA44)

There were at least some assessments focusing on content related to teachers' daily activities (GA3, GA6, GA12, GA16, GA39) or focusing on the individual students in their own experience or aspirations through the creation of a 'career plan' (GA14) or application in terms of the Curriculum and Assessment Policy Statement (CAPS) (GA28, GA30) or lesson plans (GA32).

However, other assessments approached theoretical concepts generically without any reference to a cultural or even work-related context (GA5, GA12, TE2-TE12). Most of the questions posed in the assessment texts were to the

point and basically contained just a question. For example, 'What is the difference between probability and non-probability sampling?' (GA37). However, there were some instances where questions in the assessment documents were contextualised within a wider description (GA19, GA21, GA23, GA25, GA28), actual newspaper articles (GA36) or cases (GA28, GA29, GA30, GA31, GA33, GA34, EX2, EX3, EX4, EX5, TE21, TE22). Furthermore, the use of multiple-choice questions was quite common for general formative assessments (GA27), online and written tests and examinations (EX2, TE1-TE32). Although open-ended questions lacked in terms of most of the online tests, such questions were observed in some (TE23).

Few assessments specifically request students to reflect. Reflection is, however, an essential part of the assessment process, and Beckers et al. (2019) underline the importance of reflection in fostering SDL. At least GA38 prompts students to reflect on a lesson plan created. Consequently, this is also linked with their ultimate practice as teachers. In contrast, in another assessment personal views are discouraged as students are requested to present their 'point of view', but it is stated clearly that 'The answers to the assignment should reflect proper LITERATURE RESEARCH and not based on emotional reasoning or personal opinion' (GA39). In this case, little room was left for students to take ownership of their own learning process.

☐ Aspects fostering self-directed learning

For most of the documents, little student agency was overtly evident. No evidence of student participation could be observed in creating the assessments, assessment criteria or rubrics. On a very basic level, some form of student agency was identified through students being able to select a topic for an assignment amongst a list of relevant topics identified by the teacher (GA5, GA15, GA37), or through the selection of sources to use in completing the assessment (GA5, GA15).

It is clear from the analysis of the documents that efforts were made to promote collaboration through completing assignments in groups (GA1) or pairs (GA11, GA15, GA17). Such assessments, depending of course on how they are planned and managed, may contribute towards fostering SDL as is evident in the literature (Johnson & Johnson 2009, 2019). Some documents provided in-depth instructions for peers or groups in order to do peer assessment (GA15, GA17, GA19, GA21, GA23, GA25). The majority of the assessments were clearly meant to be assessed by the teacher, followed by some assessed automatically through the learning management system and a few through peer assessment (GA15, GA17, GA19, GA21, GA23, GA25).

However, the majority of general assignments had to be completed individually (GA2, GA3, GA5, GA6, GA7, GA8, GA12, GA13, GA14). One assignment goes as far as including the following statement: 'Assignments are

individual tasks and not group activities' (GA32). In some cases, assignments were aimed at individuals' views (such as GA14) and consequently completing this individually would be sensible. However, for most of the other assessments, more collaboration could have been possible.

Some questions were posed to prompt students to consider their own views in answering the question. To an extent, this would be supportive towards some form of student agency, at least in terms of the formulation of the answer. Examples of this kind of approach included:

- '[…] add your own interpretation and/or critique of the texts and offer a creative solution to existing problems' (GA32)
- 'Based on your understanding, do you think the […]? Support your answer.' (GA33)

Marking rubrics were included in some assignments but were either not used or supplied for most of them. Most of the rubrics (some embedded in general assessment documents marked as GA and some separate marked as RU) contained very basic descriptions with no detailed criteria explaining how specific marks can be reached (GA2, GA29, GA34, GA35, GA39, GA40, GA43, GA50). However, there were rubrics such as one to be used by peers (GA4, GA10) or the teacher (RU1, RU4) that contained a lot of detail guiding groups of students assessing other groups' assessments on a literature review in this case.

☐ Self-directed multimodal learning elements

A common type of assessment is longer written assignments in the form of essays and reports with set topics and no freedom to decide on the way it is presented (GA3, GA5, GA6, GA7, GA12, GA15, GA16, GA17, GA19, GA21, GA23, GA25, GA36, GA39, GA41, GA44). Similar approaches were followed in examinations with longer essay-type questions (EX1, EX5, EX7, EX8). The advantages of essays as a means of assessment are shown in the literature (Siriwongs 2015).

The tests (TE1-TE32) – presented as online tests on the learning management system – involved multiple-choice questions with basically no multimodal content, despite the fact that the learning management system allows for the inclusion of graphical, audio, video and even other embedded online content.

A lot of the instructions provided in assessments pertain to the structuring and technical aspects regarding the way in which the assignments have to be completed (GA5, GA7, GA15, GA19, GA21, GA23, GA25, GA29, GA32, GA37, GA40) with some assignments providing no instructions (GA36). There were clear efforts of scaffolding and supporting assessments through the use of

checklists (GA1, GA11). In some cases, even templates are provided for use by students in completing tasks (GA18, GA20, GA22, GA24). Such a document can be useful in supporting new students; however, this could become an unnecessary crutch which could impact students' self-direction in mastering different aspects of word processing software themselves – a skill which is considered essential for students (as is evidenced by this research), as well as teachers ultimately. Consequently, few choices were available to students in terms of the mode of communication or interactional multimodality (Olivier 2020a, 2020b) employed.

However, limited assessments did allow for greater variation in terms of interactional multimodality. This included questions or tasks that involved designing or creating the following:

- Mind map (GA13)
- Diagram (GA13, GA37, EX4)
- An analytical rubric (GA28, GA30)
- Web page (GA40)
- Video (GA49, GA52).

Interestingly, for the assignments utilising multimodal content, the rubrics' criteria were confined to content and language issues, and no multimodal aspects were specifically assessed. However, such an approach could make the use of a variety of modes possible for the same assignment.

Language issues

The content analysis also allowed for the identification of various spelling and language errors. This was especially true for the limited Afrikaans content (GA7, GA17, GA25, GA27, GA31, GA49, EX4, EX5, EX6, TE1, TE2, TE4, TE5, TE19, TE30), but was also included in some English texts (GA7, GA28, GA30, GA32).

Some inconsistencies came to the fore in the translation, with texts presented parallel with English and Afrikaans equivalent questions. For example, in GA51, the words 'transform' was translated as 'hervorm' ('reform' in English), and 'apply' was translated as 'implementeer' ('implement' in English). In these two examples, the Afrikaans equivalents are closely related but differ enough to make a semantically significant difference in the understanding of what is being asked. Another translation issue was the fact that if an automatic true-false question was used, the options always displayed English answers despite the fact that the question might be in Afrikaans. Hence the limitations regarding the learning management systems language capabilities is a cause for concern. As these issues do not directly relate to the aims of this research, these errors were not explored in-depth.

Results of the corpus linguistic analysis

A corpus analysis was done in this chapter in order to explore the nature of axiologolects in selected assessment texts. Selective frequency tests were done on the corpus. In this regard, the interrogative words and question-related terms were explored within the whole corpus. Therefore, the instances reported here were included both in instructions as well as in parts of questions. The frequencies determined by AntConc's Word List were adapted based on the concordance list as some of the interrogative and question-related words might also serve other purposes, and only when they fulfilled the described function, they would be counted. Where possible different forms of words were all considered together and wrongly spelled words also counted. These frequencies were not normalised and are presented in terms of the full corpus (cf. Table 2.2).

It was found that the word 'what' was the most common interrogative word, occurring 173 times in the corpus. Of such constructions, the majority of the collocates were 'what are [...]' (53 times), 'what is [...]' (9 times) and 'what does [...]' constructions followed by 'what can [...]' and 'what will [...]'. Nearly all these constructions involved basic knowledge probing questions such as 'What is a sample and a population?' (GA37).

Other common interrogative words included: 'which' (116 times), 'how' (115 times), 'when' (43 times), 'why' (27), 'who' (7 times) and 'where' (6 times). In addition, other typical question-related words were also used numerously in the frequency list. The words with more than six instances included: 'explain' (42 times), 'design' (38 times), 'answer' (36 times), 'choose' (33 times), 'write' (32 times), 'complete' (29 times), 'determine' (19 times), 'discuss' (18 times), 'make' (17 times), 'describe' (16 times), 'identify' (16 times), 'formulate' (15 times), 'compare' (11 times), 'analyse' (8 times) and 'define' (7 times).

The frequency of all the relevant terms from the Revised Bloom's Taxonomy Action Verbs was also determined and is summarised in Table 2.2.

However, SDL cannot be definitely fostered through specific phrasing of questions and assessment texts, but there are words that could have been

TABLE 2.2: Verb frequency based on the Revised Bloom's Taxonomy Action Verbs.

Level	Total number of words (normalised to 1000)	Number of words 1st years (normalised to 1000)	Number of words 4th years (normalised to 1000)
Remembering	13.0	13.0	11.6
Understanding	1.5	2.2	1.2
Applying	2.7	3.4	2.9
Analysing	1.8	0.2	1.7
Evaluating	4.9	3.4	5.3
Creating	7.1	13.2	9.3

expected in this corpus. Some of the words identified in the content analysis were explored through the corpus linguistic software by means of concordance searches. There were, for example, six instances prompting self-assessment and three for self-evaluation. Of all the 38 instances of the word 'plan', only 2 referred to it acting as a verb relating to an action to be completed by the student. From the eight instances of the word 'reflect', only three prompted students to reflect on something or on an assignment.

As student responsibility and resource selection is key to SDL, so the patterns of selection verbs (such as 'pick', 'select' and 'choose') were also explored. For the word 'choose', out of 33 only 4 related to students being able to choose a topic. The rest of the instances were either used in general contexts or, similarly to all the five instances of 'select' used in multiple-choice questions to prompt a student to select an answer. Other words, such as 'pick', were either not used at all or were used in a general sense – as was the case with 'decide'.

An area for further exploration would, hence, be to compile a corpus of questions that are considered to be contributing to the fostering of SDL, and then, after linguistic analysis, guidelines could be provided in terms of question formulation.

Results of the readability tests

Readability was also investigated in this chapter in order to determine the nature of axiologolects in selected assessment texts. The open source software *Libro* was used to determine a summary of the language features of the corpus and to explore the readability of the texts. This summary is presented in Table 2.3.

In terms of Flesch reading ease (cf. Bailin & Grafstein 2016), nearly all the values fall between 50 and 60, which is regarded as being 'fairly difficult' (Flesch 1979) to read and is regarded at a Grade 10 to Grade 12[1] level. The only exception would be the rubrics where the average for all the rubrics is considered 'difficult to read' and regarded as being at university level (Flesch 1979), whilst the extracted rubrics for the first-year students is 'very difficult to read' and is at university graduate level. However, it should be noted that only one first-year rubric text was included in the corpus. Furthermore, the fourth-year rubric text with a value between 60 and 70 places it in a 'plain English' category which is at Grade 8 or Grade 9 level (Flesch 1979).

Furthermore, the Flesch–Kincaid readability tests also include the Flesch–Kincaid grade level (cf. Bailin & Grafstein 2016), which in the corpus ranges

1. The grades listed here for the Flesch–Kincaid readability tests are in reference to school grades in the United States of America, but in terms of learner age, they are fairly similar and are therefore used as they are.

TABLE 2.3: Summary of the corpus and readability scores.

Variables	General assignments			Tests and examinations			Rubrics			Total
	Total	First years	Fourth years	Total	First years	Fourth years	Total	First years	Fourth years	
Number of characters	203 015	5143	28 879	151 325	22 264	28 879	12 117	427	5027	**366 457**
Number of words	29 470	809	4395	23 699	3264	4395	1625	57	672	**54 794**
Different words	3616	363	1139	3501	819	1139	428	46	166	**5626**
% of different words	12.27	44.87	25.92	14.77	25.09	25.92	26.34	80.7	24.7	**10.27**
Number of syllables	50 986	1277	7464	39 802	5716	7464	3088	118	1073	**93 876**
Number of sentences	7971	55	342	3514	391	342	129	3	68	**11 614**
Average number of characters per word	5.80	5.33	5.44	5.56	5.93	5.44	5.98	6.68	5.05	**5.70**
Average number of syllables per word	1.73	1.58	1.70	1.68	1.75	1.70	1.90	2.07	1.60	**1.71**
Average number of words per sentence	3.70	14.71	12.85	6.74	8.35	12.85	12.60	19	9.88	**4.72**
Flesch reading ease	56.72	58.36	50.12	57.91	50.21	50.12	33.28	12.41	61.72	**57.11**
Flesch–Kincaid grade level	6.27	8.77	9.46	6.86	8.33	9.46	11.75	16.24	7.11	**6.47**
Gunning Fog Index	5.41	7.37	9.17	7.25	7.29	9.17	16.79	16.37	5.59	**6.32**
SMOG Index	5.31	5.80	7.24	6.30	6.41	7.24	10.08	10.50	5.43	**5.74**
Coleman–Liau Index	10.38	13.60	13.96	12.57	15.61	13.96	17.10	22.02	10.94	**11.53**

between Grade 6 and 'Grade 16' (which implies four years after school). For assignments, the overall grade was just over Grade 6, whilst the first-year and fourth-year assignments were just below and just above Grade 9 level. The tests and examinations were overall just under a Grade 7 level, with the first years and fourth years at just over Grade 8 and Grade 9, respectively. The rubrics were overall at just under Grade 12 level, with the first years at Grade 16 (or Grade 12 plus 4 years) and the fourth years at a Grade 7 level. Once again, the first-year rubric text may skew the results as it is only one text and the nature of words may have an influence as well.

For this data set, the Gunning Fog Index corresponds with the Flesch–Kincaid grade level in most cases. The overall grade for assignments and that of the first years is slightly lower for the Gunning Fog Index. The same applies for tests and examinations for the first-years and rubrics for the fourth-years. There is quite a significant difference between the overall grade for rubrics across all years. But generally (except for the overall and first-year grades for the rubrics), the Gunning Fog Index is between Grade 5 and Grade 9.

As the Coleman–Liau Index also provides a grade level as the latter three readability tests discussed, it is interesting that this index measures quite higher than the others. Here the overall grade is between Grade 11 and Grade 12 whilst the rest of the values are between Grade 10 and Grade 13. The exception was first-year tests and examinations being at over Grade 15, the overall rubrics at Grade 17, and the already highlighted first-year rubric at Grade 22.

No consistent trend was identifiable from the readability scores. However, regardless of the first-year rubric as an outlier, the readability of rubrics seems to be less favourable, followed by the tests and the examinations, and finally, general assessments that seem to be the most accessible. These findings show that attention should be paid to ensuring that rubrics are as understandable as general assignments and that tests and examinations should also not be written at a higher level than students are used to with other formative assessments. However, there seems to be some progression with fourth-year assessment texts being less readable than first-year texts, and that is to be expected.

Findings and discussion

The dataset showed clear evidence of axiologolects having elements supporting situated learning as assignments were often aimed at the practice of being a teacher. A general trend observed through the content analysis was the lack of student agency and participation in creating the assessments and the assessment criteria and rubrics. Such information is provided, and no evidence of inputs by students was found. Hence, it is assumed that the documents are exclusively teacher-generated. However, this is an issue that would require further empirical investigation.

In terms of SDL, some assessment texts showed evidence of supporting collaboration through peer and group assessments. The manner in which questions were posed also prompted student views and engagement. However, overall, SDL was not openly promoted through assessment activities.

With regard to SDML, most of the assessments in the dataset related to long written assignments. Guidance in terms of structuring varied, but there was a trend towards provided a lot of detail in terms of layout and format.

Very few multimodal assessments were employed, but there were attempts to include more traditional multimodal genres such as mind maps, diagrams and rubrics as well as highly relevant genres such as websites and videos. However, the inclusion of more multimodal assessments as well as choices in this regard seems to be an area for future development.

In terms of general language issues, some spelling and language errors as well as translation inconsistencies were observed.

From the corpus linguistic analysis, the most prominent interrogative words employed were 'what', 'which' and 'how'. But from this analysis, little could be gleaned regarding SDL, SDML or even situated learning. However, when verb frequencies were explored regarding the Revised Bloom's Taxonomy Action Verbs, the overemphasis on remembering followed by creating was evident. There also seem to be very few questions relating to applying and analysing. An overreliance on remembering type questions may have negative consequences in promoting an SDL approach for assessment.

From the readability tests, it was evident that there is quite a lot of variation between the texts. In order of readability, the general assignments seemed to be the simplest, followed by tests and the examinations and then rubrics as being the most complex. In addition, when first-year and fourth-year texts were compared, overall there seemed to be a logical progression in complexity.

An important requirement towards situated SDL-oriented assessment is addressing the role in and agency of students in terms of assessment. More than 20 years ago, Gipps (1999:387) already highlighted this issue and made the following recommendation: 'We need to bring out into the open the nature of the power relationship in teaching and assessment and point out the possibility of reconstructing this relationship'. In addition, Gipps (1999) proposes the following cause of action:

> [*W*]e need to encourage teachers to bring pupils into the process of assessment, in order to recognize their social and cultural background, and into self-assessment, in order to develop their evaluative and metacognitive skills. (p. 387)

Teachers' knowledge of appropriate and adaptable axiologolects is essential. Being able to adequately employ linguistic resources should be regarded as part of teachers' assessment repertoires (cf. Cowie et al. 2013).

From the literature, the importance of feedback within the assessment process was evident. Because this aspect of the axiologolects was not covered in this research, it is a possible important avenue for future research as feedback language would also need to be researched in order to explain current assessment practices. Here, the various dialogues (cf. Cowie et al. 2013) could provide very rich data for linguistic and assessment-related inquiry.

Recommendations

Lecturers should consider the readability of texts and specifically ensure that tests and examinations as well as rubrics are not more complex linguistically than other assessments utilised throughout a semester. Consequently, readability tests – which are freely available online – can be used by teachers to gauge readability and assessment texts can then be adapted. In addition, assessment texts themselves and even the process of involving students should not lead to cognitive overload or some form of burden of choice (Kicken et al. 2008) on the side of learners, and consequently, texts need to be structured effectively and processes are supported by clear structures.

The fact that no differentiation in language use was found for students with different linguistic needs amplifies the need for greater personalisation of learning. In this regard, this chapter is in support of the plea made by Elana Shohamy (1984):

> [*D*]ecision makers should be sensitive to the levels of proficiency of the test taker, since testing method, language and text, make more of a difference for low-level students than for advanced students. (p. 159)

Therefore, any assessment that is sensitive towards students' axiologolectal needs will have to be adaptable and informed by linguistic and comprehension data that could be derived from learning analytics and other diagnostic assessments that can be imbedded within the regular learning and assessment process. According to Tomlinson and Moon (2013:17), 'assessment in an effectively differentiated classroom is the foundation of successful instructional planning'.

The most important recommendation towards situated SDL-oriented assessment would be to include learners in the process of planning, structuring and not just the execution of assessments. As learners are expected to take charge of their learning, outcomes, resources and the whole process – on their way towards SDL – so should they also take responsibility for aspects of assessment and hence also have insight into axiologolects.

It is essential that learner agency is recognised through letting learners formulate questions – whether for the purposes of classroom engagement or for more formal assessments. This aspect of learners taking charge of the assessment process would be beneficial to their SDL, as learner control in terms of task selection contributes to SDL according to the literature (Kicken et al. 2008). The Question Formulation Technique (QFT™) by Rothstein and Santana (2011) could be useful. Cummings (2020) summarises this technique as follows:

> [*T*]he teacher presents a question focus, students generate questions following a simple set of rules, students identify different types of questions and learn how

> to transform them, students prioritize questions, teacher and students discuss the next steps, and students reflect on the process. (p. 38)

Cummings (2020) also emphasises the importance of convergent thinking that occurs because of the prioritisation, as well as how the reflection process as metacognitive element is essential for engagement. However, as Cummings (2020) found, mere inclusion of questioning by learners does not necessarily imply engagement and active participation and sharing of learners' thought processes are recommended. Moreover, Clark (2017) found that the QFT could also be used to successfully impact learners' curiosity which can be supportive of deep learning.

Any promotion of learner agency and greater responsibility in terms of learning need support and scaffolding on the part of the teacher (Beckers et al. 2019; Kicken et al. 2008). Consequently, when it comes to supporting learners in contributing to the assessment process, teacher support is also essential and this can involve not only support in terms of content and subject-specific skills but also axiologolectal skills. This prompts the need for further in-depth research in order to identify all the necessary relevant axiologolectal skills.

Promoting situated SDL-oriented assessment requires that such assessments be embedded in appropriate pedagogy. In this regard, Lombard (2018) observed that assessment approaches rely on the following:

> [*C*]ompetent pedagogy which is embedded in attitudes and beliefs that subscribe to the idea that assessment is unequivocally connected to quality learning, and knowledge and skills to successfully perform assessment with this perspective in mind. (p. 12)

The affordances that technology can provide in terms of formulating and evaluating the wording of assessments need to be explored. As Lindberg (2013) has shown, through the use of existing templates and technologies, questions can be formulated to be accurate, effective and pitched at a sufficient level of cognitive complexity. The challenge is to inform such systems with sufficient corpora of questions relevant to the SDL context. The ability to attend to the adaptive needs of learners, as noted by Lindberg (2013), could also contribute to fostering learners' SDL.

Assessments, and by implication the axiologolects used in the pertinent assessment texts, should be supportive of situated learning. In this regard, both process and language should promote authentic and collaborative learning environments (Donaldson et al. 2020). It is hoped that in a similar fashion as Donaldson et al. (2020) found regarding student teachers being honed as designers within a situated learning approach, so can student teachers also be supported to approach assessments and axiologolects in an authentic manner that could encourage learner agency and foster SDL.

Limitations

This study was limited in terms of the research population involved. Not only were they only from one institution, but the modules identified were specifically intended for distance learning students. In addition, only assessment texts voluntarily supplied or made available through the learning management system were included in the corpus. Consequently, the findings of this research are not generalisable and could be explored further with bigger corpora and more diverse contexts.

The study was mainly confined to English assessment texts, despite having access to some limited Afrikaans texts. For some of the tests, such as the readability and frequency determination in terms of the Revised Bloom's Taxonomy Action Verbs, only the English texts were used.

A further issue is that the findings of this research are restricted to what can be gleaned from the corpus and it might be an option to compare such findings with the intentions and views of lecturers as well as actual understanding and perceptions of students.

Conclusion

This chapter started by stating that the nature of axiologolects in selected assessment texts, as well as the way in which axiologolects were realised in assessment texts, support situated SDL-oriented assessment would be explored. It was found that this is done only in a limited way because from the dataset, it was evident that most of the assessment process is teacher-driven.

It is hoped that SDL-oriented assessment can ultimately become an 'organic and persistent interactive loop' (Tomlinson & Moon 2013:18) involving teachers and learners, and through which axiologolectal disciplinary and student needs are accommodated through dynamic and collaborative assessment text development.

In conclusion, it is evident from the analysis of the assessment texts that situated learning is supported through situating assessments within the practice of being a teacher. However, when it comes to SDL, little student agency was present, and in terms of content, the assessments did not necessarily overtly prompt activities or actions that could act in support of fostering SDL. Despite this lack of clear linking with SDL-supporting processes, the openness of some questions had the potential of SDL being fostered in a more covert fashion. Within the context of SDML, the lack of multimodal content and use of multimodal assessments were clear. Consequently, the analysed assessment texts were heavily text-based.

Chapter 3

Self-directed multimodal assessment: Towards assessing in a more equitable and differentiated way

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Abstract

An increase in the use of technology in education has led to changes in the way learning takes place and content is represented. However, despite this trend and preferences for digital modes of communication and challenges encountered by students, the assessment practices in higher education have remained largely monomodal and text-based. This conceptual chapter deals with the scholarship around self-directed multimodal assessment in order to provide recommendations which would make equitable and differentiated

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assessment possible. The concept of multimodal assessment has been extensively researched in the language teaching context, especially the theoretical foundations of multimodality. When learning is regarded as communication, the semiotic resources used in the broader learning context should also be considered for assessment. In this chapter, assessment is approached as SDL-oriented assessment with the emphasis on formative assessment that fosters self-directed learning. Therefore, assessment processes should accommodate individual multimodality whilst providing sufficient opportunity for resource selection in the Knowlesian sense. This chapter is concluded by suggesting a framework for self-directed multimodal assessment that unpacks the relevant variables as well as the relevant processes and requirements. In this regard, a self-directed multimodal view of assessment would not only address individual modal needs of students for technological access and skills but also attend to the requirements of students with special needs or disabilities.

Introduction

This chapter focuses on self-directed multimodal assessment (SDMA) and addresses the issue of the lack of multimodal assessments with an increasing need for a move away from monomodality in education. Multimodal meaning-making (Bezemer & Kress 2008, 2016) is a reality in education at all levels (Jones et al. 2020), and within this process, assessment involves various aspects of meaning-extraction and meaning-making. Furthermore, this chapter intends to gauge how SDMA can contribute to assessing in more equitable and differentiated ways.

Because of a proliferation of the integration of technology in education, learning and teaching have become a lot more multimodal (Nouri 2019; Ross, Curwood & Bell 2020; Smith et al. 2019; Tan et al. 2020). The need for self-directedness is also progressively important because of the pace at which knowledge is created and the fact that educational institutions cannot adequately prepare students for a dynamically changing world of work (Mok 2009). In this chapter, multimodal assessment is approached in terms of SDL, as student preferences and capabilities must be considered in order to support student agency in learning. Consequently, various modes of assessment are also implied.

Emphasising multimodal learning is highly relevant in the digital age as, according to Bell, Curwood and Ross (2018:1713), '[l]earning in a digital age involves the creation and assessment of multiple, multimodal, and multifaceted textual representations'. However, assessment practices have not necessarily adapted accordingly. In support of this statement, Tan et al. (2020:101) identify 'tension between conventional assessment practices and the contemporary presence of digital technologies'. Moreover, in this broader

context, multimodal assessment relates to the concept of *digitally based classroom assessment* (Russell 2019) but can also be relevant outside classroom contexts.

When it comes to assessment, there still seems to be a preference for text-based assessing despite calls in literature (Bell et al. 2018; Cartner & Hallas 2020; Fjørtoft 2020; Tran 2019) for the need to use a variety of modes for assessment. In this regard, Ross et al. (2020) summarise the current state in higher education as follows:

> Within higher education, student learning in many disciplines has traditionally been assessed through written compositions and oral presentations, often in high-stakes exam environments. For students, this can lead to disengagement or difficulty in their ability to share, critique and generate knowledge in university settings. For teachers, this presents challenges to their pedagogy, including how they formatively and summatively assess student learning. (p. 292)

The challenge, therefore, remains for teachers to consider other types of assessments than written ones as and when they are appropriate. Furthermore, any discussion on SDMA should also contemplate assessment equity and differentiation of assessments for students.

In addition, whilst multimodality (Bezemer & Kress 2008, 2016) is considered in formative assessments, there seems to be a reluctance to include digital media in summative or high-stakes external assessment opportunities (Hafner & Ho 2020; Ross et al. 2020). Importantly, within a broader view of multimodal assessment, this phenomenon does not only relate to technology but can also refer to paper-based multimodal content (Tran 2019). The need for approaches to assessment where both multimodality and self-directedness are considered is especially acute in contexts with 'strong examination cultures' (Mok 2009:61).

In this chapter, assessment is viewed from a sociocultural perspective. If approached from this perspective, 'assessment should be closely coupled with learning and enacted as dynamic and meaningful in relation to how students come to see themselves as learners' (Silseth & Gilje 2019:27). In addition, this is part of a broader view of learning being mediated by culture and situated in real-life and authentic contexts (Olivier 2020c; Silseth & Gilje 2019). Social semiotics serves as a theoretical foundation for SDMA. Social semiotics is an approach that focuses on how a community creates meaning through representations within the context of the communication landscape (Fjørtoft 2020). In the same way, a semiotic mode can be considered being a system of choices (Jones et al. 2020), so, too, could the mode of assessment be interpreted as a similar system.

In the context of this chapter, the emphasis is also on assessment as part of a social or communal process. To this end, SDMA could be interpreted within the context of the Japanese concept of *kankei,* which relates to an interrelationship (Arimoto & Clark 2018), or the South African concept of

Ubuntu as derived from the Nguni languages and *Botho* from the Sotho languages. For Le Grange (2019:217), *Ubuntu* involves humanness and 'becoming more fully human through deeper relationships with other human beings'. Le Grange also interprets *Ubuntu* as having a similar meaning as *ukama*, a Shona word emphasising 'relatedness'. Therefore, it is proposed that SDMA is considered within a broader *Ubuntu-currere* (Hlatshwayo & Shawa 2020; Le Grange 2019) approach where the emphasis is shifted from the individual (the teacher) to 'an assemblage of human-human-nature' (Le Grange 2019:222). Hence, this humanness, as not only a South African phenomenon, but rather a more global communal approach, should be prominent for learning and ultimately assessment.

Assessment is regarded in this chapter within the context of *SDML*, which relates to an approach to education aimed at promoting self-directedness (cf. Brockett & Hiemstra 2019; Knowles 1975; Mok 2009) through utilising individual modal preferences of students, learning-related communication through various modalities in addition to blending of learning, teaching and delivery through different modes (Olivier 2020a, 2020b). The emphasis of this chapter is mainly on the higher education context, but most of the issues are also related to school-based education. Consequently, the terms *teachers* and *students* are used in the generic sense regardless of the level of educational delivery.

This conceptual chapter aims to explore through a critical review of relevant literature how SDMA can be used towards assessing in a more equitable and differentiated way. To this end, this chapter considers SDL-oriented assessment and student agency, the move from monomodal and multimodal assessment, and issues of equitable assessment and differentiation. Finally, practical recommendations for SDMA are suggested.

Self-directed learning-oriented assessment and student agency

Self-directed learning and assessment

The role and nature of assessment in SDL have been explored extensively in the literature (cf. Lubbe 2020; Lubbe & Mentz 2019; Mok 2009; Zeng et al. 2018), and this chapter joins this broader discourse. In this chapter's context, the concept of SLOA is also relevant.

In this context of this chapter, SDL (cf. Brockett & Hiemstra 2019; Knowles 1975) is considered an individually driven creative and resourceful process towards student agency which involves making use of learning resources as well as people to set goals, selected means and strategies to reach set outcomes

and ultimately evaluate and reflect on the process. Assessment is a part of this process and can be approached in a manner as suggested in terms of the SLOA framework.

The SLOA framework by Mok (2009) emphasises that assessment should enhance and serve learning, and that SDL is essential. The framework entails the following (Mok 2009):

> [*A*] coherent framework of assessment, deliberately designed to capitalise on the integrative impact of metacognition, feedback, motivation, contextual factors, and self-regulation on learning in the construction of assessment activities in order to cultivate self-directed learning capacities in students. (p. 11)

For Mok (2009), the concepts of *metacognition* and *self-regulation* are fundamental to SLOA. These imply, for example, timely feedback, activities to raise students' metacognitive awareness and expanding students' self-regulation skills (Mok 2009). The SLOA can also be interpreted within the context of three integrated components: 'assessment *of* learning, assessment *for* learning, and assessment *as* learning' (Mok 2009:11; [*emphasis in the original*]). Hence, these components should also underly SDMA.

It is essential that assessment is not regarded as being separate from the learning taking place. Evidently, choices of assessment methods can prepare students for lifelong learning and also be supportive to AfL (Garside et al. 2009). Furthermore, Lubbe and Mentz (2019:362) concur that 'assessment should not be separated from the learning process, and that assessment practices should be embedded within social constructivism, with the learning process at its core'. Similarly, as regards multimodal composition and assessment, Silseth and Gilje (2019) found that:

> [*S*]tudents, when dealing with assignments that involve multimodal composition, can be sceptical about investing time and effort in producing these types of texts if they are not integrated thoroughly into the assessment practice. (p. 38)

Consequently, the proposed SDMA would also need to be integrated into the broader multimodal learning process.

The implication is, therefore, not only embedding assessment in and as part of the learning process but also approaching it as a social phenomenon – as was stated in the introduction. This approach also relates to the idea of viewing learning as communication (cf. Olivier 2020b), which, in the context of this chapter, refers to multimodal communication and, specifically, interactional multimodality (Olivier 2020a, 2020b). Moreover, by focusing on multimodal assessments, the divide between students' creative and social experiences online (cf. Ross et al. 2020) can be crossed through exploiting students' knowledge and background within the classroom setting by moving from the personal to the more public educational sphere. In this context, the role and voice of the student become crucial.

From student voice in assessment to student agency

The issue of student voice and, ultimately, student agency in assessment should be considered within a broader context where students – often outside of the classroom – are already active producers of knowledge through different modes within digital environments (Nouri 2019). In the SLOA context, Mok (2009) also emphasises that students should be activated as learner partners and resources. In this chapter, *student agency* refers to students being able to make their own choices in a self-directed manner within an educational context.

There is a need for student agency within the broader discourse and praxis of assessment. From the literature, a trend towards collaboration with students in the assessment process and even developing assessment criteria is evident (Hafner & Ho 2020; Tan et al. 2020). In this regard, Bell et al. (2018:1714) note that 'teachers within higher education need to consider how to create a dialogue with students around assessments'. Wylie and Lyon (2019) also agree that teachers should ensure that students play an active role in the assessment process. The challenge is therefore to build on existing good practices where dialogue has been established with students as regards assessments or establishing it where it has been overlooked. After which, dialogues can be transformed into active participation in the planning, structuring, monitoring and execution of assessment processes.

Moreover, the following statement by Hafner and Ho (2020) highlights the importance of student agency in multimodal assessment. They (Hafner & Ho 2020) recommend that:

> [*T*]eachers and students work collaboratively throughout the different stages of the design process so that students receive an appropriate amount of scaffolding to develop multimodal communicative competence and digital skills required in their 21st century social lives. (p. 12)

Hence, engaging with students about assessment might not be sufficient, as they need to be empowered to make informed inputs and contributions. As stated above, this process also requires the development of skills extending beyond communication skills but also touching on assessment literacy (cf. Lubbe 2020).

Student agency is also associated with so-called *critical assessment*. This view, which also relates to equitable assessment, involves challenging assessment practices with a critical lens. According to Montenegro and Jankowski (2020:9), critical assessment requires '[i]ncluding the voices of students, especially those who belong to minoritized populations or those whose voices can often be left unheard, throughout the assessment process'. However, critical literacy also involves acknowledging that all assessment is

inherently subjective, assessment types should be varied and that equity should be advanced (Montenegro & Jankowski 2020). It can be the case, as was found by Olivier (2020c) in a South African context, that assessments are not adjusted to be sensitive or attuned to the different cultural values present in classrooms, hence the need for a critical approach to the overall assessment process.

The use of multimodal assessments, as a way of giving students more choices, may also contribute to student agency. The use of multimodal (or specifically digital) tools can contribute to fostering student agency through supporting self- and peer-assessment (Wylie & Lyon 2019). Tran (2019) makes the following observations about her research on using multimodal assessments with postgraduate students:

> The choice gives all students an opportunity to have creative control over the mode of submission. The teacher is able to show students another level of respect, trust, and an openness to experimenting with assessment methods. (p. 169)

As the choice of resource is integral to SDL (cf. Knowles 1975), so does there also seem to be a social justice element to having multiple modes of submission available in order to address challenges regarding the digital divide and digital literacy levels.

Despite the literature promoting the notion of involving students throughout the learning and assessment process, it is clear that often this does not happen (cf. Olivier 2020c). In a study on culturally appropriate and situated multimodal learning at a South African university, Olivier (2020c:260) found that 'according to students, on a broader level, they do not have any choice as to what learning content is included in their curricula'. Hence, in many contexts, a key requirement towards effective SDMA would be to create circumstances that are conducive to student agency and fostering SDL in assessments. These issues are approached in this chapter through multimodality, and so the move from monomodal to multimodal assessment is relevant.

Monomodal and multimodal assessment

Multimodal learning

The need for multimodal expression is not new and has been part of human communication through the incorporation of various modes of communication for ages (McGrail & Behizadeh 2017). However, in education, there has been a hegemony of text-based resources and especially assessments. This phenomenon stands in contrast to the realities of students, as '[s]tudents have different ways to demonstrate their knowledge and we need to use assessment metrics that appropriately elicit demonstrations of what students know' (Montenegro & Jankowski 2017:15).

The term *multimodal* in this chapter also relates to the description of this term by Cartner and Hallas (2020:132) as 'a wide range of applications that enable users to share, comment, create, and discuss digital contents via text, visual, audio, tactile, gestural, and spatial representations'. *Multimodal learning*, according to Fadel and Lemke (2012:2378), entails '[using] multisensory approaches to learning, combined with higher-order experiences such as interactivity'. This definition ties in with the broader view of multimodal learning concerning the different levels of multimodality (Olivier 2020a, 2020b).

Any extension of multimodal learning and, ultimately, multimodal assessment can merely build on existing multimodal practices amongst students. From research by Nouri (2019:695), it was concluded that 'students' construction and consumption of learning material is to a large extent taking place in a multimodal way'. Therefore, teachers and education institutions also need to reflect this broader societal change and make use of students as experts of multimodality who can work symbiotically with teachers as learning experts whilst building on their collaborative knowledge expertise.

In this chapter, the focus extends beyond general multimodal learning and concentrates on multimodal assessment.

From multimodal learning to multimodal assessment

The importance of multimodal assessment has been explored in research on literacy, language learning and composition specifically. This includes research on assessment of digital composition and language-related multimodal assessment (Baldwin 2016; Curwood 2012; Grapin & Llosa 2020; Hafner & Ho 2020; McGrail & Behizadeh 2017; Silseth & Gilje 2019; Tan et al. 2020). Multimodal assessment has also been explored in other subjects such as science education (Jones et al. 2020; Smith et al. 2019). However, this approach has relevance for all subjects.

Unfortunately, teachers do not always regard multimodal assessment as important or relevant. Hafner and Ho (2020) ascribe this to a lack of teacher digital skills and confidence as well as the fact that multimodal assessments are not necessarily included in external or high-stakes assessments. The issue of validity is a further counterargument to the use of alternative methods of assessment (Garside et al. 2009).

Multimodal assessment also relates to addressing the demands of students. From the literature, it is clear that using and creating multimodal texts meet students' needs (Hafner & Ho 2020) and that students have different modal

preferences (Nouri 2019; Silseth & Gilje 2019). In this regard, Olivier (2019a:384) notes that '[i]ncreasingly, the context and practices of students require the use of multimodal media in classrooms'. Apart from individual learning and communicative preferences on the part of students, teachers should also acknowledge the role dynamic digital environments play in making even more multimodal assessment practices possible. This pertains, for example, to the inclusion of different non-verbal elements such as pictograms, various icons, graphics, videos, animations, simulations and even virtual reality environments.

Multimodal learning and assessment have numerous advantages. The use of multimodal texts can improve comprehension and student engagement (Schmeck et al. 2014). Students also learn better in multimodal environments as Fadel and Lemke (2012:2379) maintain that '[s]tudents using well-designed combinations of visuals and text, accompanied by interactivity, learn more than students who only use text'. Therefore, a multimodal approach is preferred in order to support effective learning and engagement.

Multimodal assessment is also relevant to student engagement as, according to Tran (2019:163), 'students who incorporate multimodal forms and approaches to their learning are better engaged with the content than those who employ traditional approaches, thereby enhancing their thinking and learning process'. Such engagement is crucial for student success, but the following observation by Russell (2019) is essential to understand the role of technology in engagement in multimodal contexts:

> Finally, the development of technology-enhanced items and more interactive assessment environments can help increase student engagement with assessment. But while engagement is important for quality assessment, a more critical issue is the collection of evidence that is aligned with the decisions an educator aims to make. (p. 240)

Such evidence could be derived from technology involved in the assessment process using data analytics, for example. Furthermore, Smith et al. (2019:13) confirm that an advantage of a multimodal approach as 'multimodal assessment may be a valuable approach to utilizing the new generation of formative assessment approaches designed to evaluate students' responses formulated in multiple modalities'. In addition, in regard to alternative assessment, O'Brien, Chlochasaigh and Ó'Ceallaigh (2019:7) found that 'students demonstrate a high degree of self-expression, self-reflection on preferred assessment modes for learning and self-awareness of individual strengths'. These aspects can also be conducive to aspects related to metacognition and potentially act in support of fostering SDL.

Fjørtoft (2020:2) proposes the use of multimodal digital classroom assessments (MDCAs), which entail 'any teacher-designed assessment practices requiring students to combine two or more representational modes

using digital technology'. Furthermore, Fjørtoft (2020:3) associates MDCAs with performance assessments, as they both 'focus on the similarity between the performance that is observed and the type of performance that is of interest'. Yet, an advantage of multimodal assessments might also be that they could be used outside of the classroom.

Including multimodal feedback is a further extension of multimodal assessment, Tran (2019:167) calls this approach 'like for like feedback'. However, Tran (2019) describes the negative side of such an approach as follows:

> [/]f like for like feedback is chosen to be part of the feedback and assessment process for a larger course, the issue of staff resourcing would need to be considered due to the amount of time needed to produce feedback using certain technology-enhanced learning tools. (p. 167)

However, the use of multimodal assessment feedback, although not like for like, might already give advantages of ease and speed through the use of audio- or video-recorded feedback. However, more in-depth research would be necessary to probe which medium of feedback would be the most appropriate and whether a more differentiated approach would perhaps not be more suitable for a diverse student population. Yet, practical considerations on the part of the teacher should also inform such decisions as a myriad of ways of providing feedback might not be feasible.

Another example of multimodal assessment artefact type is videos. As mobile technologies allow for easier video recording and even editing, these mediums show great promise even in low-resource contexts. The affordances of videos for multimodal learning are clear (Olivier 2019a; Yeh 2018). In this regard, Nouri (2019) observed that:

> [*S*]tudents use of video for knowledge acquisition or knowledge representation, which allow for learning at their own pace (pause, repeat), flexible/mobile learning on the go, and broadening of perspectives (access to many alternative perspectives). (p. 696)

Importantly, when it comes to video as a medium of learning and assessment, students should be informed of the grammar of the medium where different shots, cuts, the mise-en-scène, sound and visual elements and semiotics, amongst many other facets, carry meaning. As such, such genre-specific elements cannot merely be ignored or reduced to 'technical aspects' in assessment criteria. To this end, both students and teachers need to have sufficient assessment literacy in terms of multimodality in order to create and assess such artefacts. Similarly, the nature of other multimodal genres will have to be explored in terms of their unique characteristics.

In light of the above discussion on self-directedness, student agency and multimodality, equitable assessment is also explored.

Equitable assessment

Little has been written about assessment and equity in the past (Montenegro & Jankowski 2017). Importantly, Montenegro and Jankowski (2017) make the following statement:

> Assessment, if not done with equity in mind, privileges and validates certain types of learning and evidence of learning over others, can hinder the validation of multiple means of demonstration, and can reinforce within students the false notion that they do not belong in higher education. (p. 5)

This issue also relates to a move towards *socially just assessment* (Montenegro & Jankowski 2020), which involves considering certain biases and power relations and cogitating on the cultures in which assessments take place. As students and their worlds and dispositions differ, so should learning and assessment accommodate and support them in a multipronged approach.

Equitable assessment implies longitudinal and reliable AoL. In this regard, Fjørtoft (2020) contends that 'standardized tests and other types of single-day examinations rarely provide opportunities to represent student learning across longer time spans', and:

> [/]f the proposed intent of the assessment is to provide a picture of student growth across time or to represent the breadth and depth of learning, high-stakes and snapshot types of assessment practices could be insufficient. (p. 9)

Conversely, Fjørtoft (2020) describes how a longitudinal approach with multimodal assessments, specifically MDCAs, can provide rich data on student skill and understanding.

The assessment criteria and rubrics for multimodal assessments do not necessarily always focus sufficiently on the nature of the different modes involved in artefacts. Bell et al. (2018:1713) note how assessment rubrics have not been adapted to multimodal contexts and that 'technical and compositional assessment criteria do not always address the richness and complexity of multimodal work'. Ross et al. (2020:291) also concur with this view and stress that 'technical and compositional assessment criteria do not always address the richness and complexity of multimodal work'. Hence, the development of multimodally relevant assessment criteria should be an ongoing process.

Equitable assessment involves accommodating the diverse needs of students. In this regard, Montenegro and Jankowski (2017) believe that:

> [*C*]hoosing appropriate assessment tools or approaches that offer the greatest chance for various types of students to demonstrate their learning so that assessment results may benefit students from all backgrounds advances our collective interest in student success. (p. 5)

Consequently, it is essential to explore how SDMA can be used in the higher education context where students from different contexts and with different needs can be supported equitably.

A further aspect of equitable assessment is the issue of language (Driver 2019; Gandhi-Lee 2018). This aspect is not limited to the use of languages other than English, which is highly relevant to the South African context, but even the use of different varieties of a language such as the English language. The latter suggestion, however, applies to any language of learning and teaching. The issue of language and dialectal diversity is also highly relevant in multimodal literacies or multiliteracies (cf. Olivier 2019b). The role of language in making equitable assessment possible has been explored, for example, in chemistry (Gandhi-Lee 2018). However, these issues require further subject- and language-specific interrogation in order to ensure that assessments are comprehensible to students from different language communities and with different language capabilities.

Specific needs of students with disabilities and special needs also relate to equitable assessment. In this context, assessment should be responsive to the needs of students with cognitive or learning disabilities, emotional or behavioural disorders, or any other disposition that may require a differentiated approach (Driver 2019). It is clear that assessment policies and practices can marginalise students with disabilities (Driver 2019). The affordances of SDMA for assessment equity for students with disabilities require further in-depth investigation, especially in the South African context.

Within the South African milieu, the issue of equitable assessment – especially in relation to SDMA – also relates to teachers' and students' access to technology and skills. According to Russell (2019), access to digital technology is a challenge in many contexts.

The closely related concept of differentiation is also pertinent to this chapter.

Differentiation and assessment

In this chapter, *differentiation* entails an approach where different needs and capabilities of students are addressed in the classroom.

Differentiation in implementing SDMA should be considered as follows: 'while there may be multiple approaches and methods used across a program or institution for assessing student learning, at each instance of demonstration a single approach is employed' (Montenegro & Jankowski 2017:6). Therefore, multimodality does not involve only a single assessment opportunity but also an assessment per student. Hence, differentiation also implies some form of individualisation, which ties in with a student-focused view of learning as advocated by SDL.

In order to achieve differentiation in terms of assessment, assessments should be culturally responsive. This implies the following (Montenegro & Jankowski 2017):

> Culturally responsive assessment is thus thought of as assessment that is mindful of the student populations the institution serves, using language that is appropriate for all students when developing learning outcomes, acknowledging students' differences in the planning phases of an assessment effort, developing and/or using assessment tools that are appropriate for different students, and being intentional in using assessment results to improve learning for all students. (p. 10)

To this end, teachers need to consider how specific modes employed in the assessment process or as assessment artefacts could be supportive in being culturally responsive and appropriate for all students. This also implies teachers being aware of student needs and profiles, as well as increased student involvement in all the processes related to assessment.

True differentiation would rely on having sufficient data on students and their needs. Consequently, some form of diagnostic or exploratory assessment at the start of an academic year or even at unit level could be essential. Differentiation can only be supported through obtaining sufficient data. This process could involve using data analytics – that is, 'the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occurs' (Siemens & Long 2011:34). Consequently, to inform effective SDMA, data analytics should be planned as being part of the learning and assessment process.

The concept of SDMA is explored next to address the issues of equitability and differentiation. A broad framework for SDMA is proposed, focusing specifically on multimodality, the combination of modes, training and preparation, and literacy.

Self-directed multimodal assessment

From multimodality to self-directed multimodal assessment

In the literature on multimodality, this concept relates to representation, communication and interaction through different semiotic resources (Fjørtoft 2020). This concept has been extended by Olivier (2020a, 2020b) as multimodal learning to be realised at four levels: individual, interactional, instructional and institutional multimodality. In this chapter, however, the focus on multimodal learning is confined to individual multimodality, specifically multimodal assessment artefact preferences; interactional multimodality with regard to how assessments are realised as multimodal communicative acts; and finally, the different technologies and learning modes involved as instructional multimodality.

As stated at the beginning of this chapter, the prevalence of digital technologies in education has resulted in increased opportunities for multimodal assessments. In this regard, Smith et al. (2019) state that:

> [*G*]iven the growing breadth of activities enabled by digital science inquiry environments, it is important to develop assessment tools that can conduct integrated assessments of student work across multiple activities and modalities. (p. 3)

Silseth and Gilje (2019) also express the need for appropriate tools for assessment of multimodal artefacts. The fact that higher education needs to adapt to the multimodal needs that students may have in regard to learning and assessment is also supported in the scholarship (Nouri 2019).

It is apposite to consider how different modes of communication and artefacts are interpreted within the theoretical frame of multimodality. This implies refocusing from multimodal learning to SDMA and involves combining different modes.

Combining modes

An important aspect of any approach relating to multimodality is modes and the combination of different modes. According to Olivier (2020a), an essential element of instructional multimodality, which is also of importance in this chapter, is resource selection. Resource selection entails 'the use of different modes in the learning and teaching context, and in terms of self-direction, this relates to the resources that are relevant' (Olivier 2020a:122). The use of different modes also implies combining them for effective communication and, by implication, learning.

Moreover, the use of different modes emphasises the importance of not only approaching each mode individually but also considering the 'multimodal orchestration' (Hafner & Ho 2020) or the way multimodal resources are combined. In addition, Smith et al. (2019:14) note that it is 'important to identify the families of modalities that offer the greatest potential synergistic benefits', as they foresee 'some combinations of modalities may have overlap in their diagnostic power, while others will exhibit great complementarity'.

Using SDMAs can contribute to assessment relevance. Within this context, Fjørtoft (2020:9) found, in using MDCAs, 'teachers can tailor assessment practices in the classroom and select the modes of representation most likely to provide relevant evidence of student learning, increase student engagement, and stimulate creativity'.

Both students and teachers should be prepared and empowered to implement SDMA. This implies training teachers and supporting specific skills of students.

Training and preparing for self-directed multimodal assessment

It is particularly important that teachers are sufficiently trained and supported in using multimodal assessments. This view is expressed in the literature, as teachers must be informed and prepared to use multimodal assessments (Tran 2019). In this regard, Fjørtoft (2020:3) suggests that 'although the introduction of multimodal and digital approaches offers possibilities for expanding teachers' and students' repertoires, reconceptualizing teachers as designers of multimodal assessment practices remains a challenge'. Similarly, Mok (2009) underscores the importance of teacher capacity building within the context of SLOA.

In a study by Tran (2019), it is noticeable that, although students in this group were positive towards multimodal assessments, only five of 34 students opted to submit a reflection in a mode other than a traditional written document. Tran (2019) ascribed this phenomenon to a lack of skills, a preference for a mode that students feel comfortable with, as well as not being assessed similarly. Similarly, O'Brien et al. (2019) note that students need support to choose different modes of assessment, otherwise they would opt for more traditional modes. However, giving options provide opportunities for students to take charge of not only their learning and specifically assessment but also the vehicle through which they can take place.

The above-mentioned skills for SDMA also rely on specific literacies that must be developed in students.

Literacy and self-directed multimodal assessment

Different literacies are also highly relevant for SDMA. Effective assessment does not only imply the fostering of assessment literacy (cf. Lubbe 2020; Montenegro & Jankowski 2020; O'Brien et al. 2019), multimodal environments and the aim of promoting self-directedness can also imply supporting a range of literacies or multiliteracies (Olivier 2019b). From the literature, it is also clear that assessment literacy can play a role in contributing towards students using various modes of assessment (O'Brien et al. 2019).

Multimodal literacy is a prerequisite for multimodal assessment literacy. This approach to literacy is also prominent because of the increasing importance of different digital technologies. *Multimodal literacy* is also closely related to the concept of *multiliteracies,* and these are sometimes used interchangeably (Tan et al. 2020). The importance of multiliteracies for SDL has also been unpacked by Olivier (2019b), and this emphasises the relevance of SDMA as well. Furthermore, Ross et al. (2020) highlight the importance of multimodal literacy for the sake of multimodal assessments, and they also make a case for multimodal assessment literacy.

This statement implies teacher and student knowledge of semiotics and the different semiotic resources involved. In addition, both parties should have in-depth knowledge of the nature and affordances of different modes of communication and how they function within a specific discipline. The key is ultimately also optimum comprehension and communication and, as such, that the communicative potential of a mode should inform the choice of use or not. Consequently, there should be an active attempt in the classroom to develop and support multimodal assessment literacy towards creating a context conducive to the effective use of multimodal assessment.

Furthermore, Ross et al. (2020) propose a multimodal assessment framework that teachers can use to determine their multimodal assessment criteria. The identified dimensions of the framework by Ross et al. (2020) are as follows:

- 'Form, as well as content, is a vitally important site of criticality in multimodal work.'
- 'Fostering students' creative dispositions and agency is a key benefit of introducing multimodal assignments, but these must be carefully designed to support such development.'
- 'The intra-action of form and content must be recognised in the assessment process, and teachers must seek ways to look holistically at multimodal assignments and to explore with students what this means in practice.'
- '[T]eachers have to consider what they are asking students to do, and how to value it appropriately.' (p. 299; [emphasis in the original])

In this regard, it is essential that all elements of a multimodal assessment artefact are critically evaluated and that not only the text-based elements but also all other modes are included. In addition, the mentioned criticality also pertains to the composition of and interplay between different modes (Ross et al. 2020). The inclusion of creative dispositions and agency highlights the importance of creativity in and as a knowledge creation process. In line with the earlier reference to agency, once again, the assessment itself can and should be a vehicle towards fostering student agency. The above-mentioned framework also highlights the importance of having a holistic view of a multimodal artefact – in this regard, encouraging students to not narrow the focus on only the different elements to be assessed but also the overall work (Ross et al. 2020). This aspect also involves what Ross et al. (2020:301) call a 'holistic evaluation', which should be fostered in students. The final dimension of valuing multimodal assessments involves such assessments not merely being something of less importance in comparison to other assessments.

A further important affordance for SDMA – drawn from the literature on multimodal literacy – is that the process of assessment should be considered and flexible criteria should be employed. Tan et al. (2020) support

'acknowledgement and value of process, not just of the artefact, and flexible assessment criteria that develop learners' meta-semiotic awareness and metalanguage of multimodal texts'. From this quote, the importance of metalanguage in general is evident and consequently, the need for collaborative – teachers and students – development of a metalanguage for SDMA is essential.

In light of the foregoing discussion of the broader SDMA framework, some practical recommendations are made in the 'Recommendations for equitable and differentiated self-directed multimodal assessments' section.

Recommendations for equitable and differentiated self-directed multimodal assessments

The following practical recommendations are made for using equitable and differentiated SDMA:

- Teachers who consider using SDMAs should – as is suggested for MDCAs (Fjørtoft 2020) – ensure that the specific type of assessment is appropriate for the specific assessment and context.
- The implementation of SDMAs can be done cooperatively and in line with Lubbe's (2020) approach to cooperative learning-embedded assessment and especially with the aid of various multimodal technologies which make cooperative learning possible asynchronously and over distance. Similarly, it has been determined that participative assessment practices can contribute to developing SDL skills (Lubbe & Mentz 2019).
- In order to successfully use SDMAs, specific assessment literacies (cf. Lubbe 2020; Olivier 2019b) must be developed in students. Fjørtoft (2020) also highlights the importance of technology-specific literacies.
- There is a need for the creation and/or standardisation of the metalanguage around SDMA in order for both students and teachers to be able to describe and adequately discuss such types of assessments.
- In setting criteria for SDMAs, teachers should consider criticality, creativity, holism as well as assigning appropriate value to the assessments as per the framework by Ross et al. (2020).
- Teachers can also consider that students be part of the process of setting up rubrics for SDMAs (cf. Ross et al. 2020; Tan et al. 2020), as this would not only allow for teachers to draw on students' knowledge of different digital modes but can also be a learning opportunity in itself.
- Self-directed multimodal assessments should be informed by appropriate and detailed data aggregation (cf. Montenegro & Jankowski 2020) to not only support equitable assessment but also gauge preferences and skills for the mode of assessment.

- Multimedia design principles should be considered when setting up SDMAs. These design principles include the multimedia, temporal contiguity, spatial contiguity, coherence, redundancy, modality, individual differences, as well as direct manipulation principles (Fadel & Lemke 2012).
- As with SLOA (Mok 2009), SDMAs also require commitment from management and the whole institution to embrace and promote self-directedness and multimodality in assessments and related policies.
- Self-directed multimodal assessment implies authentic tasks, and in a multimodal environment, this can be done effectively through the use of digital technologies (cf. Russell 2019).

Furthermore, SDMA implies rethinking the criteria for assessing student assessment artefacts. In this regard, in their research on multimodal compositions, Hafner and Ho (2020) list the following aspects that must be considered and could also be of value for other types of multimodal assessments:

- creativity and originality
- organisation
- language
- delivery, modal interaction
- variety
- genre.

Self-directed multimodal assessment can also draw from the requirements for SLOA. Therefore, there should be external feedback by both teachers and peers and also internal feedback through self-monitoring and self-assessment by students themselves (Mok 2009). Such processes can easily be handled multimodally through sound- or video recordings or even other modes of delivery and especially through multimodal environments where online and digital learning spaces can be structured to prompt reflections and assessments. In addition to the focus on awareness around metacognition as well as cognitive learning strategies, Mok (2009) highlights the importance of motivation in self-efficacy, self-regulation and ultimately self-direction. Once again, as with feedback, not only can student evaluation and reflection in this regard take place multimodally, but data can also be generated in multimodal environments on levels and the nature of motivation, self-efficacy, self-regulation and even self-direction. This, in turn, can inform the structure of activities in learning management systems as well as the broader learning process.

Self-directed multimodal assessment also implies effective use of digital technologies to inform the learning and assessment process. To this end, teachers must consider the advantages of student response systems and quizzing apps to obtain student input and feedback (Russell 2019). In support of open education (cf. Olivier 2019a, 2020b), SDMAs can be shared online with appropriate licensing such as Creative Commons (Ehlers 2013).

Self-directed multimodal assessment may also involve both technology-enabled and technology-enhanced assessment items. In this regard, *technology-enabled* items are multimodal by nature, as they 'contain media, such as video, sound, animations, and simulations that cannot be presented on paper', whereas *technology-enhanced* items emphasise student agency in the creation of multimodal artefacts, as the items 'require test-takers to demonstrate knowledge, skills, and abilities using methods for producing a response that differs from selecting from a set of options or entering alphanumeric content' (Russell 2019:228).

As with any innovation with assessment, implementing SDMA would require support from management and embedding the approach in the institutional culture (cf. Montenegro & Jankowski 2020).

Conclusion

In conclusion, in implementing SDMA, students should not be made to (Montenegro & Jankowski 2017):

> [*C*]onform to the ways of higher education, thus reinforcing inequities and expectations based on ideologies the students may not ascribe to, but to empower students for success through intentional efforts to address inequality within our structures, create clear transparent pathways, and ensure that credits and credentials are awarded by demonstration of learning, in whatever form that may take. (p. 16)

Hence, SDMA implies a more nuanced and diverse approach to the modes of communication involved in assessment. It further implies a democratisation of the assessment process through greater involvement of students as they are the potential experts of the digital multimodal sphere. Furthermore, student agency is central to SDMA as they should take charge and be integral to the whole assessment process.

In this chapter, the concept of SDMA was explored as a phenomenon that should be considered in a digital and increasingly multimodal educational context. As regards learning as communication, the lens of multimodality can also be used to approach assessment. Furthermore, SDL was underlined as an integral facet of the assessment process. The author therefore highlighted SDL-oriented assessment and student agency as central to any implementation of SDMA. The shift from monomodal to multimodal assessments was interrogated in light of the broader discourse on multimodal learning and ultimately the relevance of multimodality and different modes of assessments. In addition, aspects of equitable and differentiated assessment were briefly discussed. Finally, an overall framework for SDMA was presented, and recommendations were made for equitable and differentiated implementation of SDMA.

Chapter 4

Aligning metaliteracy with self-directed learning to expand assessment opportunities

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Abstract

Metaliteracy is a holistic model that emphasises information-related knowledge attainment whilst challenging individuals to take charge of their learning strategies and goals. It prepares learners to become informed consumers and responsible producers of information. Metacognition is a core concept in metaliteracy, just as it is in SDL and in methods of assessment appropriate to SDL, such as AaL and AfL. This congruence provides clear avenues for using metaliteracy's framework in ways that support SDL. The first part of the chapter explores metaliteracy and its connections with SDL and assessment. The remainder of the chapter provides two examples of how the intersection of metaliteracy, SDL and assessment might be addressed in practice. These case studies provide additional and practical connections that might suggest applications in other settings. The first section explores a comprehensive metaliteracy digital badging system that is designed to advance SDL, with a focus on how the self-directed unit from this system was adapted for use in an open textbook. The final section of the chapter provides an example of how an online undergraduate course intertwines metaliteracy, information literacy and editing on Wikipedia, exemplifying principles of SDL and providing examples of AaL and AfL.

Introduction

Metaliteracy is a pedagogical framework that prepares individuals to be empowered and self-directed learners to actively create meaningful content and participate constructively in social information environments (Jacobson & Mackey 2013; Mackey & Jacobson 2011). Metaliteracy's emphasis on the four learning domains – affective, behavioural, cognitive, and metacognitive – provides strong links with SDL, AfL and the related AaL. The metaliteracy goals and their associated learning objectives, roles and characteristics provide additional connections. Whilst focused synergies will be examined in this chapter, it is worth noting that if an individual strives to be metaliterate, they are per definition a self-directed learner who takes responsibility for their own learning.

There is no academic major, no certificate programme, no continuing education course that employs instructors to teach individuals to be metaliterate and certify them as such when the programme has ended. Nor is the goal of being a metaliterate learner an activity with a finite end. Rather, becoming metaliterate is a lifelong quest that requires commitment in the face of changing modes of participation, and frequent transformations in the opportunities and platforms for information creation, sharing and collaborative engagement. Becoming metaliterate is a lifelong practice of SDL, reinforced by the metaliteracy framework and a wide range of open educational resources (OERs). A central figure to SDL is Malcolm S. Knowles (1975), who provides the following classical definition of the concept:

> SDL is 'a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies and evaluating learning outcomes'. (p. 18)

Hence, this process is student-centred and the teacher acts in a facilitator's role. In this regard, there is a distinct move from teachers being facilitators rather than transmitters of learning (Loeng 2020; Robinson & Persky 2020).

This chapter will explore and make explicit the interconnections between metaliteracy and SDL, and identify the assessment methods most appropriate for determining one's progress towards metaliteracy. Finally, this chapter concludes with two examples from the United States of America describing how the intersection of metaliteracy, SDL and assessment might be addressed in practice.

The metaliteracy framework

Metaliteracy prepares learners to become active and informed consumers and ethical producers of information (Jacobson & Mackey 2013; Mackey & Jacobson 2011). Metaliterate learners mindfully reflect on their learning and define the direction of their ongoing intellectual development (Mackey & Jacobson 2014). They assess what and how they learn to advance SDL that is reinforced by the metaliteracy model.

As originally conceived (Mackey & Jacobson 2011):

> Metaliteracy promotes critical thinking and collaboration in a digital age, providing a comprehensive framework to effectively participate in social media and online communities. It is a unified construct that supports the acquisition, production, and sharing of knowledge in collaborative online communities. (p. 62)

Introducing the framework

Through this framework, individuals hone their abilities to think critically and adapt to social settings that are often mediated by emerging technologies. As part of this dynamic process, individuals learn to continuously evaluate all forms of information through evolving media formats, whilst also understanding that they are empowered to produce and share knowledge in a multitude of collaborative and connected spaces. In these social settings that rely on contributions from participants (Mackey & Jacobson 2014):

> [*M*]etaliteracy expands the scope of how to use these spaces as individuals and requires a critical perspective that reflects on the networked environment itself and how knowledge is produced and shared. (p. 4)

The *meta* prefix in metaliteracy signals the key themes that define this pedagogical framework (Mackey & Jacobson 2014). Metaliteracy is closely aligned with metacognition as introduced by Flavell, who argues for a reflective process that generates insights for individuals about their thinking whilst allowing them to self-regulate or control their learning (Flavell 1979). As Flavell (1979) argues, metacognition:

> [*C*]ould someday be parlayed into a method of teaching children (and adults) to make wise and thoughtful life decisions as well as to comprehend and learn better in formal educational settings. (p. 910)

This vision for metacognition indicates how reflection supports individuals in generating new insights about their thinking and preparing them to take charge of their learning. As Flavell argues, metacognitive reflection supports improved learning in formal instructional environments whilst also becoming a part of one's lifelong journey. As a key part of the metaliteracy framework, metacognition is empowering because it shifts the emphasis 'beyond rudimentary skills development and prepares students to dig deeper and assess their own learning' (Mackey & Jacobson 2014:13).

The *meta* prefix in metaliteracy suggests part of the Greek meaning of the word, that of *after* or *beyond* (Lexico 2020). Whilst literacy is generally associated with reading and writing, and traditional definitions of information literacy emphasise search, retrieval and evaluation, metaliteracy scaffolds learning by building upon these abilities to advance active participation and the production of new knowledge. The *meta* prefix also suggests a higher level of abstraction, such as a *metalanguage* (Lexico 2020), denoting metaliteracy as a comprehensive framework rather than a linear or hierarchical skill set. In many ways, metaliteracy is a model that is *about* literacy and that encourages learners 'to understand their existing literacy strengths and areas for improvement and make decisions about their learning' (Mackey & Jacobson 2014:2). In this context, individuals strive towards higher-level awareness about their learning through a nonlinear and decentred model rather than a formulaic set of skills or outcomes (Mackey & Jacobson 2014:91–92). Metaliterate learners who develop 'his or her own metacognitive perspective will find that the flexibility so often found in real-world situations fits easily within this framework' (Mackey & Jacobson 2014:92).

Metaliteracy reinforces SDL with an emphasis on student agency and continual reflection and growth. Metaliterate learners are encouraged to 'critically self-assess different competencies' through metacognitive reflection (Mackey & Jacobson 2014:2). Gaining a self-awareness of one's own literacy through self-reflection is essential to metaliteracy because metaliterate learners 'critically evaluate and understand their knowledge as individuals and participants in social learning environments' (Mackey & Jacobson 2014:14). In doing so, the self-assessment process varies depending on an individual's

existing knowledge and learning goals and does not always follow the same prescribed pathway. The flexibility of this approach means that individuals who 'apply principles of the metaliteracy model in practice will find that the objectives can be met in a variety of different ways, depending on the learning context' (Mackey & Jacobson 2014:92). This variation mirrors Gibbons' (2002:111) observation on the SDL sequence of activities more generally, '[t]he criteria of success, just like the tasks that they are pursuing, vary from student to student'.

The core components of metaliteracy

Metaliteracy is a holistic model that emphasises information-related knowledge attainment whilst challenging individuals to take charge of their learning strategies and goals (Mackey & Jacobson 2014). In order to achieve this comprehensive approach, the metaliteracy model integrates four core components that include the learning domains, learner roles, characteristics and the related goals and learning objectives (Mackey, Jacobson & O'Brien 2020).

Learning domains

The learning domains are central to the metaliterate learner and recognise that individuals embody multiple spheres of learning and knowing (Jacobson, Mackey & O'Brien 2018; Mackey & Jacobson 2014). Bloom's Taxonomy originally included three specific learning areas, including 'the cognitive, the affective, and the psychomotor domains' (Bloom 1956:7). The metacognitive dimension was added to Bloom's classification system for the design of learning objectives in a later revision (Krathwohl 2002:214). As a pedagogical framework, metaliteracy builds a foundation for SDL through all four domains that include the affective (feelings and attitudes), behavioural (skills and actions), cognitive (thinking and knowing) and metacognitive (reflective and self-regulating). The affective domain addresses a person's emotions and attitudes that deepen comprehension about how they may perceive an information situation or context. Being aware of the affective domain prepares learners to investigate feelings and beliefs to analyse the impact of this domain on their thinking and actions. The behavioural domain emphasises the competencies that learners acquire through learning activities. Traditional definitions of information literacy tend to emphasise primarily skills development as reinforced through learning outcomes (American Library Association 2000). From a metaliteracy perspective, the behavioural domain is understood within the context of all four domains so that learners build upon skills and gain new ones through reflection, thinking and action in a connected world of information.

The cognitive domain focuses on an individual's thinking and knowing. Similar to the behavioural domain, the cognitive area often involves learning outcomes that advance skills and actions. Metaliteracy reinforces these important intersections but also considers a learning dynamic that encompasses all four areas. Pivotal to this model is the metacognitive domain that sparks reflective insights about one's thinking, feelings and actions whilst supporting individuals in taking charge of their learning. According to John H. Flavell, metacognition provides 'opportunities for thoughts and feelings about your own thinking to arise and, in many cases, call for the kind of quality control that metacognitive experiences can help supply' (Flavell 1979:908). This is an empowering concept for self-directed learners because reflection increases understanding about the cognitive and affective aspects of learning whilst also supporting the ability to analyse and discern quality in thought and action. Through this approach 'metaliterate students will be prepared to fill the gaps in learning and develop strategies for understanding more than what we, as teachers, present or discuss' (Mackey & Jacobson 2014:13). The ongoing assessment of individual goals and progress that is gained through reflection provides learners with the capacity to self-regulate their learning.

By framing the learning process through four interrelated domains, metaliteracy encourages individuals to see how they learn and grow in these different areas. This unified approach to teaching and learning demonstrates how the four domains are both interrelated and integrated. For instance, learners may not necessarily be encouraged to explore their emotional response to information, but these affective insights are valuable. For example, to avoid *confirmation bias*, which is 'seeking out and interpreting data in a way that strengthens our preestablished opinions' (Sharot 2017:22), it is critical to investigate one's feelings and attitudes about information and related issues. This requires metacognitive reflection and the cognitive ability to be objective in research and to seek out multiple perspectives as part of this process. This approach to critical inquiry values the ability to identify and think outside of one's own perspective or viewpoints. In addition, a person's affective response to a particular topic or concern may be a motivating factor to conduct an objective research inquiry to inform action. Imagine the individual who feels so strongly about climate change, for instance, that this emotional connection to the topic is a motivating factor to embark upon critical inquiry. As Flavell (1979:906) suggests, metacognition also provides awareness about the beliefs that learners have regarding their learning. Metaliteracy supports SDL by foregrounding the relationships amongst the four domains so that learners assess their educational needs and achievements from these associated perspectives.

Learner roles

The metaliterate learner roles are central to this framework because these responsibilities provide a real-world context for SDL. The learner roles are defined as a way to unify the different components of the metaliteracy model because 'the domains are fluid, representing a comprehensive and interrelated set of goals and learning objectives that lead to empowering roles' (Mackey & Jacobson 2014:91). Paulo Freire's central critique of what he describes as the banking model of education makes clear that learners are not empty vessels to be filled with deposits of knowledge by teachers (Freire 2000:72). He argues that '[w]hereas banking education anesthetizes and inhibits creative power, problem-posing education involves a constant unveiling of reality' (Freire 2000:81). As active participants in social settings, metaliterate learners do not simply gain skills by achieving outcomes alone, and instead envision themselves in real-world roles and scenarios. Each of these responsibilities relates in one way or another to the evaluation, production and sharing of information (Mackey & Jacobson 2014).

Metaliteracy provides a context for the development of SDL and OERs that supports the reflection upon the roles that individuals may already play as well as those responsibilities that are new to them (Jacobson et al. 2018). Metaliterate learners engage with these ideas and resources to improve upon the roles they identify with whilst striving towards new responsibilities as well. These roles are applicable to teaching and learning scenarios that promote active metaliterate learning. In one example, for instance, Professor Sally Friedman of the Political Science Department at the University at Albany developed a reading assignment for learners to reflect on the active roles they play (Jacobson & Friedman 2019). In another example, a set of questions have been designed to apply the learner roles in a variety of educational settings (Jacobson et al. 2018). The learner roles have been applied in three different Massive Open Online Courses (MOOCs), including a connectivist MOOC and two xMOOCs to support student agency in these environments (O'Brien et al. 2017). The metaliterate learner roles are central in the Coursera MOOC *Empowering Yourself in a Post-Truth World* that reinforces the learner as producer role in particular for a culminating project that requires the creation of a digital artefact (Mackey 2020).

The central metaliterate learner role is producer, because it signals the crucial shift from consumer to creator of information. Robert Scholes (1985) argued that the academic boundaries between consumer and producer need to be better understood because reading itself is 'not simply as consumption but as a productive activity' when learners make meaning through this process and refer back to 'prior texts' as a continuous and critical learning activity

(Scholes 1985:8). As text evolved to hypertext, George P. Landow (1992) envisioned a collaborative space that shifts the consumer to be a producer because individuals make decisions about which pathways to pursue through linked documents as 'newly empowered, self-directed students' (Landow 1992:120). In his original design for the Web, Tim Berners-Lee (2000) emphasised the importance of a hypertext editor because he envisioned 'an intimate collaborative medium' although he realised that it initially became more of a means for the publication of documents (Berners-Lee & Fischetti 2000:57).

The metaliteracy framework empowers learners to responsibly produce and share content in participatory environments (Mackey & Jacobson 2011, 2014). The learner as producer role takes into account the interconnected aspect of collaborative media and prepares learners to adapt to these social technologies. This pivotal responsibility supports related roles such as the researcher who engages in a process of critical inquiry to assess and create information and the communicator who effectively conveys ideas and engages with others in social settings. The communicator role is closely aligned with the participant who understands social contexts and contributes to communities in a meaningful way. This responsibility benefits from an awareness of the collaborator role so that learners conscientiously work with others in these connected spaces. Metaliterate learners are translators who adapt ideas from one artistic form to another or who create media across different platforms. Through this process, individuals are authors who not only write text documents but also gain the ability to author digital projects by combining text, image, sound and video elements.

As a producer of dynamic information, learners also need to understand the contexts and responsibilities associated with publishing content. Through the publisher role, learners actively write, edit, produce and remix information for external audiences. This process necessitates an awareness of how to share content through a publishing medium such as a blog, wiki, social media platform or independent website. It also requires an understanding of how to properly identify and attribute digital materials that are openly licensed through a global community such as the Creative Commons. Additionally, publishers make decisions regarding how to license their own work. As part of this shared process in producing and publishing information in participatory settings, 'the learner is also a teacher and each individual is a collaborative partner in the learning experience' (Mackey & Jacobson 2014:13). This is an especially empowering insight for self-directed learners who assess and regulate their learning with the purpose of expanding their knowledge whilst sharing it with others in connected social settings.

Characteristics

As metaliterate learners expand their roles through the lens of the four learning domains, they strive towards specific metaliteracy characteristics (Mackey 2019). These attributes align closely with the learner roles and define specific qualities to aspire to as part of the learning process. The *productive* characteristic is gained through the active creation of dynamic content in collaborative communities. Individuals learn to be *reflective* about what and how they create information whilst being ethical and responsible in doing so. These qualities require the *collaborative* characteristic to support the co-creation of knowledge as a purposeful social activity. Being *participatory* is a related attribute that learners aspire to as they understand the environments within which they engage and the attendant issues or concerns when doing so. In social media environments, for example, individuals need to be aware that misinformation and disinformation easily circulate without authoritative editorial mechanisms. Considering the ongoing changes in technology, learners must be critically *adaptive* to new systems whilst asking good questions about the influence of proprietary platforms and bad actors within these spaces. Additional characteristics include being *informed* about the authenticity and reliability of information and *open* to new ideas and different perspectives. In today's divided information environment, metaliterate learners need to gain the *civic-minded* characteristic to reinforce an individual's responsibility to their community (Mackey 2019).

Goals and learning objectives

The metaliteracy goals and learning objectives constitute the fourth core component of this comprehensive framework. The four goals include the following (Jacobson et al. 2018):

1. actively evaluate content whilst also evaluating one's own biases
2. engage with all intellectual property ethically and responsibly
3. produce and share information in collaborative and participatory environments
4. develop learning strategies to meet lifelong personal and professional goals.

The four overarching goals are reinforced by several related learning objectives that are identified with the most salient learning domains (affective, behavioural, cognitive and metacognitive). For instance, the first goal about evaluating bias is supported by an affective and cognitive objective to validate the expertise of information and related sources whilst also recognising that experts actually do exist in society. The second goal, to advance responsible engagement with intellectual property, is supported by

a metacognitive objective to reflect on how to ethically incorporate someone else's intellectual property into your own work. The third goal, related to producing and sharing information, is reinforced by the affective and metacognitive objective to envision oneself as both a consumer and producer of information. Lastly, the fourth goal, about developing strategies for meeting lifelong learning goals, is reinforced by a metacognitive objective to value this approach as part of one's lifetime practice. Additional objectives are tagged with either one or combinations of the learning domains to advance metaliterate learning. This open resource is scalable to a multitude of educational settings and has been translated into a number of languages, including Afrikaans, French, German, Italian, Portuguese, Setswana and Spanish (Metaliteracy.org 2019).

Through the core components of metaliteracy, individuals develop the capacity to better understand their active roles for engaging with and producing reliable and responsible information. They gain a new perspective on how they approach learning situations and develop self-directed strategies whilst striving towards the characteristics of the metaliterate learner.

Self-directed learning viewed through the lens of metaliteracy

The concept of SDL is not new and has been integral to learning in diverse contexts and is consequently also relevant for metaliteracy. The scholarly engagement with this concept harks back to the work of Lindeman (1926), Houle (1961) and Tough (1968) and a number of works on andragogy or adult education and self-education (Brockett & Hiemstra 2019; Garrison 1997; Gibbons 2002; Loeng 2020; Zhu, Bonk & Doo 2020).

Defining self-directed learning

Epistemologically, Loeng (2020:5) situates SDL in what this author calls romantic humanism as it 'emphasizes to a great extent that the human being has the power for personal development'. Whilst Van der Walt (2016) describes SDL as a pragmatic theory with roots in self-determination theory.

A definition for SDL by Malcolm S. Knowles was provided at the beginning of this chapter, but another perspective is provided by Gibbons (2002), who defines SDL as follows:

> SDL is any increase in knowledge, skill, accomplishment, or personal development that an individual selects and brings about by his or her own efforts using any method in any circumstances at any time. (p. 2)

In addition to these definitions emphasising the process aspect of SDL, it has also been described as a learner characteristic that is not dichotomous in

nature but rather occurs dynamically on a continuum (Brockett & Hiemstra 2019; Garrison 1992). Candy (1991) distinguishes between two processes, learner-controlled instruction and autodidaxy, as well as two personal attributes, self-management and personal autonomy, emphasising the relevance of SDL for both informal and formal learning contexts.

Despite SDL's focus on the individual, it by no means implies student isolation or total independence (Candy 2004). In this regard, Brockett and Hiemstra (2019) emphasise that students should take responsibility for their own learning, but that the learning itself can take place within a group. In an SDL context, both teacher as facilitator and peers can play important roles through established learning partnerships (Brockett & Hiemstra 2019). In addition, implementing cooperative learning strategies has been proven to have a positive effect on perceived SDL readiness (Mentz & Van Zyl 2018). Hence, as with metaliteracy, SDL is also closely associated with collaboration in the learning process.

Within the context of this chapter on metaliteracy, the following requirements identified by Loeng (2020:10), in addition to controlling the learning situation, show the intersections between SDL and metaliteracy: 'willingness to reflect, critical judgement, and necessary knowledge of alternatives'.

Approaches to self-directed learning

Various authors have provided models and schemes to describe SDL. Firstly, Knowles (1975) provides six steps to developing a learning contract as a means to facilitate SDL in contexts where there are external requirements and where there is a need to align or link these up with students' own needs. In a similar fashion, Gibbons (2002) refers to student learning agreements. Consequently, within the context of metaliteracy, the requirements of this concept can also potentially be reconciled with students' own goals by means of an embedded learning contract or agreement.

Bosch, Mentz and Goede (2019) provide an overview of key models of SDL, including Long's instructional model for SDL, Candy's SDL model, Brockett and Hiemstra's personal responsibility orientation (PRO) model, Garrison's model and Oswalt's model. Brockett and Hiemstra (2019:57) proposed the PRO model to 'recognize both the differences and similarities between SDL as an instructional method and learner self-direction as a personality characteristic'. This model also emphasises personal responsibility and both the learning process and self-direction of the learner as well as wider factors within the social context.

The importance of the online context was evident in the first part of this chapter and consequently SDL also needs to be considered within this milieu.

Self-directed learning and the online environment

The affordances of online environments for SDL are clear. Zhu et al. (2020) note the importance of SDL for successful learning online and specifically in MOOCs. In this regard, Candy (2004) also makes the following observation:

> [*A*]t least some forms of self-directed learning are particularly suited to the online environment, and indeed many recent technological advances are precisely targeted at supporting independent learning and use, there is clearly merit in exploring the linkages at a practical as well as a conceptual level. (p. 4)

Online platforms provide opportunities for collaboration which can be supportive for SDL (Candy 2004). Such opportunities are also highly relevant as SDL is considered a 'collaborative process between teacher and learner' within a context where '[w]e live interdependently and knowledge is socially determined' (Garrison 1992:141). Again, this potential for collaboration ties in with the requirements of some learner roles within metaliteracy.

An important requirement for SDL, identified by Loeng (2020) is phrased as follows: 'As a self-directed learner, you must have minimum control over the time, pace, and place for learning'. Such flexibility is especially true for online environments where learning can be synchronous or asynchronous, self-paced and accessed from wherever metaliterate learners want to access the relevant learning platform.

Furthermore, as the focus of this chapter is also specifically on the role of assessment, within the intersections of metaliteracy and SDL, the concept is also explored further.

Self-directed learning and assessment

Central to learning is assessment and the same applies to SDL. In this regard, Gibbons (2002) highlights the relevance of student self-assessment as an essential skill for SDL. Mok (2009:11) approaches assessment in terms of SDL through the concept of 'SLOA'. Furthermore, Lubbe and Mentz (2019) have found that participative assessment practices can contribute to developing SDL skills. Hence, both in terms of metacognition and a participative approach, clear links can be identified between both SDL and metaliteracy. In addition, Costa and Kallick (2004) advocate for assessment to be in support of SDL and that assessment strategies increasingly contribute to student agency. Ideally, within an SDL context, students should take charge when it comes to what and how assessment takes place. The importance of assessment throughout the whole SDL process is explained by Gibbons (2002) as follows:

> [*S*]tudents should be learning to think about and assess the whole learning sequence: what they have chosen to learn, the process they are following to complete the

> tasks they have chosen, the success with which they are applying their energies to the tasks, and the quality of the results they achieved. (p. 111)

From this statement, the metacognitive role of assessment and the centrality of student agency in terms of assessment is evident. The remainder of the chapter explores the ways in which SDL and assessment can be integrated with metaliteracy's core components.

Integrating self-directed learning and assessment with metaliteracy's core components

This section focuses on the connections between metaliteracy's core components (particularly the four learning domains and select associated learning objectives), SDL and assessment, with an emphasis on AaL. Pertinent to this exploration is the notion of SDL as both a process and as a learner characteristic (Brockett & Hiemstra 2019; Garrison 1992). Metaliteracy is a pedagogical framework that advances several characteristics that reinforce SDL. The flexibility of the learning domains and roles provide real-world context for self-directed learners to actively engage.

Affective learning domain

Metaliterate learners are prompted to recognise the presence and impact of the affective domain. The affective learning domain addresses how one feels when learning, and how that feeling influences learning. Pekrun and Linnenbrink-Garcia (2014:1) note, with an emphasis on learner self-direction, that '[e]motions are both *experienced* in the educational setting as well as *instrumental* for academic achievement and personal growth'. Learning may be hindered when negative feelings that might be overcome are not even noted.

The affective domain also contributes to motivation, such as when learners celebrate strides they have made. In fostering SDL, it is essential to promote enthusiasm and positivity towards students being actively involved in the learning process (Gibbons 2002). Garrison (1997) emphasises the importance of the motivational dimension in his model of SDL. It is important to recognise that '[m]otivation plays a very significant role in the initiation and maintenance of effort toward learning and the achievement of cognitive goals' (Garrison 1997:26). In this context, both *entering motivation* which relates to students wanting to start and *task motivation* which pertains to staying on task and continuing (Garrison 1997) are pertinent. Zhu et al. (2020:2087) emphasise the importance of motivation for SDL in an age of increased online learning and they state that 'the learner must have sufficient motivation, whether intrinsic and extrinsic or some combination thereof, to find, explore, and use the learning platforms made available to them'.

A further relevant aspect in terms of motivation is SRL. The relationship between SDL and SRL is clear from the literature (Garrison 1997); however, they are distinct concepts (Robinson & Persky 2020). In this regard, the scholarship on SRL provides insights in terms of how motivation plays a role in learning, specifically also in terms of self-efficacy and relates to a focus on affective, cognitive and behavioural processes (Robinson & Persky 2020). Motivation contributes to SRL and exists in a dynamic relationship, and furthermore, SRL is positively related to self-efficacy (Pintrich 1999). Importantly, metacognitive experiences can also have an effect on motivation within the SRL context (Efklides, Schwartz & Brown 2018). All these aspects also have an influence on assessment for and as learning as part of the SDL process. With regard to online classes, Darby focuses on Brockett and Hiemstra's (2019) interpretation of SDL. Darby writes, 'we have a powerful tool to fight for online student attention, engagement, and persistence: emotions' (2020). Similarly, Zhu et al. (2020) have indicated the importance of SDL within the context of MOOCs.

It should be considered that '[p]ositive emotions, such as enjoyment of learning and pride, have been linked to intrinsic motivation and interest in students across all ages, including college' (Oades-Sese et al. 2014:247).

In terms of motivation within the learning context, teachers as facilitators also have a role to play. Gibbons (2002) makes the following observation regarding the teacher's roles regarding motivation:

> [*T*]he teacher must motivate students to take on the task of managing their own activities and must then teach them to motivate themselves as an essential aspect of continuing self-direction. (p. 93)

It is clear that students have different levels of SDL and motivation at the start and throughout the learning process. Consequently, support or even interventions might be relevant on the side of teachers. One way that this might be done is by teaching and modelling metaliteracy. Learners who are aware of their feelings about and whilst learning are able to recognise when those feelings are hindering motivation, hampering SRL. The metaliteracy goals and learning objectives include pertinent items. Given the varying impacts of affect, some of these learning objectives are written neutrally. Two learning objectives address the need to 'develop learning strategies to meet lifelong personal and professional goals' (goal 4). These two objectives, which are both affective and behavioural, implicitly acknowledge the effort of staying current as a part of SDL (Jacobson et al. 2018):

- Adapt to new learning situations whilst being flexible about the varied approaches to learning.
- Adapt to and understand new technologies and the impact they have on learning.

Assessment as learning has an important role to play in striving towards the learning objectives. Earl (2013:28) describes it as follows: 'Assessment *as* learning is a subset of assessment *for* learning that emphasizes using assessment as a process of developing and supporting metacognition for students,' which will be considered in the Metacognitive Learning Domain section. However, it should be noted that this assessment may be swift when working towards these two learning objectives, as they are behavioural as well as affective. Not fully succeeding may bring forth frustration (affective) and also the realisation that one has not mastered the adaptations as put forth (behavioural).

A positive climate can be considered nurturing towards student productivity and ultimately also SDL (Gibbons 2002). This aligns with an objective from goal two, 'engage with all intellectual property ethically and responsibly'. This objective, which is metacognitive as well as affective, exhorts metaliterate learners to 'challenge yourself to formulate ethical and novel approaches to build upon the ideas of others that you find exciting and engaging' (Jacobson et al. 2018). Addressed in the positive climate Gibbons describes, it has the potential to inspire creative productivity, which in turn may lead to enhanced motivation.

Another objective, which is affective, behavioural and cognitive, is 'recognize that learners are also teachers and teach what you know or learn in collaborative settings' (goal 3). This objective foregrounds a role, Teacher, and accompanying opportunity that is within reach through SDL. This aspect also ties in with the view by Knowles (1975) that others can act as human resources in the SDL process and that peers can play an important role in the learning process (Brockett & Hiemstra 2019). One can aspire to expertise in a particular area whilst continuing to learn in others. This recognition of motivation in directing one's own learning can lead to a pride of mastery.

Metacognitive learning domain

The idea of the learner as teacher epitomises the empowering and SDL aspects of metaliteracy. As a learning objective, individuals are encouraged to recognise their roles as teachers when sharing their knowledge in collaborative environments. This objective supports an overarching goal to produce and share information collaboratively, which is another core concept of the metaliteracy framework.

Metaliteracy encompasses roles beyond simply that of the teacher and requires mastery of additional learning objectives. Determining when one might be ready to teach others requires engagement with learning domains beyond the affective. An individual must reflect on what they do or do not

know (metacognitive learning domain), develop a plan to fill gaps (cognitive) and then take the steps necessary to fill those gaps (behavioural).

The AaL that individuals undergo as preparation to teach others may emanate from formal or informal SDL initiatives, or from learner self-direction. However, learners must recognise the value of such assessment and engage in it for themselves as needed. In the case of the learner as teacher, the assessment may produce feedback swiftly. Is the person being taught understanding? Grasping the content? The individual who is serving as teacher may reflect on the experience, in the moment or subsequently, and recognise gaps to address or be further motivated by successes. Or both. Peer review is also appropriate at times when learners are serving as teachers. In the process of assessing each other's work, students also take on the role traditionally associated with teachers.

Apart from the prominence of metacognition for metaliteracy, metacognition is also essential for SDL. The commonly cited definition of metacognition comes from Flavell (1976:232), where it is regarded as 'one's knowledge concerning one's own cognitive processes and products or anything related to them'. This definition ties in well with the metaliteracy idea of student as producer and hence students in this context should be aware of the processes and products involved.

It is clear that metacognitive strategies can have a positive influence on students' self-direction (Breed & Bailey 2018; Evans 2018; Mariano & Batchelor 2018). Different strategies have been proven to support metacognition including cooperative, process-oriented and problem-based learning (Breed & Bailey 2018; Mariano & Batchelor 2018). When it comes to assessment, the affordances for SDL in embedding metacognitive strategies within assignments are evident (Kincannon, Gleber & Kim 1999). In this context, Evans (2018:4) also advocates for 'appropriate learning experiences and environments that support open-ended learning so as to balance autonomy, ambiguity, and student motivation'.

This chapter has discussed the learning objective 'See oneself as a producer as well as consumer of information' in support of goal three to 'produce and share information in collaborative and participatory environments' in connection to the learner roles (Jacobson et al. 2018). This objective involves both the metacognitive and the affective learning domains. Gibbons (2002) recognised the importance of assessment during the full SDL process. In connection with the learner as producer role and learning objective, a learner's reflective assessment of an information product will provide feedback on the quality of the result and, in the realm of the affective domain as well as the metacognitive, the success of their engagement in the learning process.

When a learner is producing non-disposable or renewable assignments (NDA), those that have a life beyond assessment by the instructor, they are often more engaged and excited. Seraphin et al. (2019:86) review the literature on NDAs, which provide evidence that they 'build intrinsic motivation and consistently promote self-directed productivity'. Seraphin et al. (2019) add:

> [*C*]ultivating intrinsic drives [...] through the production of work that is perceived to be meaningful and valuable may yield greater classroom achievement and learning productivity as well as enhanced well-being, among other self-reflective evaluations [...]. (p. 186)

Metacognition is a core concept in metaliteracy, just as it is in SDL and AaL. This congruence provides clear avenues for using metaliteracy's framework in ways that support SDL.

Cognitive learning domain

The cognitive learning domain lends itself to AfL over time, particularly because striving to be metaliterate is a continuing process. Importantly, '[a]ssessment for learning shifts the emphasis from summative to formative assessment, from making judgments to creating descriptions that can be used in the service of the next stage of learning' (Earl 2013:27). Hawe and Dixon (2017:1182) differentiate between AfL and formative assessment through the emphasis in AfL on learning and the role of the learner. This check-in on learning might be done in a course setting (Costa & Kallick 2004):

> Constructivist teachers realize that cognitive growth occurs when individuals revisit and reformulate a current perspective. Therefore, teachers provide data, present realities, and pose questions for the purpose of engendering contradictions to students' initial hypotheses, challenging present conceptions, illuminating another perspective, and breaching crystallized thinking. (p. 81)

Students may also initiate exploration. Examples of cognitive metaliteracy learning objectives that have the potential to encourage learners to actively consider, analyse and evaluate emanate from several goals. The following objectives reflect both the cognitive and the behavioural domains (Jacobson et al. 2018):

- Learning objective 8 from goal 1: Evaluate user-generated information in social media environments and differentiate between opinion and fact.
- Learning objective 5 from goal 3: Translate information presented in one manner to another in order to best meet the needs of a particular audience.
- Learning objective 7 from goal 4: Effectively communicate and collaborate in shared spaces to learn from multiple perspectives.

These learning objectives exemplify the constructive process of knowledge production that Costa and Kallick (2004) describes:

> Knowledge is a constructive process rather than a finding. It is not the content stored in memory but the activity of constructing it that gets stored. Humans don't get ideas; they make ideas. Meaning making is not just an individual operation. The individual interacts with others to construct shared knowledge. There is a cycle of internalization of what is socially constructed as shared meaning, which is then externalized to affect the learner's social participation. (p. 118)

As the dual-domain nature of these three learning objectives indicates, the behavioural learning domain is often inextricably connected with the cognitive. In order to show that learning has taken place, often an action needs to be performed, one that might be assessed. Therefore, it is appropriate to transition to this last of the four learning domains.

Behavioural learning domain

The behavioural domain might usefully address both teacher behaviour and student behaviour. Beginning with the behavioural learning domain's connection with SDL in regard to the former, Gibbons (2002) emphasises the role of teachers modelling SDL behaviour themselves in order to contribute to the motivation of students. This scaffolding, whilst contributing to behavioural efficacy, also has the potential to address the affective component of learning. Learners who are hesitant about how to proceed now have an example to follow. This modelling should include examples of how to resolve difficulties, so that through their actions students can 'be proud of their ability to identify and resolve the difficulties they confront' (Gibbons 2002:101). It should also show students how to (Gibbons 2002):

> [*T*]hink about and assess the whole learning sequence: what they have chosen to learn, the process they are following to complete the tasks they have chosen, the success with which they are applying their energies to the task, and the quality of the results they achieved. (p. 111)

Once students have learned how to follow a path of SDL, they will incorporate behaviours that enhance their goal of being a metaliterate learner, such as addressing those learning objectives listed in the cognitive domain section above. Strengthening individual characteristics will involve a range of assessment methods, often ones that include peer as well as self-review.

Metaliteracy, assessment and self-directed learning in action

The remainder of the chapter provides two examples of how the intersection of metaliteracy, SDL and assessment might be addressed in practice. These case studies provide additional and practical connections that might suggest applications in other settings. The first section explores a comprehensive metaliteracy digital badging system that is designed to advance SDL. Particular

attention is focused on the self-directed challenge from this system and how it was adapted for use in an open textbook. The final section of the chapter provides an example of how a credit-bearing online undergraduate course intertwines metaliteracy, information literacy and editing on Wikipedia, exemplifying principles of SDL and providing examples of AaL and AfL.

Adapting a self-directed digital badging challenge to educational planning

The metaliteracy digital badging system is an interactive competency-based resource that is organised around a constellation of metaliteracy concepts. Learners pursue quests, challenges and content badges in a scaffolding of activities that ultimately lead to four master badges: Master evaluator, producer and collaborator, digital citizen, and empowered learner (Metaliteracy.org 2014). This interactive environment engages learners with the content and leads to the completion of this work through specific writing assessments or short media projects. These activities are completed individually or through the guidance of an instructor or librarian associated with a disciplinary course at the University at Albany, SUNY (O'Brien 2018). The content for this system has been developed by a number of authors, including faculty and students, and is available as an OER that is available to everyone through a Google Sites website (Metaliteracy.org 2014).

The self-directed challenge discussed in this section was adapted from the original badging content for a Lumen Learning open textbook developed by Dr Susan Oaks, who is a Professor at SUNY Empire State College (Lumen Learning n.d.a). This repurposing of the challenge for the open textbook supports a required course at the college in Educational Planning that all students take to design their unique degree concentrations. This is an ideal application of this badging challenge because degree planning at SUNY Empire State College is a reflective process in which self-directed learners work individually with a mentor to design their program of study (Herman & Mandell 2004). This requires students to assess their transcript credit, determine if their life experience should be evaluated for college credit through prior learning assessment (PLA) and then combine these elements with new studies to develop a unique degree programme. As Herman and Mandell argue, 'Educational planning, including PLA, not only opens the academy to non-traditional students; it opens the academy to non-traditional learning' (Herman & Mandell 2004:110). In the context of the Educational Planning course and open textbook, the competency-based digital badging challenge supports students in fostering self-direction as they engage in the degree planning process (Lumen Learning n.d.b).

As seen through this descriptive analysis, the self-directed challenge is adaptable as a single unit, which allows it to be developed as a learning activity for the open textbook. It is also organised as part of the original badging system and open website that includes four high-level badges, including a top-level metaliteracy badge that requires achieving all of the others. According to Information Literacy Librarian Kelsey O'Brien (2018), who designs and manages this system and site:

> Metaliteracy places the emphasis on the learner by fostering learner agency, ownership and identity. Likewise, the Metaliteracy Badging System is oriented around the metaliterate learner. Both in content and structure, the system guides students as they explore their roles as empowered learners and contributors, reflecting on their own thinking and learning processes and recognizing their achievements as the fruition of both their successes and failures. (p. 186)

In this context, the pursuit of digital badges enacts metaliteracy through creative and inventive learning activities that are powered by the metaliteracy goals and learning objectives. Central to this process is metacognitive reflection that allows for meditative thinking and awareness about one's own knowledge discoveries and individualised learning through the badging journey. By cultivating learner agency, metaliteracy reinforces a key dimension of SDL that plays out as participants achieve competencies through the quests, challenges and content badges.

The badging content is built on a foundation provided by metaliteracy's core components especially related to metacognition and the learner as producer role. The influence of metaliteracy plays out in the design of the interrelated materials as well, including the embedded quests and challenges. The self-directed challenge is part of the metacognitive reflection quest and leads to the Empowered Learner badge. The badge activity reinforces the importance of reflective thinking and illustrates how learners may struggle along the way whilst ultimately learning from the experience. According to O'Brien, this foregrounding of the learning process in the badging exercises, including potential difficulties along the way, will 'cultivate an underlying mindset that helps students develop resilience as researchers and learners' (O'Brien 2018:192). In this environment, learners continually reflect on a series of question prompts and written responses, whilst gaining insights about their own thinking and learning.

The self-directed challenge explores how individuals learn through activities that take place in academic and lifelong learning settings. It reinforces the idea that metaliterate learners teach themselves and also teach others in collaborative learning spaces. The challenge presents these ideas by providing a description of multiple learning scenarios and references the definition of SDL by the renowned scholar in adult learning theory, Malcolm S. Knowles (1975). Through this introduction to SDL, individuals gain new insights about their own learning needs and goals in both formal

and informal settings and are asked to consider this perspective in their response. The culminating activity for this challenge asks participants to reflect on their own learning, with questions based on the process outlined by Knowles that encourage them to consider specific scenarios from their own life.

The first set of questions in *Part 1: Individual Reflection* asks learners why they took the initiative as a self-directed learner, how they determined their own learning need, how they designed their own goals for learning, what kind of information was required for this process, how the strategy was implemented and how they evaluated it. In *Part 2: Peer Reflection*, the questions shift the emphasis from individual to peer reflection so that learners contemplate their own self-directed experiences and then reflect on the insights gained from a conversation they initiate with a friend, colleague or teacher. They are asked to write about the outcome from this interview and to think about how this other person's experience with self-direction might influence their own individualised learning approaches moving forward.

The Educational Planning version of the self-directed challenge builds upon this initial exercise with an in-depth learning activity that asks them to identify, analyse and reflect upon a time when they failed to learn something. This activity is prompted by several related questions that encourage individuals to contemplate what they learned by failing rather than succeeding. This in-depth activity engages learners in the idea that people gain knowledge through an ongoing process of trial and error rather than achieving every predefined goal or objective. Overall, this self-directed challenge promotes meditative thinking that is practiced through writing assignments that incorporate both self-reflection and peer reflection. Learners engage with the ideas of a noted scholar, Malcolm S. Knowles, whilst reflecting on their own assessments in relation to insights offered by their peers.

Looking at this badging challenge through the lens of metaliteracy shows how it advances several of the culminating characteristics of the metaliterate learner. Individuals who complete the learning activity are *reflective* by assessing their experience and that of peers. This learning activity is built around the Knowles quote which defines SDL authoritatively, whilst also placing the learner's experience at the centre. Multiple scenarios are presented that spur metacognitive reflection about this theme. In this context, learners are *informed* because in addition to the Knowles reference, learners are asked to study additional resources related to an example of SDL about playing the guitar. Through this example, learners review an online WikiHow page, a YouTube video from a guitar expert and a Coursera MOOC site from the Berklee College of Music that shows a wide range of openly available content about music education from a well-respected academic institution. Within this context, they are *open* to different modes and *adaptable* to digital resources that extend beyond text.

Through their engagement with this badging challenge, learners are *authors*, *communicators* and *collaborators.* They assess and write about their own experience and then document and share these individual reflections by also analysing responses from peers. The exercise promotes a reflective writing process that requires the analysis of scholarly and popular materials and integrates primary sources based on the learner's insights in relation to interviews with peers. Exposure to different formats in one activity supports the assessment of professionally produced academic resources in relation to online materials. Although learners gain the *productive* characteristic by writing up their analysis, they are not necessarily encouraged to produce a multimedia response. Dynamic media options are supported by the larger badging environment with outcomes that extend beyond the written assignment in this challenge.

Although one learning activity is not expected to address all of the metaliteracy characteristics, several are supported through this activity. The *participatory* characteristic is not fully developed because learners submit their individual writing assignments to the instructor, although the overall badging environment is interactive. In addition, the civic-minded characteristic is not a primary focus of this activity either. At the same time, however, the collaborative nature of the required interview with peers does support SDL as an individualised and collaborative process that benefits from shared ideas. The larger context provided by the Educational Planning course includes opportunities for social engagement in the online community.

Developing metaliteracy and self-directed learning in a culture of assessment in an information literacy course

A one-credit information literacy course at the University at Albany, State University of New York was designed to teach both metaliteracy and information literacy using open pedagogy. The course, which is taught asynchronously online, also promotes SDL and uses both AaL and AfL to enhance student mastery and confidence. The course is a mere six weeks long, and thus the moving parts must all be carefully selected and aligned.

Information Literacy for the Humanities and Fine Arts meets the University at Albany's upper-level information literacy general education requirement for students majoring in philosophy, East Asian Studies and Korean Studies, although students in other majors take it as well. Most students who enrol are seniors and have a solid background in traditional library research-related abilities, a more traditional understanding of information literacy. This course asks students to move beyond their comfort zone by conducting research and sharing their results for an entirely different purpose than writing a scholarly

essay for their professor. They select a topic connected to their major field of study to research for the purpose of adding content to Wikipedia, through participation in the Wiki Education programme (WikiEdu n.d.). This NDA provides benefits for readers around the world whilst also asking learners to engage with elements of metaliteracy and to take part in shaping their own learning.

Course expectations and focus

The course syllabus provides a brief introduction to the importance of metaliteracy in the course, including the role of information creator in a collaborative, open and online environment, and also the importance of metacognition. The syllabus also highlights personal attributes that the course hopes students will enhance, attributes that encourage SDL, such as cultivating a growth mindset, accepting challenges and making space for opportunities that promote creativity and exploration, and allow connections and personalisation.

Metaliteracy is both a subject of study within the course as well as scaffolding as the students assume roles in a setting unfamiliar to them. After an introduction to metaliteracy, they focus on the learning domains and the roles. At the same time, they are learning about information literacy as presented in the *ACRL Framework for Information Literacy in Higher Education* (Association of College & Research Libraries 2015). This Framework is clustered around six frames essential for a conceptual understanding of information literacy:

- authority is constructed and contextual
- information creation as a process
- information has value
- research as inquiry
- scholarship as conversation
- searching as strategic exploration.

Students read all of the frames but engage with four in particular. *Information has value* is the first frame they grapple with, selected because the upcoming course project provides an entrée into the topic: Wikipedia primarily reflects topics selected and articles written by white males. There is a need for broader representation amongst Wikipedia editors (as writers are called) and subjects. Our explorations of the value that information can have range far beyond Wikipedia, but this situation informs students as they select their topics. Both the affective and the cognitive learning domains are involved, as students are motivated by the forum discussion and associated class reading.

Searching as strategic exploration is the theme of the following week, which asks students to acknowledge that '[s]earching for information is often

nonlinear and iterative, requiring the evaluation of information sources and the mental flexibility to pursue alternative avenues as new understanding develops' (Association of College & Research Libraries 2015). The following week's theme is a metaliteracy learning goal, *Engage with intellectual property ethically and responsibly,* which encompasses Wikipedia's rules on plagiarism, but also highlights the students' role as information producers. This goal is supported by several objectives that encompass all of the learning domains in support of the ethical production of information.

Information creation as a process, the next frame to be analysed, helps students think about the different expectations of this project compared with the writing they traditionally engage in. Their newfound appreciation of examining how they feel is of particular importance with this frame, as they are decidedly outside their comfort zone learning how to write for Wikipedia. This frame also helps to prepare them for appropriate self- and peer-assessment, as they are moving beyond the confines of scholarly writing, but need to acknowledge that. It also aligns closely with the emphasis of information production that is woven throughout metaliteracy.

Produce and share information in collaborative & participatory environments, another metaliteracy goal, is the theme of the last class of the semester. It reminds students of their obligations as they share their completed content in Wikipedia articles. A fourth frame, *Scholarship as conversation*, is not a weekly theme but does play a role during the second half of the course when students engage in discussion with other Wikipedians and with student peer reviewers. By sharing their knowledge in this way, learners become teachers as they fulfil this key metaliteracy objective in support of producing information in the collaborative environment of Wikipedia.

The open pedagogical approach of this course overlaps with elements of SDL. Gibbons describes seven principles that help to move classes from traditional teacher-directed learning towards student-directed learning (Gibbons 2002:43–45):

- teach students the skills they need to take control over their learning activities
- shift the emphasis of the program from content to productivity
- introduce new practices in gradual gradients of complexity
- make new ideas familiar with connecting them to students' lives
- develop in students the attitudes necessary for success
- change from telling to asking, from lecturing to interaction
- launch the student on a hero's journey of discovery.

Table 4.1 puts each theme in the context of information literacy (IL), the associated metaliteracy learning (ML) domains and roles, highlights elements of SDL per Gibbons and notes assessment that occurs in connection with that theme.

TABLE 4.1: Interconnections between metaliteracy, self-directed learning and assessment.

Weekly IL frame or ML goals	ML domains	Roles	SDL (per Gibbons 2002)	Assessment
Introduction to ML and IL	Cognitive Metacognitive	Participant (class forum)	Introduction to new attitudes	Self-reflection on ML
Information has value	Affective Cognitive Metacognitive	Communicator Researcher Participant (class forum)	Exploration of theme based on their experiences, interests	Peer responses to posts in the class forum
Searching as strategic exploration	Behavioural Cognitive	Researcher	Gradients of complexity based on Wikipedia requirements	Instructor feedback on submitted sources
Engage with intellectual property ethically and responsibly	Behavioural Cognitive	Producer	Gradients of complexity	–
Information creation as a process	Cognitive Metacognitive	Author Translator	Shift from content to productivity	–
Produce and share information in collaborative and participatory environments	Behavioural Cognitive	Producer Participant Communicator Author	Shift to productivity and interaction Launch on a journey of discovery	Possible evaluative response from Wikipedia community Metacognitive reflection on ML's roles of author and participant Self-assessment using course rubric Metacognitive response to metaliteracy
Scholarship as conversation (carries over several weeks)	Affective Behavioural Cognitive Metacognitive	Communicator Collaborator	Attitude development	Peer review within and outside the class Possible Wikipedia community review

SDL, self-directed learning; IL, information literacy; ML, metaliteracy learning.

☐ Spotlight on self-directed learning and assessment

This course contains major components of SDL but is hampered by the brief time span available to develop the full environment associated with this form of learning. Per the first principle proposed by Gibbons (2002), teaching students the skills needed to take control of their own learning, students are throughout the course working through tutorials provided by the Wiki Education programme. These tutorials have accountability attached to them: the course dashboard tracks their completion of each tutorial and prompts the instructor to determine whether reminders should be sent to students

who have not yet completed any tasks that are overdue. There are no grades associated with completion. However, students will struggle in the live Wikipedia environment if they have not learned what they contain. There is the potential that students will recognise the importance of the tutorials, and therefore develop an appreciation for resources that will help them to succeed when they are engaged in SDL.

Regarding Gibbons' second and third bullets, student production of contributions to Wikipedia advance in complexity, from adding a citation to an existing article, to leaving comments on a fellow editor's talk page, to creating content that will be incorporated into an existing article (or creating a new one). The *Scholarship as conversation* frame overlaps with this production. Students interact with other community members as a way of becoming situated in the environment, but these members also provide a source of assessment. This occurs in a neutral manner when students ask a question in a platform space for novices midway through the course but can become more personal as students grapple with peer feedback and possible negative feedback from Wikipedia community members. Should negative feedback occur, it calls into play all four learning domains, as students feel rejected, work through their reactions and make decisions about actions to take.

Students engage in AaL as their draft contributions to a Wikipedia article near completion, as a classmate provides detailed feedback on their work. In addition, students in another university course that are honing their peer assessment abilities also review the article draft, and despite the fact that they are first-year students, they have provided feedback that has proved to be particularly helpful to the seniors.

A newly implemented method of AaL has added to potential learning in the course – students review their contributions using the assignment's assessment rubric, offering them an opportunity to make decisions about potential changes prior to summative grading. Because they have made self-directed choices about what content was needed to enhance the existing article, they do not necessarily see strong connections between what they have accomplished compared to what another classmate might have done. This flexible rubric provides assurance and emphasises the flexible nature of the assignment based on each student's assessment of what is needed.

Final reflective essays indicate that students understand how the course components interconnect. One student's comments – for which ethical clearance as part of a bigger project and written informed consent for use was obtained – encapsulates themes found in this chapter:

> For the most part, I have only learned a fraction of what my major entails so I am not a true expert. I would say I am more of an acolyte, but even then, this

> process has given me insight and the confidence to recognize that I know enough about a subject to at least start a Wiki page about it and generate interest from the larger community [...]. [*T*]he coordination between Metaliteracy and Wikipedia has encouraged constant reflection on each word that I write and whether or not what I am writing is what I think and if it is the best way of thinking, engaging the metacognitive faculties within the metaliteracy framework. (Undergraduate student, Philosophy major, 24 September 2020)

A six-week course provides challenges for integrating metaliteracy, IL and a mechanism for allowing students to put their newfound learning into practice, further developing it as they do. Whilst ideally there would be additional time to focus on SDL, the students do have the opportunity to continue with their 'journey of discovery' (Gibbons 2002:45).

Conclusion

This chapter sought to explore and make explicit the interconnections between metaliteracy and SDL. An additional goal of the authors was to identify the assessment methods most appropriate for determining one's progress towards metaliteracy and make connections between this assessment and the forms particularly pertinent in SDL, AaL and AfL.

The chapter started with an overview of metaliteracy and its core components, followed by a section that considered SDL as viewed through the lens of metaliteracy. It then delved into a close examination of selected components from metaliteracy, relating them to SDL and assessment. Two descriptive case studies close the chapter. This exploration on both the macro and the micro level provides solid evidence of the interrelationships amongst metaliteracy, SDL, AaL and AfL. The authors propose that future research studies into these topics expand their scope and their import by considering these connections.

Chapter 5

Leveraging student self-directed learning through online tutoring and integrated ipsative assessment

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Abstract

In the wake of the coronavirus disease 2019 (COVID-19) pandemic early in 2020, drastic precautionary measures were put in place to slow down the expansive spread of the virus. Social distancing is one of the heightened mitigation efforts that countries adopted to dodge the explosive spread of the virus and to obviate its transmission. To ensure that student learning is not compromised as a result of such an aggressive outbreak, schools around the world resorted to online teaching and learning. Hastily, online tutoring became the most attractive option that could offer online education for hundreds of millions of learners whilst preserving the traditional in-class teacher–student interaction. Making use of current research in databases and online learning tools was paramount to improve learning outcomes and to enhance student learning whilst saving effort, time and resources.

This chapter advances the establishment of an online tutoring system integrating several state-of-the-art online education systems geared towards helping students be more self-directed, maximising their learning and raising their self-efficacy through integrated ipsative assessments. The main motivation behind the online tutoring community is to engage students in SDL beyond the regular class periods. The novelty of this approach is that the system can reward students for their active participation by giving bonus credits measured relative to their contributions to the system.

The online system we are proposing is interactive and is designed to grow with the needs of the participating students. The students not only pose questions for the system but can also create and add their own questions to challenge other students. This feature enables the system database to grow with the needs of the students from very simple and easy questions to very complex ones as the database becomes larger. With integrated ipsative feedback, students can monitor their own learning and enhance their metacognition.

Introduction

Traditional tutorial sessions in many remediation programs in K-16 classrooms proved to be a successful approach to addressing gaps in student achievement (Ogina & Mampane 2013). However, holding supplementary tutorial sessions is not always possible and may not be the ideal solution to support meaningful student AoL. Online tutoring is a very attractive option that would offer many features available in traditional tutorial sessions that are complemented by a computerised online learning system.

It has been widely established that one of the attractive aspects of an online tutoring community is immersing students in self-directed environments affording myriad opportunities for interactions with peers and teachers in real time and beyond the regular class periods (Luo 2015). The novelty of this self-regulated environment is that students engage in reciprocal teaching approaches (Oczkus 2018), orchestrating interactive dialogues with their peers and teachers, and are rewarded for their motivation and active participation by earning bonus credits measured relative to their contributions to the system. The proposed system is interactive and is designed to grow with the needs of the participating students. The students not only pose questions for the system but can also create and add their own questions to challenge other students. Once a question receives an approval rating from both the teacher and the rest of the students, it will be permanently added to the database, accompanied by a proper answer to be used for the rest of the current term as well as future offerings of the same class. This feature enables the system database to grow with the needs of the students from very simple and easy questions to very complex ones as the database becomes larger.

The basic theme of this chapter is capitalising on the positive aspects of online education whilst preserving the traditional in-class teacher–student interaction. We argue that making use of current research in databases and online learning tools can improve AoL outcomes and enhance student–teacher interaction whilst saving resources. Several studies suggest that systems that promote student interactions are more successful in online education (Banna et al. 2015; Rogers et al. 2003; Salmon 2003). The proposed knowledge-building feature of the online environment is used to self-direct students who lack knowledge in a certain topic to train themselves, overcome their weaknesses and build their confidence. The online tutoring environment uses relational database logic to pinpoint specific deficiencies and suggests particular resource locations that contain the needed knowledge. Furthermore, it combines education as well as evaluation tools to assess initial knowledge level of students and to help them monitor their progress throughout their activities.

The proposed environment is principled by self-directed learning with technology (SDLT), in which the learner sets their own learning goals to acquire new competencies and build new knowledge (Long 1994). The literature on the use of online environments as facilitators of SDL has confirmed that engaging in collaborative interactions via technology could in fact improve student capacity to become self-directed learners (Lee et al. 2014; Teo et al. 2010). Conversely, Kirk (2012) asserts that the extent to which learners are self-directed can predict their level of engagement in using online technologies as tools for learning. Furthermore, Alotaibi (2015) contends that the level of student academic success could be linked to the degree of their SDL readiness.

This chapter seeks to make a connection between SDLT and online tutoring environments with built-in assessment components. We argue that an efficient assessment of the gained knowledge at every stage of the learning process would guide both the teacher and the student to put more emphasis on particular subjects that in turn could save time and effort. As such, we propose the development of online tutoring systems that are geared towards helping students maximise their knowledge, improve their learning and monitor their progress using ipsative approaches to assessment. Hughes (2011) describes ipsative approaches to assessment as being self-referential, shifting the focus away from achieving external standards and onto individual learner's progress and learning gains. The database system could be interactive and dynamic and the majority of queries can be automatically answered by the proposed system. Computerised student assessments and evaluations have provided innovative tools that allow significant improvements in the way we teach and assess student learning. Building on the motivational power of ipsative assessments, this chapter argues that self-directed online tutoring, an application of SDLT, could help learners become assessment literate, setting goals for learning, manoeuvring and managing academic resources enabling them to succeed in school subjects and beyond.

Ipsative assessment in the context of self-directed learning

The knowledge assessment component of the proposed online tutoring environment is based on ipsative assessment approaches, which is most critical to the design. Hughes (2011:353) defines ipsative assessment as 'the process of comparing a student's performance against his/her previous performance'. Unlike other approaches to externally referenced assessments, such as criterion and norm-referenced that rely on comparing student performance to external criteria or to his peers, ipsative assessments are self-referential as they compare students' performance to their own previous performance mitigating the stress of competition between peers and focusing on the learners' personal progression towards achieving desired learning outcomes (see Figure 5.1). By encouraging students to act on immediate feedback, ipsative assessment champions a growth mindset attributing success in learning to effort and boosting self-esteem by rewarding self-paced personal progress.

Savage and Fautley (2016:212) described ipsative assessment as 'an assessment the student makes against their own prior performance, so that they are measuring their personal progression against their own previous work'. As such, the process of ipsative assessment is inextricably associated with learning as students actively and continuously self-assess in order to achieve learning outcomes (Partti, Westerlund & Lebler 2015). Reflecting on

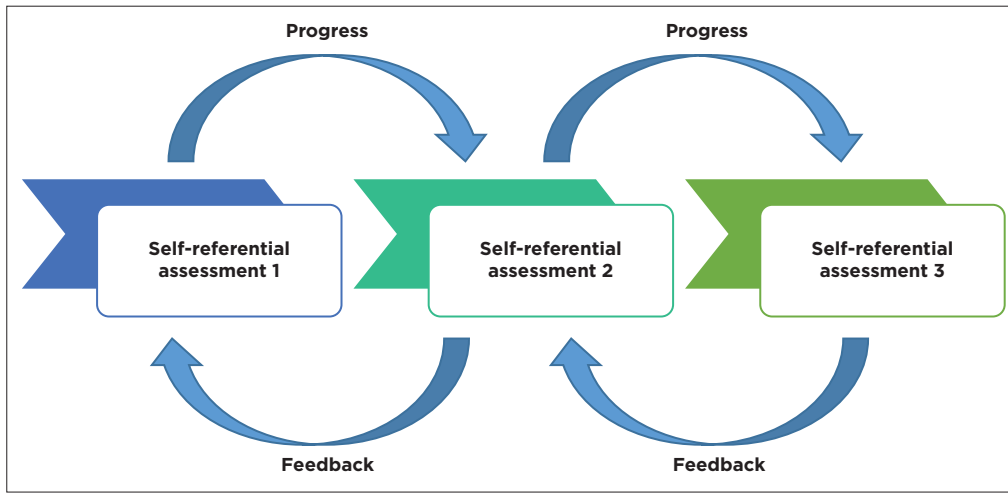

FIGURE 5.1: Depiction of ipsative longitudinal assessment process.

current and prior understandings of concepts and skills is key to a successful and productive ipsative assessment process.

Generally speaking, ipsative assessments consist of four basic elements underpinned by the belief that every learner can improve and an awareness of the importance of the learner's high self-esteem (see Figure 5.2).

Therefore, the learner is involved throughout the process as an active participant rather than a receptor, with the role of the teacher moving from controller to facilitator. When lessons are punctuated by self- and peer-assessment, learners are actively engaged in thinking and articulating that thinking (Seifert & Felix 2019). Even when engaged in independent tasks, they could be encouraged to stop at regular intervals and check their work against success criteria they benchmarked or look for places where they can improve.

As opportunities for learning, ipsative assessments can offer students occasions to discuss and work cooperatively. By giving specific feedback about specific aspects of their understanding, offering suggestions for discussion, exploration or improvement, focusing on how students are learning as a means to help them better consolidate that learning without the stress of fierce competition. Through extensive exposure and self-directed appraisal, students eventually could independently close the gap between what they know and what they need to know and be able to achieve a specific standard(s) (Hughes, Wood & Kitagwa 2014). To close the gap, Nicol and Macfarlane-Dick (2006) aver that students need to: (1) possess a concept of the standard being aimed for, (2) compare the actual (or current) level of performance with that standard, and (3) engage in appropriate action, which leads to becoming self-regulated learners. In an environment where ipsative assessment is

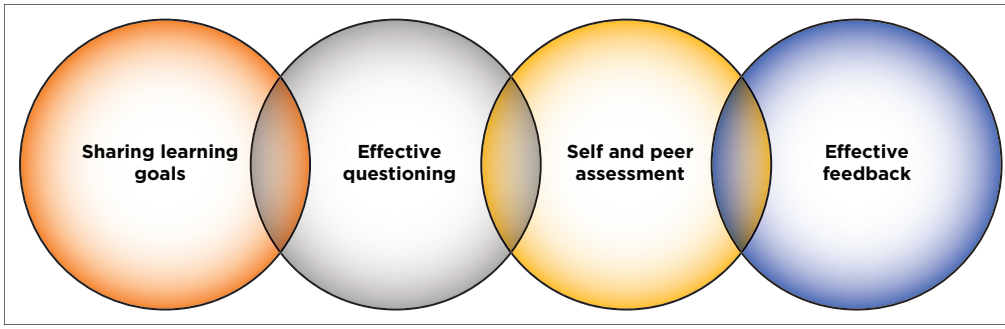

FIGURE 5.2: Components of ipsative assessments.

employed, learning goals rather than performance goals dominate, and effort rather than ability is emphasised.

However, the literature highlights several misconceptions regarding the effectiveness of ipsative assessments, mainly target setting and minimalising achievement. There is a misconception that any assessment might lead to learning. However, what is important is that ipsative assessment focuses on deepening and furthering learning rather than just measuring it (Broadfoot 1996). Finding out what students need to pass the tests, setting targets, and then finding out later whether they have been met or not does not align with the expectations of ipsative assessment. As with SDL, ipsative assessments relate to personal gains in learning as well as 'progression towards individual targets and possibly self-directed goals that matter, not only reaching external standards' (ed. Hughes 2017:2). Therefore, minimalising ipsative assessment is where the learned learning objectives can be 'ticked off'. This is true for closed skills (e.g. to be able to make a list, to state times tables in math, etc.) but with open skills such as problem-solving and proving a hypothesis, ticking off the criteria or the learning objective is meaningless. Students need to have models of quality and be encouraged to decide where success has been met and where they need to improve.

Although ipsative assessment draws from the characteristics of formative assessments, however, unlike the latter, student performance is compared to her best previous attempt within the same curricular concepts. In this context, assessment is considered a 'profiling' type of test. A reported advantage of ipsative assessments is the facility by which students can track their progress with their existing 'personal best' over time but within the same curricular content. Such a unique feature promotes ipsative assessment as a type of self-appraisal and reflection conducted by the student to monitor academic progress setting realistic goals and steps for achieving those goals. Hughes (2014) declares that this type of self-competition supports student self-determination as they become more aware of their own progress,

self-diagnosing and self-regulate based on successive feedback and establishing personalised plans to attain personal and curricular expectations. Furthermore, Hughes (2017) highlights key attributes of ipsative assessments that closely align with SDL approaches where the learner is allowed to set personal learning goals and to plan personal learning gains. Building on the guidelines proposed in Chapter 1 (this volume) regarding the effective use of assessment approaches to support meaningful learning, we argue that there is a mutual overlap between the goals of SDL and ipsative assessment approaches in relation to enhancing students' skills to become autonomous and self-directed learner, managing and controlling their learning gains. These include peer and self-assessments and ipsative feedback as a modality of social learning.

Peer and self-assessment

The involvement of students in the self-appraisal of their performance and the constructive criticism of their own work and the work of their peers is a key aspect of SDL (Youngeun & Anderson 2016). In this context, peer and self-assessment emerge as equalising agents to ensure that students have a fair share of contributing to assessing their own learning gains and regulating their self-performance accordingly. Students, when trained, are able to identify their success against the success criteria of a task and then are able to identify others' and their own learning successes. Therefore, it is highly encouraged that across disciplines, students would be introduced to 'models of excellence' (Stewart 2012) and be allowed to make their own improvements, suggest improvements to their peers and identify where and when they require teacher support (not the answer). This frees the teacher from being the main source of knowledge and information and encourages students to become autonomous and self-reliant learners.

Peer assessment

Double, McGrane and Hopfenbeck (2020) confirmed the effectiveness of peer assessment as a formative practice and encouraged its implementation in the classroom. Generally speaking, peer assessment or peer review engages students in using specified assessment benchmarks to review and assess their peers' written work, which in turn promotes student competence to provide feedback to their peers (Chin 2016). Through peer assessment, we argue that some ownership of the assessment process is transferred to the learners, which eventually leads to being more self-directed learners, with an enhanced sense of motivation and engagement and a drive to learn more deeply, building up their understanding of new knowledge and skills. Furthermore, peer assessment affords students the opportunity to reflect deeply on how they assess a task compared to their peers. As such, peer assessment

represents a major focus of self-directed assessment to inform learning and not simply a means to monitor grades. As a result, students acquire the necessary competencies to judge the reasonableness of ideas, to critique and justify, and to become more self-aware of their own learning (Reinholz 2016).

Self-assessment

It has been widely established that making judgements about the progress of one's own learning is integral to the learning process. Whilst there are numerous definitions in the literature describing self-assessment, the simplest characterisation is that it builds on a natural tendency of students to check out the progress of their own learning. Andrade (2010) argues that self-assessment capitalises on the role of feedback as a catalyst for deep learning and improved performance. In describing the purposes of self-assessment, Andrade (2019) explains:

> [*S*]elf-assessment is to generate feedback that promotes learning and improvements in performance. This learning-oriented purpose of self-assessment implies that it should be formative: if there is no opportunity for adjustment and correction, self-assessment is almost pointless. (p. 2)

Boud (1995:11) explains that self-assessment with its emphasis on student responsibility and making judgements is 'a necessary skill for lifelong learning'. Additionally, the self-assessment process can help 'prepare students not just to solve the problems we already know the answer to, but to solve problems we cannot at the moment even conceive' (Brew 1995:57). Therefore, engaging students in the formulation of criteria for self-assessment tasks is essential to deepen their understanding of what constitutes quality learning outcomes across disciplines.

Strategies for peer and self-assessment

Having assessed the work of others, students will find it easier to identify weaknesses in their own work and to see how they can make improvements (Boud & Falchikov 2007). Therefore, it is recommended that students learn how to peer assess before engaging in self-assessment. Hughes (2014) argues that it is essential that students be given the opportunity to contemplate and meticulously appraise their learning progression by correlating their current performance with past effort and monitoring their advancement towards personal goal attainment. In this context, Spiller (2012) proposes several strategies that can be incorporated in the classroom to strengthen students' peer and self-assessment skills. We list 10 strategies in Table 5.1 that provide recommendations for enhancing students' peer and self-assessment practices.

TABLE 5.1: Peer and self-assessment strategies and key benefits.

Peer and self-assessment strategies	Key benefits
1. Emphasise the need to focus on being attentive to questions posed in class and to request explanations if ideas presented are not clear (Barr et al. 2002).	• Students use questioning as a means to inform understanding. • Students reflect on each other's work to build meaningful knowledge. • Students collaboratively build new knowledge. • Students have ownership of their learning and support the learning of their peers (Earl & Katz 2006).
2. Peers share their work to negotiate understanding and find better ways to build new skills and knowledge.	• Students support each other in identifying criteria for success based on their own learning trajectory (Boud 1995). • Students are informed of how others assess their performance and thus develop the skill of self-directed assessment (Boud 1995).
3. Encourage students to accept constructive criticism and acknowledge their strengths and areas that need improvement.	• Students become autonomous learners having control over their learning (Price 2012). • Students will trust each other and make informed judgements about the quality of their performance.
4. Engage students in critically assessing each other's work providing clear directions on how their peers can improve performance.	• Support students to become independent researchers seeking new knowledge to support their lifelong learning. • Students build communities in their classrooms to support each other (Nulty 2012).
5. Train students to pose good and relevant questions to each other and to set criteria for successful performance (Boud 1995).	• Students gain an understanding of key concepts as they develop questions and answers. • Students feel less stressed and become empowered to engage in posing questions and assessing responses.
6. Make self- and peer-assessments as opportunities for developing new knowledge and skills.	• Students become skilled in reflecting on their own performance and monitor their learning progress and that of their peers independently. • Students use assessment as a learning aid to facilitate a deeper understanding of concepts (Race 2001).

Ipsative feedback

Broadly speaking, feedback can support students to become independent learners and equip them with the necessary skills to confidently conduct peer- and self-assessment and make subsequent improvements to their ongoing work (Spiller 2012). Boud and Molloy (2013) define feedback as:

> [*A*] process whereby learners obtain information about their work in order to appreciate the similarities and differences between the appropriate standards for any given work and the qualities of the work itself, in order to generate improved work. (p. 6)

Hughes (2014) argues that ipsative feedback is one common form of ipsative assessment that enables dialogues with students, helping them reflect upon

their experiences and contributing to their satisfaction and interest in learning. Furthermore, Hattie and Timperley (2007) explore developmental feedback, or *feed forward*, as a mechanism for predicting future learning gains. Nonetheless, Hughes (2017) caution against the term ipsative feedback that is transmitted to students without their systematic engagement in the follow-up process. Hence, the focus on students as self-directed learners managing and controlling available resources in their environment to support meaningful learning and goal setting. Whether feedback is just there to be grasped or is provided by another person, effective feedback is dialogical and goal-referenced (Hughes 2017); tangible and transparent (Spiller 2012); actionable; specific and personalised; timely; ongoing and consistent.

On the other hand, explicit ipsative feedback can become quite challenging particularly that not only the baseline of the learner should be known but also previous levels too. In this case, Hughes, Hawkes and Neumann (2017) recommend digital record-keeping through an adaptive virtual learning environment that stores the feedback history of students during the academic year. As such, cumulative ipsative feedback collected over time is most useful to ensure seamless progression in learning and to support personalised gains.

There are numerous practical implications of ipsative feedback principles. Cited mostly is closing the gap in student knowledge and understanding (Goold 2016; Hughes 2014, 2017). Because immediate feedback is key to influencing learning gains, it is necessary that ipsative feedback be incorporated into daily lesson plans. For example, questioning strategies provide one-to-one feedback from teacher to student and paired discussions provide individual feedback to students from their partner about their thinking or their written work. Mid-lesson learning stops as well as cooperative marking enable students to actively improve their work by seeing excellent examples and discussing possible improvements.

Similarly, Hughes, Smith and Creese (2015) highlight the role of virtual learning environments in capturing and recording ipsative feedback to ensure access to the rich information on student learning gains in the process of conducting ipsative assessments. These digital tools can help make progress visible to the students and teachers, generating history feedback profiles for individual learners. However, some challenges are cited in the literature regarding the accessibility and tracing of digitised ipsative assessments pulling together information on student progress from multiple resources (Rennie & Morrison 2013). Therefore, there is a need and demand to design virtual environments that facilitate ipsative assessment approaches compiling and storing feedback profiles of individual students to document and digitally preserve trajectories of learning gains over time.

Background: Role of technology in ipsative assessment

In the past two decades, there has been a considerable increase in the use of computer assisted assessment (CAA) applications in educational sciences. Particularly at the tertiary level and as number of students in the classrooms grew larger and larger, teachers were forced to digitise student assessment reports, using standard exams almost exclusively (Conole & Warburton 2005). The problem with standard exams is that, in order to be able to discriminate between all the different knowledge levels, teachers had to include questions at all ranges of complexity. As a result, tests became longer and included questions that are either too difficult for some students with lower knowledge level or too easy for others with higher knowledge levels. Currently, the use of computer technology in student assessment has become a common practice across many educational disciplines. Rezaie and Golshan (2015) note numerous technology-based tools geared towards AoL, such as CBT (Computer-Based Test), CAA, CAT (Computer Aided/Assisted or Computer Adaptive Test) (Weiss & Kingsbury 1984) and CALT (Computer Adaptive Language Testing).

Broadly, CBT employs computer tools and platforms in the assessment process. Some of the early research in computer-based assessment is about the effect of using computers in student assessment compared to paper-and-pencil (Brosnan 1999). Way and Robin (2016) trace back the origin of CBT to the work of psychologist Albert Binet. However, the attractiveness of CBT is captured by Bunderson, Inouye and Olsen (1988) when they declared:

> The changes brought about by the wide availability and low cost of new technological delivery system alternatives are moving testing from its delivery through paper and-pencil and printed booklets to delivery through online computer work-stations. (p. 402)

Thelwall (2000) describes earlier computer assessment tests as text-based, comprising basically of objective, factual questions eliciting specific answers and restricting marking only to predefined answer keys minimising any subjective judgements on the part of the marker. Arguably, much of the earlier objective testing carried out was based on Classic Test Theory (CTT) principles (Bichi 2016; Bull & McKenna 2000). Classic Test Theory comprises a set of psychometric procedures and measures the internal consistency of the items in the entire test. Magno (2009) avers that CTT procedures are developed on the assumption that each student taking the test has a true score, an unobservable quantity representing the hypothetical perfect score value of a student's ability, assuming no error because of assessment instruments. He further asserts that because measuring instruments can be biased, a student's score on a test does not necessarily reflect their true ability. The difference between the true score and the obtained score is attributed to an error in measurement.

Computer adaptive tests

The term computer adaptive test (CAT) is a type of CBT that is user-tailored and describes a software application employing item response theory (IRT) principles to estimate a student's ability (Kimura 2017). Noijons (1994) describes CAT as:

> [*A*]n integrated procedure in which language performance is elicited and assessed with the help of a computer, consisting of three integrated procedures including: generating the test, interaction with candidate, and evaluation of response. (p. 38)

The basis of most CATs is derived from a psychometric theory known as IRT. It was proposed by Birnbaum (1968) and was initially known as *Latent Trait Theory.* In IRT context, testing is based on item analysis approaches taking into consideration the student's ability (Magno 2009). Conejo et al. (2004) explain:

> In IRT, it is assumed that the knowledge level of the student is measured with a single variable that is called the trait. Using as input data a set of responses of the students to a set of questions, the level of knowledge of the student is estimated (with some statistical method). Then, this estimation is used to determine the most informative item to ask next. These steps are repeated until some stopping criterion is met. (p. 2)

As such, different IRT models have been developed that direct the selection of questions based on various statistical techniques.

In general, Wainer and Mislevy (2000) argued that CAT is commonly used within IRT approaches; however, adaptive testing is not dependent on the IRT.

De Boeck and Wilson (2004) asserted that using explanatory item response theory (explanatory IRT) will enable an examination of how background variables can influence the detection of initial knowledge levels especially when the student first enters the virtual learning environment. Wauters et al. (2010) cautioned that a less precise initial assessment of ability may lead to inaccurate readings of entry knowledge level hereby resulting in a higher number of questions to determine students' accurate knowledge baseline. To address this issue, Park, Joo and Cornillie (2019) proposed using explanatory IRT modelling to assess students' knowledge levels taking into consideration their background information and previous learning trajectories. By simulating different student profiles under various conditions, the authors found that using explanatory IRT modelling significantly reduced baseline knowledge estimation errors.

Computer adaptive testing is one of the types of CAA software applications (Thompson 2011). In its simplest form, CAT is a multiple-choice test battery administered by a computer, where questions are automatically selected based on an examinee profile dynamically generated from the responses to prior questions. Concomitantly, student profiles are created and updated during the interaction with the online environment. Ipsative assessments are

supported by using CAT to discern personalised learning gains, thereby reducing the stress of competition and easing the load of assessment anxieties (Bull & McKenna 2004).

There are numerous advantages of using CAT tests. For example, Rezaie and Golshan (2015) cite a number of benefits for using CAT, including provision of innovative self-assessments, saving time and providing immediate feedback with a more efficient appraisal of student knowledge level compared to paper-and-pencil tests. Computer adaptive testing scoring identifies the items correctly answered by students and counts the overall number of correct responses (Reckase 1989). For example, students answering difficult questions score higher than correctly answering an easier set of questions. Additionally, as the pool of items increases, the effectiveness and efficiency of the CAT system item selection algorithm increases.

Furthermore, numerous derivatives of CAT were developed over time. Trentin (1997) developed a hierarchical representation system where content tested is presented in a calibrated level of complexity. The system automatically adjusts the difficulty levels of items when the responses that the student provide fall below a designated value. The strength of Trentin's proposed model lies in mapping student knowledge level with appropriate items on a test so that overachieving students receive high-level questions. By the same token, Rudner (2001) employed measurement decision theory (MDT) to design CAT that classifies student knowledge levels into either pass or fail. Additionally, Lütticke (2004) describes adaptive test questions where student responses are automatically analysed by the system. If an incorrect response is provided, the system will prompt a tutoring assistance, presenting some feedback, and then the question is re-administered. This process is repeated until the student provides a correct response. Canfield (2001) referred to such systems as intelligent tutoring systems (ITS) where the systems provide insight into students' knowledge level and adjust assessment accordingly. By supporting immediate and precise feedback when incorrect answers are submitted and introducing new concepts based on student readiness, Canfield (2001) confirms that these features qualify ITSs to be part of a new breed of instructional computer programs.

To increase measurement precision, it has been suggested that the CAT development system includes a large calibrated pool of questions or items, with a wide range of difficulty to accommodate a spectrum of different ability levels. There is some debate regarding the size of items that should be included in a CAT system. For example, Wainer and Eignor (2000) recommended populating thousands of question items, whereas McBride (2001) suggested that the pool should contain five times more items than what is administered to students. Stocking (1994), on the other hand, concluded that an item pool about 12 times the length of a CAT was acceptable to cover a variety of content domains and test formats.

The virtual environment is capable of accurately estimating the student's knowledge level at every stage of the assessment process using several built-in algorithms and statistical methods. Furthermore, the computerised assessment system can predict the questions to be administered next based on the student's record of accumulated previous answers, which fits a specific statistical model such as Bayes model. This functionality involves sifting through the calibrated item pool in order to identify a non-administered question that best fits specific selection criteria (Dodd, De Ayala & Koch 1995). Additionally, the literature cites a number of approaches that can be used to set a termination end-point, or 'stopping rules' of a particular test to ensure that students are tested on a unified standard (Stafford, Runyon & Casabianca 2019). For example, a termination signal can be issued based on reaching a maximum number of questions, exceeding a predefined time limit, or achieving a desired knowledge level.

Oppl, Reisinger and Eckmaier (2017) describe a multi-step approach involved in the execution of CAT process. Starting with item 1 selection from a pool of questions, the item is then administered, eliciting responses from the student. If a correct answer is given, then the complexity level of the following question will be increased. Matteucci and Veldkamp (2013) further explain that the CAT procedure continues in successive iterations and ends only when a specified criterion is met. Some of these criteria can be the test length, level of precision, or time span (Segall 2004).

Online tutoring community

The pilot online tutoring community we propose in this chapter is developed by the second author and is a system that brings together students and teachers, teaching assistants and any other volunteers such as retired teachers or senior students. The system is managed and controlled by the teacher, whose permission is required for anyone who wishes to become a member of the online tutoring community. The system is designed such that a particular topic is broken down into smaller segments, each assigned a low, medium or high level of difficulty. The level of difficulty of each question can be automatically determined by the system and approved by the teacher. Artificial intelligence (AI) tools and algorithms can be combined with pattern recognition tools to assess students' knowledge and highlight their weaknesses. The AI assessment tools can be used to tailor specific content for each individual student and provide reading material and adaptive tests to assess their progress towards achieving learning gains.

The basic component of the online tutoring environment is the development of test bank questions to assess the level of participating students and to evaluate their progress whilst utilising the system. The test bank can be as simple as multiple-choice questions that vary in difficulty to very complex

essay-type questions. The state of the art of the research in this topic is quite advanced, and there are several widely used ipsative assessment strategies that can be automated. For basic sciences, multiple-choice questions tests are widely used techniques to assess students' comprehension level. These tests, when administered by computers, cost less in terms of time and resources. Different approaches can be introduced to accurately assess the level of knowledge of each participating student and to provide ipsative feedback in the process.

Online collaboration and knowledge assessment

The online tutoring environment is basically comprised of two components: a knowledge evaluation component and a collaboration component. The knowledge evaluation component is based on using the CAT technology to design efficient tests to evaluate and monitor the progress of each participating student. Each student can request an evaluation test at any stage during studying for a particular subject or topic. The test outcome can be used to guide students through the process of learning new knowledge and skills and provide feedback on the prerequisite background needed to fully comprehend concepts and processes (see Figure 5.3).

The collaboration component, on the other hand, links participating students with other users of the system including teachers, teaching assistants and other volunteers to help in understanding certain topics or answer some difficult questions. The collaboration component has all the necessary tools to support discussion boards, search engines, and editing functionality. The system provides immediate reinforcement for successful performance by rewarding bonus credits for students who actively engage

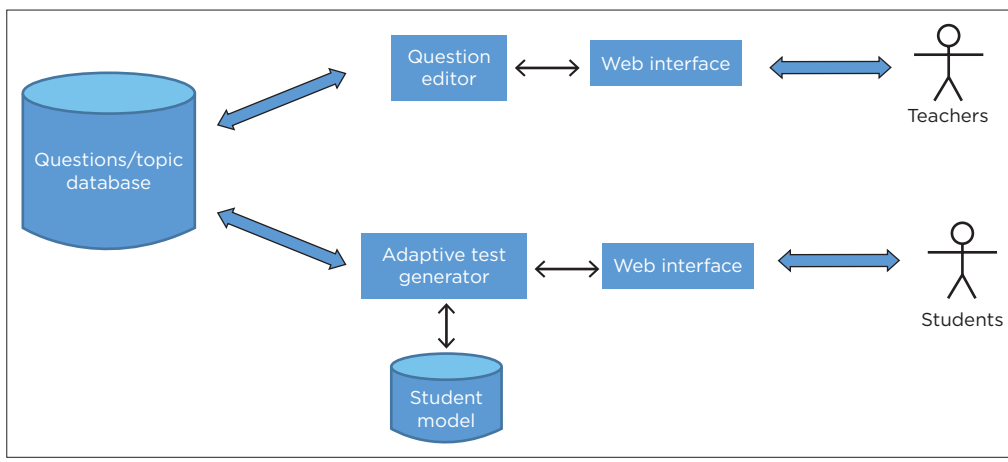

FIGURE 5.3: Depiction of the general architecture of the knowledge evaluation system.

in either answering or posing questions. In addition to extra credits that can be counted as part of student ongoing formative assessment in a given discipline, other reinforcements can include activities or privileges such as playing computer games or having extra time in the gym. We argue that positively rewarding students' participation in the virtual tutoring environment enhances their interest in becoming self-directed learners who are actively engaged in setting goals for success, which boosts their self-esteem.

Online tutoring system design

The literature cites numerous studies that provide evidence of the effectiveness of online tutoring in improving student learning globally and across disciplines. For example, Huang (2013) showed that online tutoring significantly impacted student performance in Mathematics. Other studies also suggested that interactive online Mathematics tutoring could result in improved student success rates (Chappell et al. 2011). Furthermore, Chappell et al. (2015) examined the impact of online Mathematics tutoring on student academic performance and perceptions. Chappell et al. also deduced that tutoring resulted in a statistically significant increase in student assessment scores as well as positive attitudes towards the online experience.

Generally speaking, online tutoring is a web-based tool that supports the ipsative assessment of student performance across school subjects. The system would generate question items from an existing database dynamically based on students' profile, hereby determining students' baseline level in terms of acquired prerequisite concepts. The second author, a computer scientist, designed this system so that teachers can develop several assessment tools to measure student learning and monitor their progression towards acquiring new knowledge and necessary skills. The main components of the proposed system are shown in Figure 5.4 and include three major modules: Knowledge organization, discussion board controls and testing management.

Question/knowledge management: This module manages all questions either posted by the students or designed by the teacher. It is the core module in the system. The communication between the teacher and the students is conducted through postings to the discussion board and involves the following interaction:

- The student posts some questions on the discussion board.
- The teacher can view the students' level automatically through the system.
- The teacher can use the system to evaluate the students' knowledge level.

Discussion board management: This module manages all posted threads and messages. It is the place where students can communicate with each other or

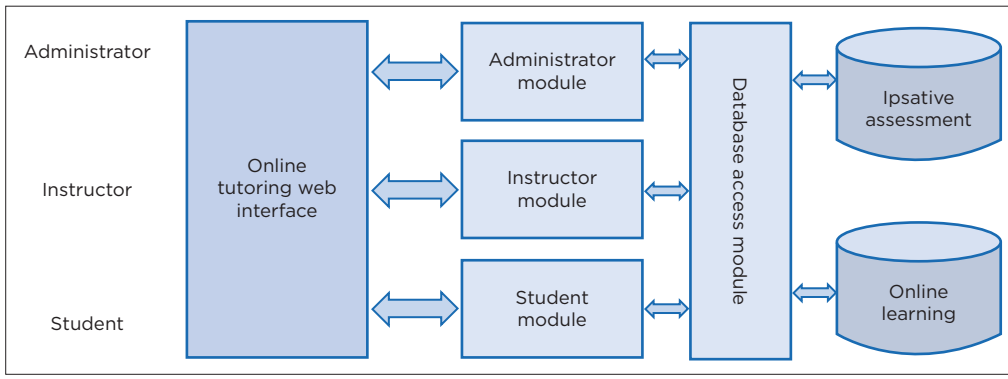

FIGURE 5.4: Depiction of online tutoring system architecture and framework.

communicate with the teacher by posting some questions and replying to the posted question. It works as follows:

- A student posts a question in the discussion forum, which will become a new thread.
- Other students post their reply under that thread, which becomes a series of messages linked to each other.
- The teacher can 'close' the thread if some conclusions are reached, such as the answer/solution is found, or the question is trivial in that it does not need any further discussion. The teacher can decide whether to add a question to the test database.

Testing management: This module manages all potential tests/quizzes and operates as follows:

- The teacher specifies a set of questions to test the student's level on selected topics.
- When a student posts a question, if the level of the student is unknown, the system will ask the student to do a level evaluation test. The result of the test will be used to determine the initial level of the student.
- The student or the teacher can monitor the changes in knowledge level by requesting another evaluation test. The system can generate a new test with different questions one level of difficulty higher than his current level.

The system is designed to support and include the adaptive test evaluation component as well as the tutoring component. The evaluation component is used for both determining the current level of the participant and producing reports that can be analysed by the tutoring component to suggest a study plan for each participant.

The basic system requirements consist of:

- **Question database:** The question database is a dynamic database populated with questions as the system evolves. Initially, the teachers may populate the database with sample questions. As the system evolves, it can extract new questions from the participating users. These questions can be used to enrich the system question database upon receiving approval from the teacher.
- **Question editor:** This module will provide the teacher with an interface to add questions to the question database. A user can define different parameters of questions and any related answer options. An analysis tool is added to search all existing similar questions to enable the teacher or the student avoid duplicate questions.
- **Student model:** The student model is tailored to each student specific needs. Basically, the student model would assess the knowledge level of a particular student and store the level information in addition to statistical information such as how many questions were answered correctly and display a study guide for the ones answered incorrectly. This model can also be used later to monitor the progress of the student and create statistical reports for the teacher.
- **Test generator:** This is the main module in the knowledge assessment process. It is responsible for dynamically selecting questions based upon specifications extracted from the student profile. The Prototype of ipsative assessment is shown in Figure 5.5.

Specifically, the activity starts by establishing the learner's initial knowledge level. This level represents the baseline and benchmark against which ipsative assessment and feedback are provided. The next step proceeds with selecting then administering a question item. Ipsative assessment follows evaluating responses based on the learner's baseline knowledge. By employing the Bayesian Theorem, an estimation of new knowledge is possible, building on the baseline knowledge level obtained earlier. Consequently, a new question item is selected that is compatible with the hypothesised new knowledge. The cycle repeats until all questions are answered by the learner and the activity terminates at this point.

The basic requirements needed to maintain the functionality of the system are listed in Table 5.2.

The database design incorporates several elements including topics, suite of potential content-related question items, answer options, user profiles and system functionalities. In each test, a subject is divided into several different topics depending upon their importance. The questions and topics are structured as shown in Figure 5.6.

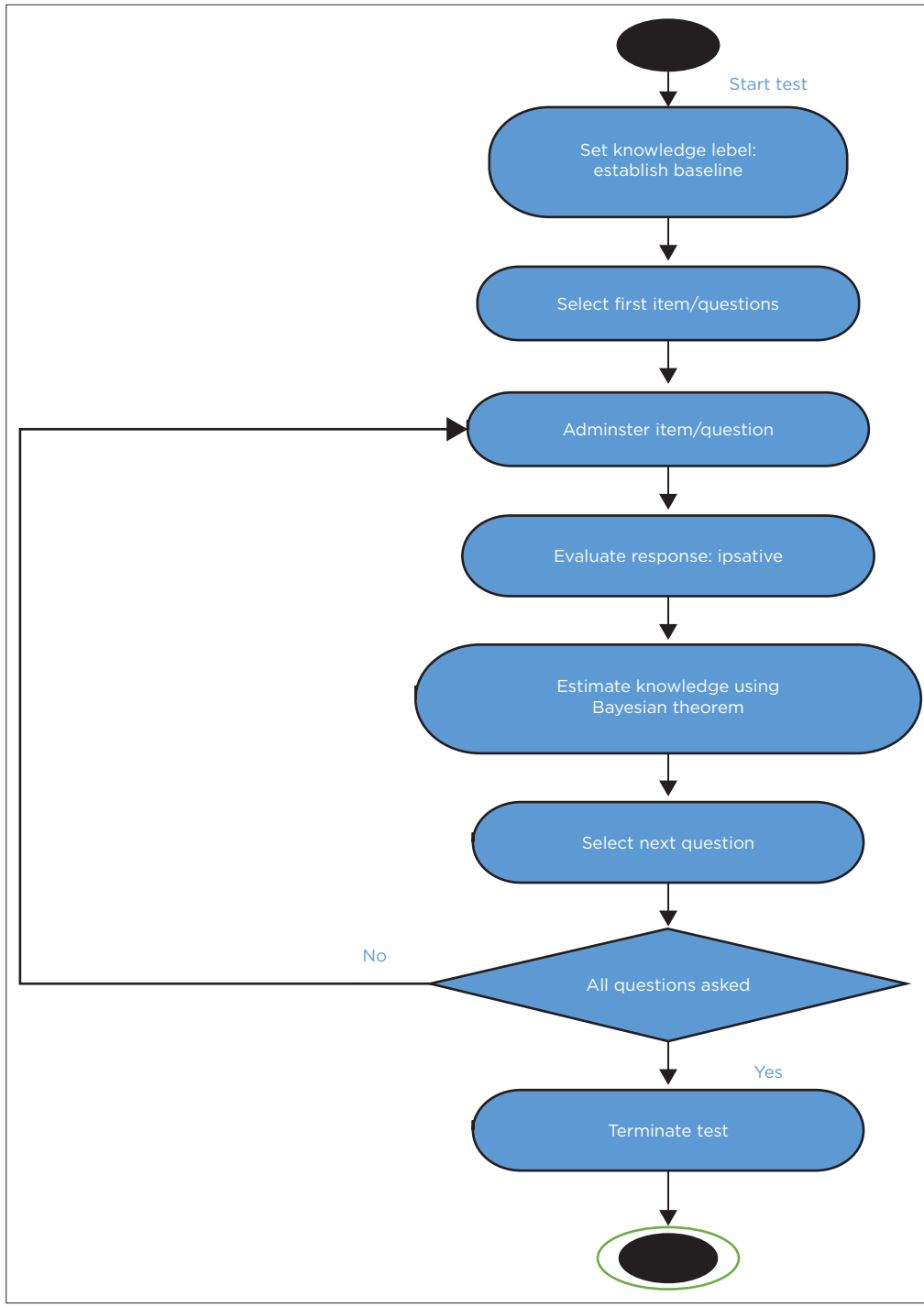

FIGURE 5.5: Depiction of the ipsative assessment activity using Bayesian Theorem.

TABLE 5.2: Requirements for system maintenance as proposed by the second author.

Maintenance requirement	Justification
Security	System security is an important functionality to keep each users' private records and information protected from being accessed by any other user.
Reliability	The reliability of the system is key to keep confidence in the system high and plays an important factor in keeping student participation high.
Maintainability	The system administrator in the initial stage is a graduate student who normally uses the data resulting from the system to conduct educational research.
Resource utilisation	The effective use of all available resources to educate the students is an important ingredient to the effectiveness of the system. External resources such as online libraries can be linked to the system to add more inputs into some topics.
Administer item	This functionality is used to access an item in the database and pass it to users.
Evaluate response	This stage is responsible for the actual evaluation process. It will take the user response and then compare it with the correct answer in the database to find its correctness.
Knowledge level estimation	The selection of the algorithm for knowledge estimation is implemented at this stage. Two main approaches have been used for the algorithm.
Terminating a test	To specify the criteria responsible for terminating a test, we use three approaches. One approach terminates a test when a specified knowledge level has reached; the second terminates the test when a certain number of questions have been asked; and the third one terminates a test when a specified time period has elapsed.
Save questions data in database	This use case is used to handle the storage of question data into the database. These data are then becoming available for all users of the system.

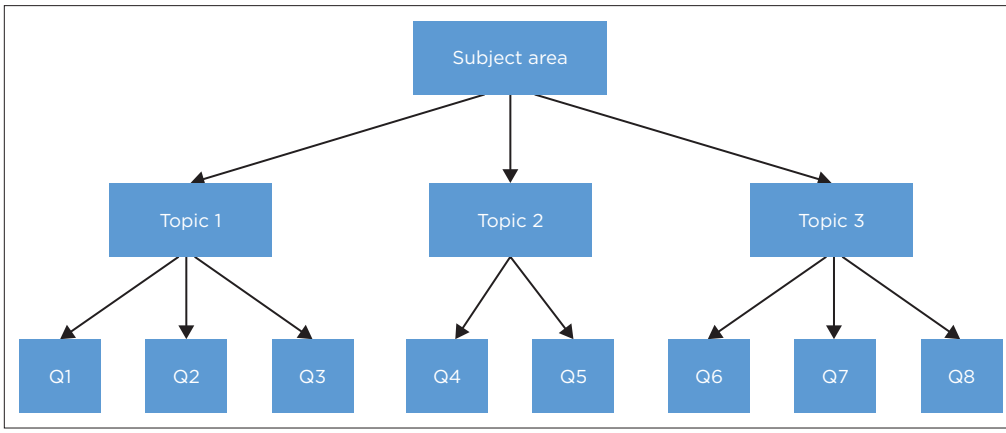

FIGURE 5.6: Depiction of the structure of topics and related questions.

Ipsative assessment of students using the system

The system is designed to encourage students to participate in the discussion board, posting questions or answers. Each participant is automatically evaluated by the system with a predefined set of points that can be used to determine the level of participation and later on can be used by the teacher towards giving extra credits in the course. Factors affecting the participation

level of a student might be the number of posted messages or the teacher assigned bonuses, for example, a bonus for a very informative posted message.

The evaluation of the student knowledge level is achieved through several testing components embedded in the software. Figure 5.7 outlines the main components of the process of evaluating the knowledge level of students or system users, which is divided into the following functionalities:

1. A student requests a level evaluation.
2. The system identifies the current level and generates questions of a higher level.
3. The student takes the test.
4. The system checks whether the level can be incremented or not.

Prototype system implementation and preliminary results

A prototype of this online tutoring with integrated ipsative assessment environment has been successfully piloted and tested by the second author on one introductory computer science class at his institution. Around 80% of students participated in the pilot using the environment to conduct self-assessments and monitoring of performance. Furthermore, the second author conducted pre–post perception survey at the beginning and the end of the semester to record student feedback related to the effectiveness of this virtual environment. Results showed that 83% of the students who used the online system reported some improvement in their study skills. Furthermore, discussions between instructors in the same department revealed that faculty enthusiasm for the virtual environment is fairly high and that overall, students' impression of effectiveness was positive. These preliminary results are

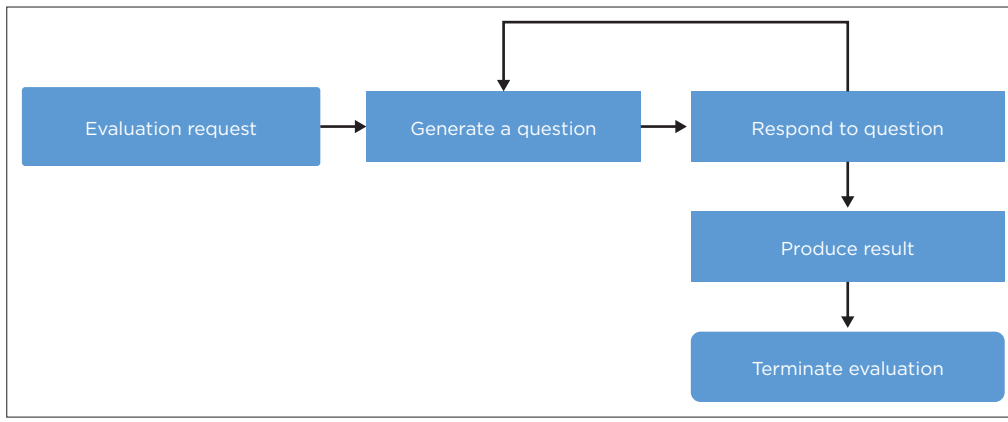

FIGURE 5.7: Depiction of the iterative ipsative assessment of student knowledge.

encouraging considering that the system is fairly new and the fact that this intervention was the second author's first trial experimentation with such a system.

A number of periodical evaluations were planned throughout the implementation stages. The testing and evaluation component of the software is very useful to extract statistical information about the effectiveness of the software in improving the knowledge level of the students in general or some segments of students in particular. The statistical reporting component is very useful in this regard. Surveys were also employed as useful means to collect overall student impressions and to reflect on this feedback by making adjustments to improve the virtual environment and to make it more efficient and user-friendly for the users.

Conclusion

The proposed virtual system is a unique interactive and adaptive system that combines the advantages of online collaboration with that of a traditional classroom environment. A potential benefit of the pilot is supporting ipsative assessment and feedback by compiling and preserving student submissions across multiple modules, making it easy for students and teachers to track past performance and to monitor learning gains. Furthermore, teachers can employ the data nestled within this virtual environment as a pedagogical tool to direct further learning and monitor progress at different time points.

There are numerous salient features of this virtual ipsative assessment system that supports self-directed approaches to knowledge-building. Firstly, the system complements classroom instruction by providing an interactive forum for students to pose questions, get answers from teachers and fellow classmates, as well as look up previous discussions on course topics in a convenient manner. The system includes intelligent algorithms to search the question bank for similar items given one or more keywords, thus providing a suite of smart searching capabilities. Based on keyword search, the system is capable of retrieving several related questions, thereby reducing the repetition of questions posed in the forum. In this way, students are afforded opportunities to self-regulate their learning by managing access to knowledge from multiple resources.

Secondly, the system facilitates ipsative assessment approaches delineating trajectories of acquired knowledge levels over repeated assessment activities. At the beginning of a course, each student takes a short diagnostic assessment, which defines their baseline knowledge level. This baseline level determines the level of complexity of successive assessments that students need and delineate the depth and breadth of ipsative feedback required during the process. By taking personalised and adaptive assessment modules several

times during the duration of the course, students and their teachers can get a good estimate of the learning that is taking place on an individual basis. Results from these ipsative assessments can be correlated with students' formative assessment in the course and support a plan to either enrich or remediate based on students' emerging needs.

Thirdly, the virtual environment facilitates student-content interaction by using an incentive-based system rewarding student engagement in SDL and giving a range of reinforcements, including extra credit. For example, the teacher can configure the system to migrate questions to the test bank and aggregate bonus points for individual students who use and contribute to the system over the duration of the course. The entire student group benefits from increased usage of the system. The question banks get enriched with the increased use of the system when new questions are posed by students and answers are populated. Ultimately, the enhanced knowledge base and skill acquisition that students experience by independently using the virtual environment will support an extended interest in using more self-directed approaches to learning.

We envision that the virtual pilot environment will have several fundamental benefits. Firstly, there is unlimited accessibility as students can create and complete the assessments anytime and anywhere where Internet access is available. Secondly, another benefit relates to identifying and supporting struggling students by scaffolding instruction and establishing step-by-step remediation plans to close their knowledge gap and track their learning gains. Thirdly, we argue that the virtual tutoring pilot has the potential of stimulating dialogue between students, peers and teachers, allowing for more interactive context for making decisions about future learning building on past performance. More importantly, and as Nicol and Macfalane-Dick (2006) noted, enabling students to be self-directed learners delineating their own learning progression in a self-regulated manner, which is key to ensuring successful lifelong learning beyond school settings.

Chapter 6

Assessment as an epistemological tool to facilitate metacognitive awareness and promote self-directed learning

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Abstract

Assessment practices are largely seen as mediating ways to enhance students' learning. As the COVID-19 pandemic, with set lockdown periods, posed a threat to education practices on a worldwide scale, opportunities for a stronger and more rapid movement towards online, remote and distance modes of education are afoot. Internationally, the focus of higher education institutions has shifted to developing and supporting innovative education practices. This also involves practices of assessment, in particular assessment

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practices that provide and require opportunities and approaches for SDL. Alternative measures have been put in place with the after-effects of the pandemic for the purpose of sustainable education, which necessitates exploring how assessment can serve as a tool to enhance the learning experience. This debate has provided a range of possible propositions of understanding SDL across various educational settings (e.g. teaching, learning and research initiatives). To this end, the chapter provides a proposition concerning the facilitation of metacognitive awareness and promotion of SDL capacities needed in the 21st century. It is argued that higher education institutions prepare and continue teaching and learning initiatives, especially in terms of establishing assessment practices that will promote SDL. This proposition is presented based on a philosophical analysis of the conceptions of assessment and metacognitive awareness considering the theory of an epistemology of engagement. In closing, a framework is offered that can serve as a model for exploring metacognition and SDL in assessment practices, where assessment serves as an epistemological tool.

Introduction

Several new practices of innovative applications of assessment have recently emerged, including the use of videoconferencing and the availability of classroom websites. In addition, lecturers and students, in many cases, rely (perhaps now more than ever) on their own resourcefulness and materials to support and enhance learning experiences. With the hope of returning soon to what some call the 'new normal', the after-effects of rethinking assessment towards a sustainable form of education remain. However, amidst this need, an online Google Scholar search for available publications on assessment practices in higher education produced only 55 available references when limited to the keywords 'problem-based learning', 'self-directed learning', 'metacognitive awareness', 'higher education' and 'teacher preparation' (Google Scholar 2020a). When this search was further refined to recent publications of the past five years (between 2015 and 2020), the research results listed only 32 citations (Google Scholar 2020b). These results indicate the limited access to and scarce availability of innovative applications of assessment practices to promote SDL towards a pedagogy of hope for sustainable education.

Access for lecturers and students who are in search of literature reporting on the conditions and conduct of assessment practices that focus specifically on the facilitation of metacognitive awareness and the promotion of SDL is therefore limited. In this chapter, the author aims to narrow this gap in the literature by proposing a framework that could position assessment on an epistemological level, theoretically argued, in terms of the various conditions that an assessment task should meet in order to facilitate metacognitive

awareness and promote SDL. In this way, assessment can be seen as an epistemological tool that serves as a knowledge level developed by the increase of personal engagement with reality, which occurs through reflection on ideas that emerge as a result of the engagement with the assessment task.

Although there are many online access and source materials that can be used to conduct assessment (e.g. see Roberts 2019), the literature search shows a scarcity in the field, as there are only a few publications with a focus on SDL, which is regarded as an international education imperative. This scarcity highlights the need for a framework and discussion that can assist educators in determining important aspects of assessment and learning, including a need for explanations on how to facilitate metacognitive awareness, which emphasises skills such as planning, monitoring and evaluation. In essence, a framework is needed to offer guidance in terms of how students and lecturers should engage with the assessment process. This also requires a discussion on the promotion of SDL for assessment as considered from Knowles' (1975) important guiding principles for SDL. This chapter therefore holds the proposition that assessment opportunities must abide by a series of epistemological conditions. In the discussions that follow, three arguments are aligned to serve as epistemological tiers that structure the proposition. Firstly, in the conceptual framework, an overview of connections between the metacognition and SDL literature, both historical and practical, is provided. Secondly, in the theoretical framework, a discussion is offered on Brinck and Liljenfors (2013) theoretical tiers of metacognitive awareness. These conditions, in theory, explain the set conditions of when and how the student and the lecturer should engage with the assessment processes in such a way that the assessment can serve as a tool to facilitate metacognitive awareness towards promoting SDL. Lastly, in the philosophical analysis through an 'epistemology of engagement' and its implications for the psychology of metacognition, particularly in terms of the levels of metacognitive awareness, the argument is made to support the meta-theory that metacognition needs to be facilitated to promote student self-direction.

Setting of the context

In higher education, the assumption is that students do and will take responsibility for their learning. In a study by Chatzipanteli, Grammatikopoulos and Gregoriadis (2014), for instance, research indicated that it was necessary to enhance students' metacognitive awareness of the meta-level skills needed to deepen the learning experience. As a consequence, knowledge transfer and critical thinking skills can then accumulate when students who exhibit metacognitive awareness by planning, monitoring and evaluating their work are enabled to improve their academic performance (Chekwa et al. 2015).

Internationally, the undertaking to move away from outmoded transmissive-type teaching approaches towards a holistic education approach (Miller 2000) promotes the idea that students learn how to learn and, in doing so, they develop self-reflective problem-solving skills which encourage their pliability and adaptability. Also, teachers encourage such thinking about thinking practices in the classroom by modelling this behaviour, directing the self in learning (Du Toit-Brits & Van Zyl 2017). In contrast, Roberts (2019) reports that teaching styles in South Africa are outdated and do not sufficiently equip students for the future. Regarding the unpredicted worldwide pandemic in 2020, Egenti and Okoli (2020) point out that most teachers are now being forced to unlearn the ways they have always used for teaching and assessing, and this challenges much of the rooted beliefs held in their education.

The ontology of assessment

Questioning can serve as a type of ontology-based assessment technique (as shown in Table 6.1). Ontologies describe the main concepts or content on which the assessment task is based and can be used in assessment tasks (Gavrilova 2003). An ontology-based assessment approach, therefore, provides a way to deal with students' evaluations of their learning and proposes that students show their understanding, knowledge and skills whilst constructing individual ontologies (or beliefs about learning). Such a method of assessment gives preferences over conventional, traditional assessment methods, when compared to techniques such as tests and quizzes (Leshcheva, Gorovaya & Leshchev 2010). According to Gavrilova (2003), ontology can be defined as a hierarchy of organised experiences or qualities that describe a domain, environment or context. Terms associated with the context of learning are often found in problem-based assessments (e.g. word problems, project-based learning activities or problem-centred approaches) which provide details concerning the physical, personal and

TABLE 6.1: Conceptualisation of assessment practice.

Assessment components as elements of the proposition	
Conception of assessment	**Purpose and functions of assessment**
What are lecturers' perceptions of the curriculum?	How does assessment serve as a tool to improve teaching?
What are lecturers' beliefs about teaching and learning processes?	How does assessment serve as a tool to improve learning?
What are lecturers' beliefs about students?	How is assessment driven by the school or faculty for accountability purposes?
What are lecturers' beliefs about professional self-efficacy?	How is assessment driven by the student for accountability purposes?
	How is assessment driven by the lecturer for accountability purposes?

Source: Inspired by Wang's (2019) framework of conceptions of assessment.

cognitive space. One example of such spaces is the use of indigenous knowledge in the classroom, where the indigenous practice or artefacts (e.g. indigenous board games) or virtual realities such as laboratories or cultural and heritage museums serve as ontological tools to mimic or (re) create the space, environment or context for learning which represents the particular ontology. Ontologies can therefore serve as useful structuring tools that draw upon the imaginative faculty of the lecturer and student to visualise and mentally create a model of the ontology of the task – a sort of hyper-space or domain of knowledge (also called a 'locale'). Ontology design is therefore also regarded as useful and may be considered a condition of the assessment task. Reflecting on, thinking about and mentally visiting this locale requires higher-order meta-level thinking on a meta-level, which Jagals (2015) refers to as the 'metacognitive locale'.

In order to draw assessment, metacognitive awareness and SDL together – advocating the use of assessment to enhance SDL and metacognition, the association between epistemology and assessment needs to be clarified. First, epistemology can be defined as a philosophical theory of what knowledge is (Gavrilova 2003). Pedagogy may, in part, be seen as a form or type of educational epistemology, or the science of imparting knowledge to students. However, this relationship between epistemological concepts such as pedagogy and assessment is a topic seldom of educational debate (Leshcheva et al. 2010). The chapter therefore sets out to reason that assessment can serve as an epistemological tool that facilitates metacognitive awareness and promotes SDL. The remainder of this chapter is structured as follows to develop this framework of thinking and to motivate and support the proposition following this methodology:

1. An examination of the concepts of assessment, metacognition and SDL to anchor the entire proposition and form the basis on which a conceptual-theoretical framework can be built to support and explain the proposition (see Figure 6.1).
2. Key components of the three concepts are explored, in particular as ways by which they can emerge in research as codes or themes (or elements of the proposition) (see Table 6.1).
3. A review of related literature is offered to determine how scholars addressed these key components and to identify any underlying assumptions.
4. A list of key concepts as constructs and variables relevant to the proposition have been arranged across the sections that follow, specifically to illustrate the different components of the concepts of assessment, metacognitive awareness and SDL.
5. The relevant theory concerning the tiers of metacognitive awareness provides an understanding of the implicit, perceptual and metarepresentational levels of metacognitive awareness.

6. The assumptions are then discussed in the philosophical analysis section of this chapter following Heyns' (2006) theory of an epistemology of engagement, from which a set of beliefs is formed about the task of assessment. Ultimately, such beliefs evolve into an implicit, perceptual and metarepresentational metacognitive awareness. This awareness, in turn, shapes the personal epistemology, which is discussed next. Thereby, facilitating metacognitive awareness and the SDL capacities needed in the 21st century, future learning and lifelong learning towards sustainable education could be enabled.

Conceptual framework

There is a perceived role that students are accountable for the learning process, and that assessment should take priority in this regard. The relationship between assessment and metacognition is, however, scarcely reported on in the literature on education because the initial search results (Google Scholar 2000a; Google Scholar 2000b) show few attempts in addressing this in higher education contexts. The work by Wang (2019) highlights assessment literacy as a guiding factor in determining the conception of assessment. Wang reports a framework of conceptions of assessment, which will contextualise the discussion that follows. Furthermore, the literature review suggests a noteworthy relationship between metacognitive awareness and student academic achievement (e.g. Erlin, Rahmat & Rejeki 2020).

Assessment and assessment literacy

Assessment is usually depicted as a cyclical model that involves (1) a gathering of information about students' learning, (2) an analysis of this collected information, (3) interpreting the analysed information, (4) recording the interpreted information, (5) reporting on the recorded information, and (6) using the interpretations to enhance future learning. This process typically involves a number of infiltrating principles that guide the degree of the assessment practice and include principles such as reliability, validity, fairness, meaningfulness, transparency, balance, bias, cognitive complexity, generalisation, feasibility and accountability. However, Wang's (2019) framework of the conceptions of assessment presents two major components of assessment as (1) conceptions of assessment and (2) the purpose and functions of assessment, relating to these conceptions.

In essence, assessment purposes and functions define assessment in terms of the tools it offers to improve teaching and learning (Lam 2020). As assessment is driven by the faculty for accountability purposes, it is also driven by the students, and so, lecturers also hold accountability to the different stakeholders in the assessment process (Wang 2019). The conceptions

that are held regarding these purposes and functions relate to the lecturers' perception of the curriculum being implemented and their epistemological beliefs concerning teaching and learning (Wang 2019). Based on the conceptualisation of assessment in this section, the following list of questions, as inspired by Wang's (2019:157) framework, can serve as codes or themes (of underlying propositions) for exploring assessment practice.

The agenda of assessment

Two decades ago, there was a notion that true assessment transformation in policy and practice could only occur when the curriculum reformed in the same direction (Lam 2020). First, a closer look at how assessment can be conceptualised. Today's education system can be regarded as the result of the industrial revolution (Pillay 2020), which organises students' developing skills and forthcoming careers that require much more unified ways of thinking. However, education takes place when new knowledge emerges through encounters with challenges in everyday life (Wheeler, Waite & Bromfield 2002). The curriculum should therefore emphasise the teaching of skills that develop a personal epistemology, one that holds education and its assessment as a cultivating practice.

Aspects of assessment literacy

Numerous studies have reported on the various principles of planning and conducting assessment (see for instance Price et al. 2012). Recent literature by Khani (2020), however, suggests that teachers' cognition and practices of assessment are not congruent with the principles of assessment. Some studies (e.g. Lian & Yew 2020) have reported on the various psychometric properties of assessment literacy to be at the heart of this problem. Assessment literacy refers to an individual's (either a student or lecturer's) understanding of the essential concepts or the procedures and approaches of assessment (Inbar-Lourie & Levi 2020). This includes the assessor's competency in selecting an appropriate assessment method. Lian and Yew (2020) indicate in their framework the characteristics of assessment literacy: (1) unistructural, (2) multistructural, and (3) relational levels of the task.

Lian and Yew (2020) explain the levels as follows: the *unistructural level* requires the response to the assessment task to directly refer to a piece of concrete information or factual knowledge in the task. This involves the understanding of the envisioned educational or learning outcome. After such engagement, in response to the task, concrete, abstract and relevant information provided in and by the task can be focused on to identify a learning outcome. On the *multistructural level*, the task requires this specified information to be applied in a specific order. That is, the student needs to

determine the outcomes and categorise the learning needs where the task information can be applied. However, on the *relational level,* the task necessitates an amalgamation of all given information to make a decision. The assessor has to consider all the information provided to determine the most appropriate assessment method. It is also possible that the three levels can be combined in a single task; however, this then requires different levels of its application.

Conceptualising assessment in terms of metacognition

Awareness of one's thinking and knowledge of the cognitive processes (or metacognitive knowledge) seem to play a vital role in the conception of assessment indicated in Wang's (2019) framework. It appears from studies such as those by Siegesmund (2017) that the understanding of metacognition for learning involves an understanding of assessment and relates to assessment literacy levels identified by Lian and Yew (2020). Examples of assessment practices that employ metacognitive awareness include guided participation as a form of apprenticeship teaching towards autonomy, self-assessment practices and authentic assessment practices that utilise real-life situations and typically involve problem-based or project-based learning initiatives – all of which align with productive and frequent feedback. Wang (2019) also mentions feedback that can serve as a metacognitive tool when being indorsed by self-assessment scripts and rubrics along with modelling.

Facilitating metacognitive awareness

Flavell (1979) posits that metacognition is simply described as the process of the awareness of thinking. Reflecting on text for comprehension and scrutiny aimed at the purpose of academic achievement seem to be at the heart of the assessment process (Lam 2020); yet, the assessor's (as teacher or lecturer) beliefs and own cognition can either advance or impede students' beliefs about themselves and their cognitive development in the assessment and awareness of the task at hand (Siegesmund 2017).

Metacognitive processes function on the meta-level of cognition. Whereas cognition refers to the object level, metacognition refers to the reflected and accumulated knowledge (or awareness) on the meta-level (Jagals 2015). Metacognition is often associated with the dimensions on the meta-level, as illustrated by Flavell (1979) regarding metacognitive knowledge in addition to metacognitive experiences, and Brown's (1987) study concerning the dimension of metacognitive regulation or self-regulation. The knowledge one develops and constructs based on the reflection of the metacognitive

knowledge, experiences and regulation processes is generally referred to as 'metacognitive awareness' (Efklides 2011).

☐ Awareness of metacognitive knowledge

Reflection on one's metacognitive knowledge occurs before, during and after cognitive strategies have been employed (Jagals 2018). This process of awareness occurs consciously and deliberately when the teaching-learning content and the knowledge about the thinking processes involved in that process coincide. This refers to the person, task and strategy knowledge represented in the unseen intangible thoughts about one's own capacities. The act of reflecting on this knowledge ignites the interaction between metacognitive knowledge and the regulation of this knowledge, such that meta-level awareness oversees the understanding and application of the teaching-learning content (Jagals 2018). Based on this understanding, it seems that deciding on an appropriate assessment strategy, the lecturer must think about similar tasks, reflect on the task and strategies and anticipate the development of this awareness.

As indicated by Dunlosky and Kane (2007), metacognitive awareness assists in the learning process as a beneficial motivation in the learning experience. This form of mindfulness supports the learning process situated between one's capacities to be aware of own qualities and shortcomings and the feelings and emotions that accompany the learning experience.

Declarative knowledge responds to what information with respect to one's own understanding one becomes aware of (Jagals 2015). At the point when students self-reflect on their comprehension of a specific task, they additionally become aware of the specific parts of the task that they discover to be simpler or more difficult to comprehend (Jagals 2018). The student at this point develops this contingent form of knowledge by focusing on either familiar and useful information (or information of oneself), task information or the system/processes information required (Setlhodi 2019). Where metacognitive awareness creates opportunities to contemplate (Jagals 2018), students often either underestimate or overestimate their understanding and application of their knowledge and skills. Likewise, his misconception of self-knowledge appears to have an impact on the quality of the measures taken to assess metacognitive learning. This is regularly found in quantitative results whereby self-reports on a Likert-type scale are meant to report on own metacognitive awareness, which forms, in turn, their own epistemology of learning (e.g. Siegesmund 2017).

Procedural knowledge refers to how one sees the assignment or task and thinks about the procedures underlying the task's content (Jagals 2015). This could be, for example, what length of time will be spent on completing the

task, what sort of appraisal openings ought to follow and what procedures or strategies would be suitable for this particular assignment. Furthermore, understanding the underlying systems, for example, different procedures and philosophies associated with the assessment task can be evaluated to determine what specific difficulties are to be expected (Ramanarayanan, Evanini & Tsuprun 2019).

Conditional knowledge alludes to the specific conditions where one's very own usefulness for utilising metacognitive systems can be applied. Students who are aware of the approaches they follow to solve a task are empowered to reflect on these strategies. They then become aware of the conditions under which particular strategies or approaches to the task work in a way that is better than others. Efklides (2011) alludes to this awareness as the cycle of memory checking and self-guideline.

☐ Awareness of metacognitive regulation

Metacognitive regulation involves the actions that arise from the intentional thinking of metacognitive knowledge and serves as an informed and goal-directed process to control one's thinking (Flavell 1979). Lecturers who are aware of their students' thinking are able to predict suitable assessment strategies that will promote the students' SDL (Pillay 2020). Metacognitive regulation comprises the monitoring and controlling of students' cognition (Erlin et al. 2020). Three distinctive metacognitive processes of self-regulation are present during assessment, namely planning, monitoring and evaluation. Metacognitive regulation raises awareness of the underlying practices to plan, predict, monitor and evaluate this thinking (Siegesmund 2017).

Siegesmund (2017) presents a model of metacognitive regulation of the self and argues that self-questioning brings about metacognitive awareness. Siegesmund's (2017) model illustrates that the process of self-regulation requires the student to (first) self-assess by asking self-questions (e.g. *What should I do differently next time?*), followed by a focus on task-assessment (e.g. *What about this task do I already know?*). This process of self-assessment and task-assessment raises the awareness of metacognitive knowledge. Wang (2019) also acknowledges this as the metacognitive component of cognitive knowledge in the assessment framework. According to Siegesmund's model, the next two steps require planning and monitoring. The student plans (e.g. *What steps will I take to solve this problem?*) and monitors (*What strategies that I have used are assisting me to complete the task?*) his or her thinking.

Planning embraces the setting and formulation of learning objectives. This requires, in turn, a reflective process to bring to mind an awareness of declarative, conditional and procedural metacognitive knowledge. When monitoring this process and their understanding thereof, students can make

changes to the strategies they employ for learning, as well as revisit the knowledge they have. This is followed by the student's self-evaluation (or self-assessment) concerning the effectiveness of the learning strategy. The student evaluates, that is, asks questions such as the following: *What is required from me?* or *What knowledge or skills can I use to complete this task?*

Interestingly, Flavell (1979) introduced the term 'metacognition' to the field of educational and cognitive psychology during the same decade that Knowles (1975) published his work on SDL. Even so, the theories involving these two concepts have developed alongside each other, often in different strands of teaching and learning philosophy.

Self-directed learning in assessment

In this section, SDL refers to the vital features of a critical, rather than mechanical or technical interpretation of the extent of learning and includes: (1) self-direction as a constant deliberate and continuous process to take personal control over learning decisions and (2) self-direction as the capacity to identify and access appropriate resources (Brookfield 2020).

Pillay (2020) raises the concern that South African school curricula do not encourage the necessary teaching and learning activities that allow students to develop much-needed SDL skills. Once these students have completed their secondary school studies and enrol at universities, they are not familiar with SDL activities in tertiary education. Du Toit-Brits and Van Zyl (2017) further explain a discrepancy between the students' and the lecturer's views on SDL. Often, the lecturer sees SDL as a holistic learning process, whilst the students hold a different mindset that pertains to SRL instead of reflective learning practices, which pertain to metacognitive awareness and SDL. There is, however, value in pacing SDL (Setlhodi 2019). In Pillay's study, for instance, a lack of critical reflective skills indicates an absence of self-directedness.

Lam (2020) shows that schools that focus on a product-type education, where knowledge production is seen as an end result of schooling, emphasise writing processes for self-reflection. Also, Lam (2020) suggests that self-reflection is essential in empowering students to become less dependent on feedback obtained from the lecturer, as assessment opportunities that promote SDL offer less lecturer-driven feedback and require more self-reflection.

Educationists, teachers and researchers often experience doubt with regard to assessment, and not all lecturers and students are necessarily aware of the variety of accessible assessment approaches, particularly those that promote SDL. Those who are aware of it have difficulty in selecting an appropriate assessment approach (Roberts 2019). Van Hout-Wolters (2000)

distinguishes between four types of goals to keep in mind when planning assessment practices: (1) diagnostic evaluation, (2) formative evaluation, (3) summative evaluation, and (4) non-evaluative assessment.

These types of evaluation should not be interpreted as metacognitive evaluation, which is why these types of evaluations have been edited to refer directly to the particular assessment types:

1. *Diagnostic assessment* refers to the obtaining of information about the strong and weak points of the student's learning skills (to gather knowledge about the person) *before* the learning activity. The assessor can here determine what students' identified learning needs are, for instance, and in so doing kindle the process of SDL. This could lead to a discussion or self-developed and negotiated (between lecturer and student) framework towards reaching the set objectives. Through this diagnostic process, individual students can benefit from personal and adaptive learning environments for an individual, school or class level.
2. *Formative assessment* refers to the testing of progress made and involves a process where the goal is to occasionally collect evidence *during* the lesson and then give feedback to the students, with some guidance on how the process can be personalised or adapted. In this assessment type, SDL can be promoted by monitoring the development of the learning process through self-reflection, self-report, reflective writing in cooperative learning settings or peer assessment.
3. *Summative assessment* occurs *at the end* of the learning experience or task to determine to what extent the identified objectives have been reached as a form of final testing. In the author's opinion, this is where most traditional approaches to assessment in higher education are focused – assessing for marks, and seems as if it is anticipated and expected by students (e.g. Lam 2020; Roberts 2019).
4. *Non-evaluative assessment* occurs *without* conclusion or judgement and serves to assess learning skills only for the purpose of recording it as a form of non-evaluative assessment. As this type of assessment does not count towards final grading in terms of test points or marks, students often underestimate its value for promoting SDL. The focus is on gaining insight into distinct learning skills and can take place before, during or after the learning activity.

Theoretical orientation

Joksimovic et al. (2019) show that metacognitive awareness can promote reflective states of consciousness. Their study builds on the assumption concerning how metacognitive knowledge shapes this awareness of own cognitive processes and how one understands, manages or regulates these processes in order to enhance learning. The work by Brinck and Liljenfors

(2013) offers a theoretical perspective on metacognition. The authors explain that metacognitive awareness develops across three stages or metacognitive tiers, including (1) implicit experimental awareness, (2) perceptual awareness, and (3 metarepresentational awareness.

☐ Awareness on an implicit level

Approaches to an assessment task require skills such as arranging outcomes and information, observing the needed strategies to implement and assessing the application thereof (Flavell 1979). When a student becomes aware of these skills, this new information becomes self-related (Efklides 2009). Efklides (2011) proposes that learning environments help with creating different sources of inspiration, and these encounters can intuitively influence the awareness of other related thoughts, for example, expectations, convictions and perspectives (Pratt & Collins 2000). Through involvement in such self-reflection, awareness is encouraged with respect to the expectations for educating and learning, for example, what system, strategies or knowledge will best suit the assessment of task A, and what perspectives with respect to a specific theme will be constructed based on this approach or assessment method.

☐ Awareness on a perceptual level

The level of perceptual awareness includes the support of the metacognitive faculty of metacognitive awareness of feeling and thinking (Efklides 2011). In such cases, students may wonder what the reason is for completing a particular task. Or they may wonder what the reason is for utilising a specific assessment technique, or whether it is relevant. Perceptual awareness can, for instance, serve as an exceptional and personal reflection on the deep commitment between the student as future teacher and his or her realisation of the calling as a teacher (Proust 2013). On this level of awareness, educating and learning experiences are scrutinised through a personal search for meaning.

☐ Awareness as a metarepresentation

Proust (2013) sees metarepresentational awareness as any representation or expression that alludes to both the substance of educating (e.g. the subject or educational programme) and a pertinent assessment method. Metarepresentational awareness can be viewed as a third or elevated type of awareness, as it overarches the influences of cognition and metacognitive knowledge and regulation. Together, the three levels of metacognitive awareness can create a profound and individual incentive to the instructing and learning encounters and educate the advancement regarding a

hypothetical direction towards understanding the estimation of work-incorporated learning for proficient educator improvement programmes in open separation learning.

Philosophical analysis

Self-directed students have a sense of personal agency about their learning (Siegesmund 2017). Initially, in the conceptual framework, assessment practices were conceptualised according to the framework of conceptions of assessment (Wang 2019) and SDL, and then aligned with Brinck and Liljenfors' (2013) levels of metacognitive awareness as theoretical lens. Understanding metacognition from this review, along with its knowledge and regulatory processes, offers an understanding of assessment across multiple conceptions. The work by South African authors, including that of Setlhodi (2019) and Du Toit-Brits and Van Zyl (2017), seems to support the claims made that assessment and metacognitive awareness can promote SDL.

At this point, the author wants to direct the reader's attention to the philosophical underpinnings involving metacognitive awareness for SDL, with particular reference to the self in learning. This is because both metacognition and SDL have their roots in the underlying approaches to the ontology and epistemology of assessment practices (Proust 2013). In particular, such a philosophy provides the methodological principles by which assessment can be understood and by which it can serve as a component of engagement.

The proposition made in this chapter is oriented by the theory of engagement (Heyns 2006) that serves as a metatheoretical lens to interpret and understand assessment as an epistemological tool. This involves an understanding of the application of assessment practices and theory, in other words, assessment literacy (e.g. what practices are suitable to conduct assessment) and includes the understanding of emerging thoughts in terms of affective experiences, the intentions, beliefs and attitudes towards assessment practice that shape the perspective and reflections on this practice that inform a change in regulation (i.e. planning, monitoring and evaluation). After this orientation, the conceptual overlaps amongst assessment, metacognitive awareness and SDL have been explored by means of the theoretical framework, which then serves as the conceptual-theoretical framework that contextualises the underlying argument of the proposition.

Representational epistemology (Heyns 2006) refers to the process whereby a foundational idea (e.g. the content of a task) can be reflected upon to attain in the mind an exact representation of that idea. In this sense, the act of reflecting serves as the engagement with a task that generates a personal epistemology of how both the content of the task and the task itself will

be assessed. An argument put forward by Heyns (2006) concerning such reflection refers to the theory of an epistemology of engagement. Heyns (2006) explains that engagement takes place in a series of eight conditions, summarised in Table 6.2 and is aligned with the levels of metacognitive awareness as identified by Brinck and Liljenfors (2013).

Heyns (2006:75) explains the first condition as the gathering of 'foundational precepts or ideas about things and then build a representation from these building blocks'. When students engage with a task, they do so by reflecting on the instructions provided by the lecturer, as well as their own ideas about the requirements of the task. Through such engagement, they build a representation in that they become aware of their knowledge about the task, person and strategy. This epistemological engagement, it seems, facilitates implicit experiential awareness of metacognitive knowledge and metacognitive regulation skills because of the conditions of the task that serves as an epistemological tool.

Through such reflective engagement, a second condition is set in that the task itself must become a focal point in the learning process. In this sense, the student plans, monitors and evaluates the ideas on the task and, at the same time, becomes aware of the affective experience in learning, in that the task may be enjoyable or frustrating. An example that Strawderman (2009) draws on to explain this is the student's awareness of his or her confidence (or lack thereof) to complete a task.

TABLE 6.2: Conditions of an epistemology of engagement in relation to the levels of metacognitive awareness.

Conditions of an epistemology of engagement	Level of metacognitive awareness
1. 'All knowledge is a perspective determined by our interest, aims and beliefs'. (p. 79) 2. 'The aim of knowing is to engage with the multitude of aspects of reality that are knowable and are thus engageable'. (p. 81)	Implicit experiential awareness to facilitate awareness of metacognitive knowledge and metacognitive regulation.
3. 'Representations and perspectives fundamentally or in principle are in contact with reality'. (p. 84) 4. 'Knowing or finding truth about reality is important because we are embedded in a reality that crucially influences our functioning in it'. (p. 87) 5. 'The fundamental embeddedness of the self in the world assumes a structure for human abilities and reality that enables and necessitates engagement'. (p. 88)	Perceptual awareness to promote self-directed learning.
6. 'Knowledge comes into being in the act of engagement between knower and known'. (p. 91) 7. 'Interaction between my abilities to engage with reality and the objects of knowing that stimulate my abilities of knowing'. (p. 93) 8. 'The knower engages with a knowable of which we are able to know a variety of functions and relations between these functions'. (p. 98)	Metarepresentational awareness to transcend learning from the task to a personal epistemology of self.

Source: Author's alteration from Heyns (2006) and Brinck and Liljenfors (2013).

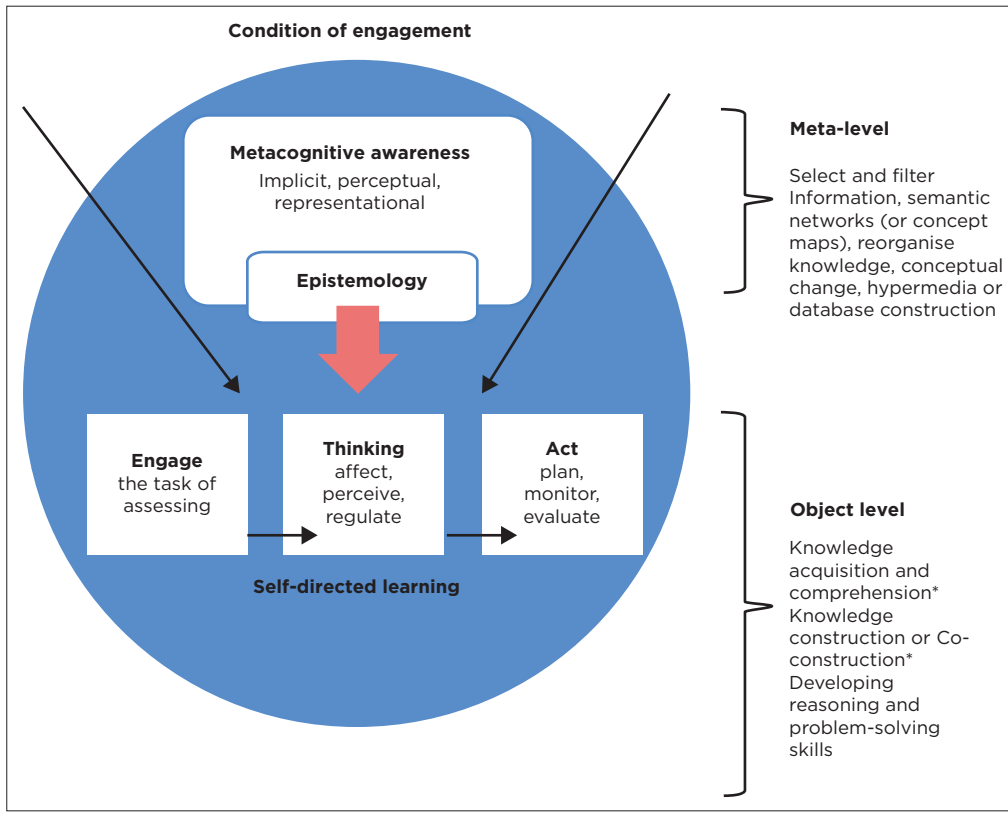
The third condition set by Heyns (2006) employs the notion that the student has reflectively engaged with the task, and his or her implicit awareness, to the point where mental representations or ideas of the task are being perceived as related to other perceptions or ideas. Strawderman's (2009) model shows that students associate their affective and meta-affective experiences to the origins of the idea. For instance, they will typically recall a family member or friend helping them with a similar task or point out their own success at attempts with related tasks in the past. This, as the fourth condition implies, affects future engagement with the task, as affective experience with the task facilitates awareness of the metacognitive processes (such as knowledge and skills).

Based on the perception as facilitated by engagement with the task, the fifth condition suggests that the student develops an epistemological belief (or representation) of awareness of the self, which needs to be directed towards the aim of the task. Here, Knowles' (1975) process characteristically calls for a step to take the initiative with or without the assistance of others (such as peers, family members or lecturers) in diagnosing learning needs. This, theoretically at least, implies that the facilitation of perceptual metacognitive awareness promotes SDL.

Thereafter, the sixth condition calls for metacognitive knowledge to assist in formulating learning goals through planning, monitoring and evaluating the person, task and strategy knowledge. This indirectly implies an 'ongoing process of interaction between my abilities to engage with reality and the object of knowing that stimulates my abilities of knowing' (Heyns 2006:93) through identifying what perceived 'forms of human and material resources for learning' and what the 'appropriate learning strategies' (Knowles 1975:18) are.

Heyns' (2006) eighth condition suggests an overall metarepresentation of the processes of metacognitive awareness to instil an evaluation of the attainment of the learning outcomes. To this extent, the levels of metacognitive awareness can produce a personal epistemology of engagement. From this reasoning, the author aligns himself with this theoretical orientation to extend the argument further with the key concepts to model a conceptual-theoretical framework, which is discussed next.

The meta-level refers to the higher-order (or metacognitive) processes involved. Efklides (2011) refers to these processes as the meta-affective domains. Students then act upon the task by determining what the task requires from them (as a form of declarative knowledge). They then plan how they will acquire the necessary knowledge and skills, monitor whether they comprehend this knowledge and determine under what conditions (conditional knowledge) and with what procedures this knowledge can be applied (procedural knowledge). This is followed by evaluating the constructed



Source: Adapted by the author with permission from Funk (2001).

FIGURE 6.1: The self in self-directed learning.

or co-constructed knowledge and skills, which can be reflected upon as self-knowledge. It is possible, however, that declarative, conditional and procedural knowledge (as forms of metacognitive knowledge) can exist before, during and after any metacognitive regulation, that is, planning, monitoring or evaluating. On the meta-level, this process of thinking and responding to thoughts can facilitate metacognitive awareness as a form of self-knowledge (source) and establish personal beliefs, opinions and certainties that shape the individual's epistemology. This epistemology then acts as a knowledge tool created by the engagement with assessment and informs future engagement, as shown in Figure 6.1.

The self in assessment

Figure 6.1 is adapted, for the purpose of this chapter, with permission obtained from its original author, Funk (2001). A set of beliefs is formed about the task that is assessed, and this influences the students' perception of and thinking about the task. Ultimately, such beliefs evolve into implicit, perceptual and

metarepresentational metacognitive awareness. This awareness, in turn, shapes the personal epistemology, discussed next.

Figure 6.1 illustrates a dynamic and iterative process of self-direction, as conceptualised for the purpose of this chapter. The process involves engagement with the task being assessed and suggests the task itself is presented in a way that will introduce familiarity with its ontology. On the object level, this familiarity serves as a form of knowledge that can be acquired by promoting students' thoughts about the affective, perceptual and regulatory behaviour needed to complete the task. The object level draws on the ontological elements of SDL (e.g. engagement, thinking and acting). These are the elements that one can become aware of or use as cognitive (or ontological) tools. This suggests that the task, the thinking processes and the behaviour acted on when engaging with the task can all be reflected upon to answer the question of 'what is', as in: *What is the task requiring from me? What strategies do I need? What plan of action should I follow?* These example questions illustrate the need for reflection on the nature of the task. To elaborate on the nature of the task, the reader is guided by the following brief discussion of the role of ontology in assessment.

The use of assessment as an epistemological tool

In the ensuing discussion, the author now draws assessment, metacognition and SDL together – advocating the use of assessment to facilitate metacognitive awareness and promote SDL. This discussion therefore relies on the above conception as illustrated in Figure 6.1.

In order for assessment to serve as an epistemological tool that facilitates metacognitive awareness and promotes SDL, the framework by Heyns' (2006) epistemology of engagement (see Table 6.2) needs to be followed. According to the interpretation of Table 6.2, Condition 1 suggests that an ontological space should be provided through an ontological design. This will establish the perspective (e.g. interests, aims and beliefs – Heyns 2006). Along with this condition, Condition 2 suggests that engaging with this ontological design, the student will become implicitly aware of the knowledge and regulation skills they have about the various aspects of reality that this engagement brings to mind. This implicit experiential awareness of the knowledge of the task, strategies and skills on either a conditional, procedural or declarative level can advocate them to take the initiative to use the feedback from diagnostic assessment. In turn, the diagnostic assessment can promote thinking about identified learning needs and the required learning resources. This can occur with or without the help of others (Knowles 1975).

Condition 3 requires representations and perspectives about this ontological design (or task) along with Condition 4's truth-finding about the task – that is: *What knowledge is embedded in the task that relates to own experiences?* In addition, Condition 5 requires a reflection on what self-knowledge and skills this task requires from the student – and how the knowledge relates to the use or application of particular task-related skills. Because these three conditions facilitate perceptual awareness, the assessment practice further fosters opportunities to formulate learning objectives and identifying human and material resources for future learning.

Metarepresentational awareness transcends the learning experience from these perceptions that developed up to Condition 5. In Condition 6, knowledge is constructed through engagement with the existing pre-knowledge and skills and that which is familiar about the assessment task. Such engagement can then stimulate the capacity to plan, monitor and evaluate own learning, thereby directing the learning experience. This awareness then promotes the selection and the application of appropriate learning strategies in Condition 7. Once these strategies have been implemented, the student can engage with the result of these strategies, thereby determining whether the strategy they selected fits with the conditions of the assessment task. As a result, the student can engage with the assessment task whilst being aware of the appropriateness of the strategies, thereby monitoring and evaluating the extent to which the learning outcome has been reached or the assessment task completed.

Conclusion

Assessment practices in education remain a single factor to determine whether students are ready to continue on their education journey, with the learning experience at its core. The peripheral questions or choices concerning assessment – for example, which assessment task is more suitable, what assessment strategy is best applicable to the particular task, whether the assessment projects promote SDL skills and how the task facilitates the relevant knowledge and skills for students' lifelong learning – all indicate how important SDL is for education. Besides these, there seems to be a global concern about exactly how assessment practice should take place, with such a variety of principles and approaches to acknowledge (e.g. Khani 2020; Roberts 2019; Setlhodi 2019). It is recommended that assessment practices concentrate on facilitating metacognitive awareness. Figure 6.1 has been conceptualised to illustrate this view. What remains is to explore the possibilities of how students' and lecturers' metacognitive awareness of the conditions of assessment tasks reveal the nature of this framework and to what extent assessment practice can assist in the advancement and understanding of the

concepts of metacognition and SDL. To some extent, assessment seems to originate from the absence of existing metacognitive and self-directed guidelines, in many instances outside of the conditions of a personal epistemology. How this awareness is encouraged and what role metacognitive awareness plays in such situations are also unknown. Metacognitive awareness needs to unequivocally form part of the assessment practice, and in turn, SDL can be promoted.

Chapter 7

Value of feedback during the implementation of the group–individual–group cooperative learning method of assessment

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Abstract

Assessment feedback should be an integral part of learning as it provides powerful support to students and can have a positive effect on learning. This aspect of learning is, however, often neglected by educators and hence also

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by their students. Different views and opinions of researchers on feedback complicate this matter even further. A mismatch between the perceptions of students and of educators about the purpose and usefulness of assessment feedback seems common. The researchers investigated the group–individual–group (GIG) cooperative learning method of assessment (CLMoA) to determine whether it adheres to the principles of sustainable assessment, specifically in terms of feedback. The research was based on the social constructivist learning theory. Firstly, the GIG CLMoA was evaluated in terms of feedback within a sustainable assessment perspective. Thereafter, a qualitative interpretivist methodology was used to determine the perceptions of both educator and students regarding the value of assessment feedback during the implementation of this cooperative learning (CL) method in a first-year Life Sciences class for pre-service teachers. The results show that the GIG CLMoA adheres to most of the sustainable assessment principles, and feedback forms an integral part of the learning process as students generate their own feedback. Both the educator and the students experienced peer feedback during the GIG CLMoA as predominantly positive; however, some aspects of its implementation need to be refined.

Introduction

According to Purnomo et al. (2018), there must be consistency between teaching, learning and assessment. Assessment, specifically assessment feedback, should form an integral part of learning, as it should enable students to reflect on, monitor and evaluate their own learning process and progress (Ferguson 2011). Successful assessment feedback is thus not primarily corrective action by the educator, but an action which allows and assists students to gain a thorough understanding of their own learning through dialogue and active participation whilst sharing their learning experiences (Archer 2010; Carless et al. 2011). Educators should actively plan for successful feedback opportunities throughout the learning process.

Problem statement

Despite the value of assessment feedback emphasised by Deeley et al. (2019), feedback often does not result in improved student learning and is therefore a subject of great concern (Ajjawi & Boud 2017). Assessment feedback is one of the most debated themes in assessment discourse, and mismatching perceptions of students and those of educators about the purpose and usefulness of assessment feedback are commonly reported (Carless & Boud 2018; Pat-El et al. 2015; Van der Kleij 2019). Boud and Molloy (2013) identify two distinct models for feedback, namely educator-driven and student-driven feedback. In educator-driven feedback, educators are

seen as the sole providers of feedback, whilst student-driven feedback entails students taking responsibility for their own learning and feedback. These conceptually different views explain why the views of educators and those of students about the usefulness of assessment feedback often differ. According to Evans (2013), the dissatisfaction experienced with feedback is well reported. Amongst others, students complain about the content of feedback or that feedback is often administered too late; hence, students perceive it as no longer relevant or as unhelpful and unclear (Price et al. 2010; Sadler 2010). Educators often complain that students are mostly not concerned about feedback but only about the marks obtained (Sadler 2010). Students therefore do not act upon the feedback to enhance their independence in their learning. They also do not incorporate feedback into subsequent tasks.

Different views as well as different expectations about the respective roles of the educator and of the student in the feedback process contribute to the dilemma. According to Boud and Molloy (2013), research favours the rethinking of feedback as an act that involves peers and not as the sole responsibility of the educator to provide information to the student (Boud & Molloy 2013). Its implementation, especially within a CL environment where peers can fully participate, is challenging (Le, Janssen & Wubbels 2018). Researchers are aware of the fact that assessment in a CL environment can be problematic. Students often complain about inadequate feedback when working cooperatively on assessment tasks (Thondhalana & Belluigi 2017).

The group–individual–group cooperative learning method of assessment (GIG CLMoA) is the focus of this chapter. The researchers wanted to determine whether this method adheres to sound assessment feedback principles from a sustainable assessment perspective where students, as self-directed learners, take responsibility for their learning and generate their own feedback effectively. The researchers also wanted to establish the perceptions of the educator and those of students after implementing the GIG CLMoA. The research questions, therefore, were:

- To what extent can the GIG CLMoA contribute to sound feedback practices from a sustainable assessment perspective?
- How do the educator and the students respectively perceive the value of feedback provided through this method of assessment?

Theoretical and conceptual framework

The key concepts of this study discussed within the theoretical framework of social constructivism (Vygotsky 1978) are sustainable assessment, assessment feedback, CL and the GIG CLMoA.

Social constructivist perspective

In agreement with Vygotsky (1978), the researchers believe that learning cannot be separated from its social context, as knowledge is socially constructed through interaction with others.

Within constructivist learning theory, assessment focuses strongly on the process of learning and feedback, which prepares students to become lifelong learners (Boud & Falchikov 2007). In terms of social constructivist learning theory, learning and assessment are situated in the social environment and occur simultaneously during interaction with other individuals and the environment (Wenger 1998). Feedback should be structured to develop students' monitoring, evaluating and regulating abilities within a dialogic environment to support their learning (Ajjawi & Boud 2017). Through collaboration with others, students can construct their own knowledge by connecting existing knowledge with new knowledge (Jacobs 2015). Any form of collaborative learning can thus be positioned within a social constructivist perspective and could 'provide a venue for peer interaction, which in turn provides opportunities for students to build and try out their developing knowledge' (Jacobs 2015:37). From a social constructivist perspective, learning and assessment are therefore seen as an integrated social and collaborative activity where students' thinking, learning and assessment are developed and shaped whilst working together.

Sustainable assessment

Sustainability in education is about the sustainability of all educational practices in 'order to form and sustain learners who will be able to operate effectively in a complex society' (Boud & Soler 2016:400). Students need to act as independent, self-directed learners who can continue to assess their own learning as a lifelong process (Deeley et al. 2019).

To create sustainability in education, sustainable assessment can be seen as providing students with the necessary tools to self-assess their learning progress and to 'reflect on feedback from those other than the "teacher-expert"' (Witts 2016:78). Sustainable assessment should therefore be adopted in order for students to become lifelong learners (Witts 2016). Assessment practices should not only equip students for their current learning but also for future learning (Boud & Soler 2016). Consequently, assessment should not be viewed as a 'unilateral act done to students' but rather as a 'mutually constructed' action between students themselves and between students and the educator (Boud & Soler 2016:402).

Assessment practices should 'equip students for a lifetime of learning and the assessment challenges they would face in the future' (Boud & Falchikov

2006:400); it should 'generate meaningful feedback', which students could use for future learning (Watling & Ginsburg 2019:77).

As a lifelong attribute, students should practice becoming judges of their own learning and learning by their peers (Boud & Falchikov 2006). Boud (2010) and Boud and Soler (2016) provide some guidelines on how to promote sustainable assessment:

- engage students in their own learning and assessment
- include authentic learning activities and take challenges from students' future practices into account
- include students as partners in the design of assessment tasks and in providing assessment feedback
- provide assessment tasks in which students should judge their own learning and that of others; thus, include peers in assessment and feedback
- consider preparation of students for learning in a post-graduation environment.

When planning for sustainable assessment, strategies should be established to engage students in deep learning and higher-order cognitive skills, opportunities for self-evaluation and peer evaluation, reflection on results and planning for future improvement (Kazlauskiene, Gaucaite & Poceviciene 2016; Wickramasinghe, Weller & Smith 2020). At the same time, students should be prepared for evaluative judgement outside formal education as well (Boud & Soler 2016).

From this discussion, it is clear that assessment feedback is essential in sustainable assessment practices and should be used to improve student learning – not only for a specific learning outcome but for future learning as well. Hereafter, assessment feedback within the context of sustainable assessment is discussed.

☐ Assessment feedback within sustainable assessment

Gibbs and Simpson (2004) suggest 11 conditions under which assessment supports learning. Seven of the 11 conditions concern feedback and emphasise its importance (O'Donovan, Rust & Price 2016). Assessment feedback could provide powerful support and might have a positive effect on learning if administered correctly (Carless et al. 2011).

Ferguson (2011) identifies feedback as important to support and enhance students' development as self-directed learners who are able to monitor, regulate and evaluate their own learning. Feedback can be explained as the way by which students interpret information about their learning and use such information to improve their future learning (Dawson et al. 2019). Feedback should therefore be 'a process used by the learners to facilitate their own

learning' (Boud & Molloy 2013:703–704). This feedback is then acted upon after making sense of it (Henderson et al. 2019), and is aimed at 'development and learning' (Watling & Ginsburg 2019:77). Assessment feedback is an integral part of learning (Cramp 2011) and an ongoing process (Carless et al. 2011), and should therefore not be seen as an end product where information is only provided by the educator. According to Boud and Molloy (2013), feedback should be viewed as a way to promote learning and as a means to increase the capacity of students to make own judgements and act upon their judgements.

Boud and Molloy (2013:701) explain two directions in terms of feedback:

- In the first direction, the prime responsibility of the educator is to provide feedback to the student (Feedback 'Mark 1'). This does not fall within the framework of sustainable assessment discussed in this chapter, as students are not involved in their own judgements or that of their peers.
- In the second direction (Feedback 'Mark 2') (Boud & Molloy 2013:703), students actively seek information to inform their own judgements. This fits in with sustainable assessment.

According to Feedback 'Mark 2' (Boud & Molloy 2013:703), assessment feedback should be viewed as a way to promote learning and as a means to increase the capacity of students to make their own judgements and act upon these. When planning assessment feedback, students also need to be supported and encouraged to obtain skills to seek feedback from as many sources as possible (Boud & Associates 2010). In planning feedback, the focus should not be on marks and grading, but rather on how to equip students 'to become judges of their own learning' (Boud & Soler 2016:402) and how to engage with feedback (Harris, Brown & Harnett 2014). Students also have to obtain the skills to act upon feedback to adjust, correct or manage possible actions to facilitate their own learning (Boud & Molloy 2013). Feedback should encourage student reflection on their own learning (Beckers et al. 2019).

Feedback can be considered essential for sustainable assessment practices. It can be most effective when it is part of a social learning environment, such as CL, where students are actively involved in their own learning through dialogue and reflection (Ajjawi & Boud 2017). During peer and self-assessment, students develop skills that will enable them to make informed judgements regarding their learning progress (Boud 2009; Nguyen & Walker 2016). Dawson et al. (2019:35) argue that the effectiveness of feedback lies in 'what students do with information about their work, and how this results in demonstrable improvements to their work and learning strategies'. Henderson et al. (2019:1405) are of the opinion that 'feedback design, [the] capacity of the people involved and the institutional culture' influence successful feedback practices. They argue that students should be actively involved in the feedback

process and need to know how to use the information provided to them (Henderson et al. 2019).

Feedback should provide students with the opportunity to clarify misconceptions and elaborate on future actions (Black & McCormick 2010). It should encourage students to reflect on their own learning (Beckers et al. 2019), and should occur when it can best support students to act upon it (Henderson et al. 2019). According to Henderson et al. (2019), students should develop the necessary skills to monitor and evaluate their own learning and that of their peers with a fair degree of independence.

Boud and Molloy (2013) posit that students should have the opportunity not only to practice giving feedback but also to receive it from their peers. According to Gibbs and Simpson (2004), the most effective feedback available is that provided by students to themselves as they study or write assignments together. Henderson et al. (2019) found that collaborative learning spaces enable and support frequent feedback. Hence, it is all about the quality of students' engagement within such a collaborative learning environment. In order for students to evaluate their own work and the work of their peers effectively and to produce valuable information, which can contribute to current and future learning improvement, students should be supported in terms of their feedback literacy (Deeley et al. 2019; Henderson et al. 2019). 'Preparing students to understand their role within the feedback process, particularly how they can seek, interpret and use the information, needs to occur early and continue throughout a course' (Henderson et al. 2019:1406).

Cooperative learning environment conducive to assessment feedback

Cooperative learning is a special form of collaborative learning where students need to work together in small groups to maximise their own learning as well as the learning of each member of the group (Johnson, Johnson & Smith 2006). It is a student-centred, active teaching and learning strategy, which provides a supportive and safe learning environment to students (Gedamu & Shewangezaw 2020; Johnson & Johnson 2013).

Five essential elements are required within any CL environment to be successful, namely (Johnson & Johnson 2019):

- positive interdependence between group members
- individual accountability of all group members
- promotive interaction between group members
- effective social skills
- group processing, during and after completion of a group task.

These elements need to be structured carefully and planned for in any CL environment because they are important elements in terms of assessment and the success of assessment feedback. The purpose of any CL environment is to maximise each other's learning (Johnson & Johnson 2013). Students should therefore assist and support one another through giving and receiving feedback, and by continuously clarifying uncertainties. Henderson et al. (2019) found that learning spaces where students work together could support immediate feedback.

When CL strategies are incorporated into the assessment task, they tend to ensure dialogue and active participation as students share their learning experiences (Johnson & Johnson 2013). According to Johnson, Johnson and Holubec (2008), assessment is part of the teaching and learning process of CL groups, as CL provides the environment and context suitable for assessment to be integrated into the learning process. Group members have a common purpose and commitment to assist in each other's learning, and they therefore have to participate in assessing each other's progress and plan together how to improve in the future (Johnson et al. 2008), all of which are consistent with sustainable assessment.

However, assessment within a CL environment is often problematic, as educators still tend to implement assessment strategies that are not rooted in social constructivism (Thondhalana & Belluigi 2017) or sustainable assessment. Educators often still act as if they are the sole providers of all knowledge. They argue that involving students in assessment may cause confusion because peers could provide incorrect feedback (Jacobs 2015). Students often complain of no or incomplete feedback when working cooperatively because no opportunity for feedback was built into the learning process. Peer and self-assessment feedback practices are, however, 'useful learning tools' and are seen as 'means of enhancing [students'] proclivity toward and ability at engaging in lifelong learning' (Jacobs 2015:38). This fits perfectly into the sustainable assessment perspective.

It is important that CL environments be planned carefully. There should be a challenging task, which might have more than one answer or more than one way of solving (Willis 2007), which will enhance students' motivation to participate. The learning environment should provide opportunities for dialogue, knowledge seeking, and reflection between students in order to build a trust relationship (Boud & Molloy 2013) in terms of knowledge sharing and peer feedback.

The group–individual–group cooperative method of assessment

The GIG CLMoA was introduced by Johnson et al. (2008). It is an integrated learning and assessment method, which includes assessment feedback within

a CL group. The GIG CLMoA builds on the principles of CL, and all the elements of a successful CL environment should be included in the planning.

According to this method of assessment, students prepare during class and in a CL group for a test as the first phase of the method. Thereafter, each student takes the test individually and submits the test for grading. This is the second phase of the GIG CLMoA. During the third and final phase and directly after submitting all individual tests, the same group that prepared together retakes the same test cooperatively and submits the test for grading. During the cooperative test-taking, they have the opportunity to discuss each question and attempt to provide the best possible answer to all questions. They have to reflect on their own answers in the individual test and compare the answers from their individual tests with those of their peers. Group members have to communicate their reasoning and have to reach a consensus on answers for each question, ensuring that all members can explain the answers. During phases 1 and 3, students have the opportunity to ask questions within a closed environment where they feel comfortable to ask for explanations and clarity. When completing the retake of the test as a group, they should reflect on their work as a group and learn from their interaction as part of the normal group process during any CL activity. After this reflection, the educator can also lead a discussion to facilitate final feedback, if needed. During the GIG CLMoA, students can prepare for the test together and review the test afterwards. According to Johnson et al. (2008), this not only optimises students' preparation for a test but also provides immediate clarification and remediation to students about content that they did not understand or know. The group is responsible to ensure that all students can explain the answer and understand the rationale for each answer (Johnson et al. 2008). The grades of the group as well as the grades of each individual group member can be shared with the whole group.

Cox (2015) implemented a GIG CL model on a large enrolment of first-year chemistry students over a two-year period. The goal was to use CL with connected assignments and emphasise individual accountability. Students in the treatment group needed to complete group and individual assignments. Cox found that participants in the GIG model reported greater satisfaction than groups not participating in such model. A few students indicated that the group work had a negative influence on their performance. Some weaker students tended not to participate and share their ideas with the group. It was nevertheless reported that the GIG model implemented was successful in promoting problem-solving, individual accountability and better understanding of concepts (Cox 2015).

Examples of how the five elements of CL (Johnson & Johnson 2013, 2019) can be included in the GIG CLMoA include the following:

1. **Positive interdependence:** There should be a challenging task, preferably related to a real-life situation where students can apply knowledge and skills required for the stated learning outcomes. The instruction to the group

should be to prepare for the assessment together, and students should be made aware that they would receive a group grade for their achievement during the third phase. This goal to complete the task together will create a feeling of 'sink or swim together' amongst group members. They will be motivated to contribute by preparing for the test and using every possible source to complete the task successfully. Roles allocated to the different group members (e.g. *recorder*, *checker* for understanding, *encourager* of participation and *elaborator* of knowledge) might further contribute to positive interdependence during the process.

2. **Individual accountability:** The average of the individual grades can also be part of the grade of each group. Students are then even more committed to preparing for the test to obtain clarification about aspects of the work that they do not understand, to assist their group members in terms of explaining and clarifying difficult concepts and to obtain different sources of information in order to assist the group in their learning.
3. **Promotive interaction:** Students should be informed of what is expected of them. The main aim of CL, namely to contribute to optimal learning of all members of the group, should be communicated clearly. The nature of the GIG CLMoA requires students to assist each other in their learning and preparation as well as providing them with feedback on their learning during the third phase.
4. **Social skills:** Students should know exactly what is expected of them in terms of acceptable communication and listening skills and how they should participate and cooperate during the GIG CLMoA. The educator should facilitate this process during phases 1 and 3.
5. **Group processing:** After completion of the GIG CLMoA, a short group discussion about what was helpful, what might be improved in future collaboration and what was gained from working together should be scheduled. This reflection of their learning could contribute to future learning.

In Figure 7.1, a graphic representation of the GIG CLMoA clearly indicates the three phases as well as the planning and processing phases to complete the

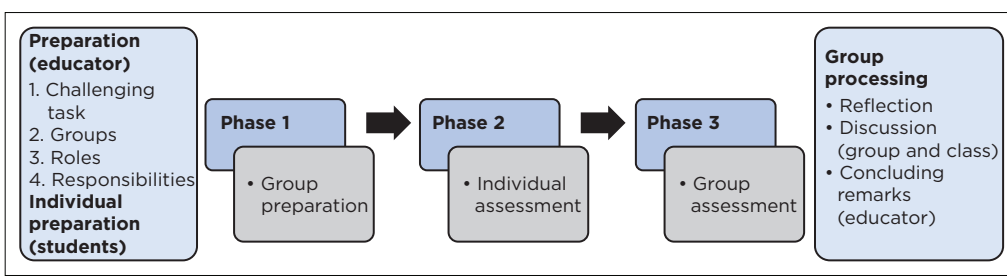

FIGURE 7.1: Graphical representation of the group–individual–group cooperative learning method of assessment.

process. The task or assignment should be selected carefully in order for students to be motivated to engage in the completion of the task as a group. A challenging problem, where a single right or wrong answer is not required, contributes to the success of the method. Careful planning of group selection, roles and responsibilities of each member of the group is needed.

Hereafter, the methodology to evaluate the effectiveness of assessment feedback in the GIG CLMoA is discussed.

Effectiveness of the assessment feedback in the group–individual–group cooperative learning method of assessment

To determine whether the GIG CLMoA adheres to sound assessment feedback principles within a sustainable assessment perspective, we evaluated the method against the criteria for sustainable assessment and feedback as discussed in the theoretical and conceptual framework. To explore and understand the perceptions of the educator and students regarding the value of assessment feedback during a GIG CLMoA, a basic qualitative interpretivist research method was used. Qualitative research can facilitate the meaning-making process (Krauss 2005), which is a fundamental aspect of the understanding of human and social interaction and therefore suitable to determine the perceptions of students and educators on feedback during GIG activities.

Of the 79 first-year Life Sciences students enrolled for a course in a pre-service teacher training programme at a university in South Africa, 71 as well as one educator, voluntarily took part in this research. The overwhelming majority of students who participated were in the age group 18–19 years. Most of them had completed Grade 12 the previous year and had selected Life Sciences as one of the major subjects in their teacher qualification programme. The majority of the students were female (77%) whilst only 23% were male.

The GIG CLMoA was implemented as part of a normal class activity and served as an intervention in the current study. The students knew they had to prepare for an assessment on a specific topic. In this particular instance, the assessment was on a topic in the study unit on Basic Chemistry and Biochemistry, which students always find difficult to comprehend. The assessment consisted of higher-order questions where students could not merely provide memorised facts but had to apply their knowledge in new situations. The GIG CLMoA was initially explained, as well as their roles and responsibilities. The educator divided participants into groups of four. As part of the first phase, they had 15 min together as a group to clarify difficult concepts arising from their preparation. In the second phase, each group member received a copy of the assessment to complete individually. After 45 min, the individual assessments were submitted for grading, and students

had to meet in the original groups where they prepared for the assessment. During the third phase, a copy of the same assessment was handed to each group, and they had 30 min to complete the assessment within the group and submit it for grading. During this phase, the group had to share their knowledge, explain their reasoning to one another and try to correct mistakes whilst completing the assessment together. They had to ensure that each student in the group agreed and understood the answer given by the group. Mutual support and guidance had to be provided to each other.

After implementing the GIG CLMoA, the participating students and educator had to express their experiences and perceptions about the method in the form of individual narratives. The probing question was: Explain in a paragraph how you experienced the GIG CLMoA. No specific mention was made of feedback as such, as the researchers wanted to determine whether students identified feedback as an integral part of the assessment.

The analysis of the narrative data focused on experiences mentioned by participants specifically related to assessment feedback. The two researchers analysed the data individually, and then compared and discussed themes to ensure credibility and trustworthiness. Meticulous attention was given to the conceptualisation of certain themes, comparing the analysis of the researchers and eventually arriving at a consensus. Thematic analysis of narratives was done to categorise aspects related to assessment feedback in order to answer the research question.

Ethical clearance for this research had been obtained as part of a larger research project. The implementation of the GIG CLMoA was part of the normal class activity within this Life Sciences module, but the completion of the narratives was voluntary. The educator and all the students who agreed to participate in this research signed informed consent forms and agreed that their data could be used for research purposes. All students participated anonymously in the writing of the individual narratives, and it was explained to them that their participation would under no circumstance have any effect on their overall grading. Analysis of data only started after the module marks had been finalised.

Results

Evaluation of the group–individual–group cooperative learning method of assessment according to sustainable assessment principles

In this section, we evaluate the GIG CLMoA whilst taking into account the principles on assessment feedback within sustainable assessment identified and discussed in this chapter. In Table 7.1 and Table 7.2, the principles of

TABLE 7.1: Group–individual–group cooperative learning method of assessment measured against principles of sustainable assessment.

Principles of sustainable assessment	GIG CLMoA
Engaging students in their own learning and assessment (Boud 2010; Boud & Soler 2016)	During all three phases of the GIG CLMoA, students are actively engaged in their own learning and assessment. This happens, firstly, when they prepare together, then when they complete the individual test and reflect on what they are able to do, and lastly, when they complete the same test as a group, judging their own performance and that of their peers.
Including authentic learning activities and taking challenges of students' future practice into account (Boud 2010; Boud & Soler 2016).	It is possible to design a task for a GIG assessment and take this requirement into account. The educator should, however, specifically plan in this regard.
Include students in the design of assessment tasks as partners and in providing assessment feedback (Boud 2010; Boud & Soler 2016).	Students are not included in the development of the assessment task but should be informed about the scope and purpose of the assessment. However, students are involved in providing assessment feedback during phases 1 and 3 of the GIG CLMoA.
Provide assessment tasks in which students judge their own learning and that of others; thus, include peers in assessment and feedback (Boud 2010; Boud & Soler 2016).	During phase 3 of the GIG CLMoA, students have to complete the test as a group, communicating, arguing and clarifying their answers. They not only receive feedback on their own individual assessment but also provide feedback to their peers.
Keep the preparation of students for learning in a post-graduation environment in consideration (Boud 2010; Boud & Soler 2016).	During the GIG CLMoA, students get the opportunity to work and solve problems in a group, simulating the environment of work where they will have to work as a team to reach the goal.
Engage students in deep learning and higher-order cognitive skills, opportunities for self-evaluation and peer evaluation, reflection on results and planning for future improvement (Kazlauskiene et al. 2016; Wickramasinghe et al. 2020).	The extent to which students are engaged in deep learning and higher-order cognitive skills depends on the task given during the GIG activity and requires careful planning by the educator. There are clear opportunities for self-evaluation during all three phases of the GIG CL method. Peer evaluation opportunities are found in phases 1 and 3 and reflection on results during the group processing at the end of the assessment. Although planning for future improvement is not explicitly included in the GIG CLMoA, it can be implicitly structured as part of group processing. Engaging in the learning process through ongoing dialogic feedback, students are acquiring vital skills that they will be able to use in future learning endeavours.

GIG CLMoA, group–individual–group cooperative learning method of assessment.

sustainable assessment are listed in the first column, and in the second column, we provide some evidence of the extent to which these principles can be identified in the GIG CLMoA.

From Table 7.1, it is clear that not all the principles can be accomplished to the same degree when evaluating the GIG CLMoA. It depends on the instructional planning of the educator to incorporate the five elements of CL, the expectation in terms of student preparation before the implementation of the GIG CLMoA, as well as the nature of the assessment given. It further depends on the student culture whether students will apply the feedback

TABLE 7.2: Group–individual–group cooperative learning method of assessment measured against principles of successful feedback.

Principles for successful feedback practices within sustainable assessment	GIG CLMoA
Feedback should be planned to develop students' own skills in terms of judgement and critical appraisal. Students should be judges of their own learning and each other's learning (Boud & Molloy 2013; Boud & Soler 2016; Henderson et al. 2019; Nguyen & Walker 2016).	During the first and third phases of group preparation, students have the opportunity of taking the test together to communicate and motivate their views and to evaluate everyone's contribution critically in order to reach the desired outcome. The fact that this is a small group in which they feel comfortable sharing what they know and do not know might also contribute to the development of their judgement ability and critical appraisal. Students no longer depend on the educator to provide them with the correct answers or solutions to a problem, but they are actively involved in finding the correct answers and solutions by interacting, arguing, communication and sharing information with each other. If they believe their answers or solutions are correct, they have to justify their answers, evaluate each other's arguments and adjust their answers accordingly, if necessary.
Feedback should be an integral part of learning (Cramp 2011).	During the process, students learn together, perform assessments together and at the same time provide feedback to each other.
Feedback should be employed from a variety of sources (Boud & Associates 2010).	If students are aware of the fact that they will have to participate during the GIG activity, they will be motivated to consult a variety of sources and bring them to class for preparation purposes. This principle therefore depends on the instructional planning of the GIG activity and could well be included in the GIG CLMoA.
Students should act upon the feedback to adjust, correct or manage own learning (Boud & Molloy 2013).	The GIG CLMoA provides students with feedback on what they know and what they can achieve whilst preparing for the test as a group. There are many opportunities for clarification, adjustment or correction before the individual test (phase 1) as well as during the group test (phase 3). The fact that students realise that they have to answer the test individually motivates them to ask questions, assist each other and clarify any aspect that they do not understand. This is therefore a way to promote learning and increase the capacity of students to correct, adjust and act upon their own judgement.
Feedback should encourage student reflection (Beckers et al. 2019).	During the group test (phase 3), all group members have to reflect on their own answers from the individual test (phase 2) and motivate their reasoning. Students have to explain, defend and/or adjust their strategies during phase 3, which will provide opportunities for reflection. The group processing also serves as an opportunity for reflection on the learning experience.
Feedback should actively involve students in the feedback process (Henderson et al. 2019).	The GIG CLMoA comprises only a small number of students in one group (2–4), which makes it difficult for any one student not to be actively involved. The CL elements, which are built into the method, ensure positive interdependence, individual accountability and promotive interaction amongst group members. The fact that the individual and group tests have to be submitted for grading contributes to all students' active involvement and participation.
Feedback should provide students with the opportunity to clarify misconceptions and elaborate on future actions (Black & McCormick 2010).	Within this small group setting, students tend to ask for clarification much more than they would have done in a whole-class environment where they do not have the courage to admit when they do not understand. They are comfortable asking assistance from peers, as well as sharing ideas within the group.

GIG CLMoA, group–individual–group cooperative learning method of assessment.

Table 7.2 continues on the next page→

TABLE 7.2 (Continues...): Group–individual–group cooperative learning method of assessment measured against principles of successful feedback.

Principles for successful feedback practices within sustainable assessment	GIG CLMoA
Students should know how to use the information provided to them to correct their actions (Henderson et al. 2019).	The GIG CLMoA provides an environment in which students can grow and practice to correct future actions. They have the opportunity to clarify uncertainties with their peers immediately and ask for explanations and assistance when they realise that they do not understand. During group processing after completion of the GIG CLMoA, group members can discuss how they learn from their mistakes and how they will apply this in future assessments.
Feedback should be given at a time when it can best support the student to act upon it (Henderson et al. 2019).	Feedback during the GIG CLMoA is provided during phase 1 when the group studies together, as well as during phase 3 where they complete the task or assessment together. Feedback is immediately available before and after the individual test is taken. The students can therefore still remember the questions where they were uncertain or those they did not know how to answer. From the discussions within the group, members receive the necessary feedback and clarification.
There should be opportunity to practice giving and receiving feedback (Boud & Molloy 2013).	There is continuous interaction within the group in phases 1 and 3 of the GIG activity in order to give feedback to one another and to receive feedback from the group.

GIG CLMoA, group–individual–group cooperative learning method of assessment.

obtained during the GIG CLMoA to future learning. Students need to get accustomed to working in groups to provide constructive feedback to peers, to assist peers with their learning and to explain their own views logically (see Johnson & Johnson 2013). The success of the GIG CLMoA might increase if it is implemented repeatedly, as the environment is conducive to reflection, critical appraisal and judgement. Students will then gradually gain exposure to being discerning and they will become increasingly critical about their own learning and that of their peers. Increasing students' level of feedback literacy might also contribute towards the success of the GIG CLMoA.

In the current research, assessment feedback was thus integrated into the social learning environment and all students were in a position to provide the necessary support and guidance to members of their group in order to reflect and monitor their own learning and adjust their learning process accordingly.

Results Related to Student and Teacher Perceptions of Feedback

The analysis of the narratives provided by the students after completion of the GIG CLMoA revealed the following themes that can be conceptually and theoretically connected to their perceptions on feedback during the implementation of the method.

☐ Increased learning and knowledge acquisition

Although not all students specifically mentioned the fact that feedback was provided whilst completing the test as a group, almost every student mentioned that they gained additional knowledge about the specific learning outcomes during that time. They indicated that this resulted in better understanding and improved achievement. All quotations are reproduced verbatim and unedited. One student declared, 'I understood better after we wrote the test together' (S1, Life Sciences education student, first year). Four students did not explicitly mention that they had gained more knowledge and learned more, and another six students specifically indicated that they did not gain academically from the interaction during the implementation.

☐ Broadened horizons

Students indicated that the discussion and reasoning during the implementation of the method broadened their horizons and thus equipped them with more than only knowledge required for the specific test. A student said, 'I have better insights after writing it with the group' (S35, Life Sciences education student, first year). It seems as if they valued the feedback received during phase 3 more than the studying together before the individual test (i.e. phase 1).

☐ Acknowledgement of multiple answers and perspectives

Students indicated that they had engaged in their own learning and actively participated in rewriting the test in order to achieve a good score. They learned to reason, defend their answers and respect other students' viewpoints in their efforts to complete the test successfully. Because of the feedback provided to them, they realised that there was more than one possible way to solve the same problem, more than one possible correct answer and more than one possible correct viewpoint on a particular issue. A student remarked, 'It makes me see another point of view other than my own' (S9, Life Science education student, first year).

☐ Motivation for future learning

Students were of the opinion that the implementation of the GIG CLMoA motivated them to learn, and they enjoyed working together. Some responses about the motivation aspect reported by students were: 'It motivates everyone in the group' (S14, Life Sciences education student, first year) and 'It was an enjoyable experience' (S61, Life Sciences education student, first year).

Students further indicated that they valued the way in which learning, assessment and assessment feedback were incorporated in the GIG CLMoA.

However, three students indicated that they did not enjoy the GIG CLMoA and gave the following reasons: 'It is depressing' (S38, Life Sciences education student, first year), 'I like to answer on my own' (S42, Life Sciences education student, first year), and 'I am studying hard and others is just using me when they did not study' (S59, Life Sciences education student, first year).

☐ Exposure to different learning strategies and study skills for future learning

Apart from the learning gain, students also indicated that the GIG CLMoA introduced them to different learning strategies and study skills which they could utilise in future learning, for example. 'Insight in others' way of learning was valuable' (S27, Life Sciences education student, first year). They obtained not only further knowledge but also skills that might be transferred to new learning situations in future.

☐ Improved understanding and clarification

The students argued that the opportunity they had to discuss their own learning, argue and reason about possible answers to questions and defend their own answers led to improved understanding and clarification of the learning content and related directly to assessment feedback. One student revealed, 'I struggle to understand when studying alone [...] my group explained it to me and now I understand' (S48, Life Sciences education student, first year). From the students' responses, it seemed that peers explaining difficult concepts to one another – in their own words – were much more successful than explanations in a textbook or explanations by the educator. Students explained that they were by far more comfortable with asking their peers when they did not understand something than asking the educator.

☐ Identification of own gaps

The group discussion assisted in self-assessment, as everyone realised their own limitations in terms of achieving the outcomes. A typical answer was, 'I realised that I made some mistakes' (S12, Life Sciences education student, first year). This provided them with opportunities to adjust their learning accordingly.

☐ Timely assistance

Students indicated that they appreciated immediate feedback after the assessment and acknowledged that the GIG CLMoA did just that. They could still recall their own answers to the questions and received immediate feedback

to correct their own mistakes. 'It helps to compare answers immediately afterwards', a student said (S44, Life Sciences education student, first year).

Analysis of the narrative of the educator revealed that themes related to the educator's perception of the feedback to students during the GIG CLMoA can be grouped into two distinct categories within active participation in students' own learning, namely *peer interaction* and *peer assistance*.

Peer interaction

The educator (E1, Life Sciences teacher, date unspecified) indicated that active peer interaction took place in all groups. 'I was amazed to see the interaction within the groups', she commented. Students were eager to work together and complete the test together. Students visually explained the work to one another and used mind maps and diagrams to explain their reasoning and convince group members of their answers. They communicated effectively and no group conflict was visible:

> 'The whole atmosphere in class was productive, positive and exciting. [...] They went on and on explaining and discussing the work [...], I could not identify a single group in which no peer interaction took place.' (E1, Life Sciences teacher, date unspecified)

Peer assistance

The assistance given to one another was visible as students were not shy or uncomfortable asking each other questions and using each other as resources. They communicated effectively and the educator witnessed several aha moments when students realised their own misconceptions. The educator also mentioned that she noticed considerable in-depth discussion of higher-order learning outcomes, which indicated that the students grew beyond their current level of competency. According to the educator, this was an indication that the GIG CLMoA was constructive, effective and helpful to students in terms of feedback on their own assessment. The educator indicated, '[t]here was no need to provide additional feedback to students' (E1, Life Sciences teacher, date unspecified). Nevertheless, she provided the opportunity for students to ask questions after the group processing at the end of the GIG activity.

Discussion

Educators would like their students to be active participants in the learning and assessment process and not only passive receivers of knowledge. According to the educator participating in this research, it was exactly the fact that all students were active participants in the learning that excited

her most. Students were actively involved in feedback on their own individual assignments and on that of their peers during phase 3 of the GIG CLMoA. It was clear from the responses of the educator and the students that the feedback provided was adequate and that it addressed the needs of the students.

During the GIG CLMoA, learning and assessment occurred simultaneously whilst students were actively involved in their own learning and in that of their peers. From the literature, it was clear that students and educators often complain about assessment feedback and hold incompatible views on its effectiveness (see, for instance, Ajjawi & Boud 2017; Deeley et al. 2019). In this study, it was clear that most of the students and the educator viewed the feedback in the GIG CLMoA as valuable in terms of its timeliness, clarity, ability to foster self-reflection amongst students, stimulation of their motivation for learning, and an increase in knowledge and skills acquisition.

The findings of this research show compliance with the requirement stated by Archer (2010) and Carless et al. (2011) that feedback should assist students to gain their own understanding through dialogue and active participation when they share their learning experiences. The students' responses revealed that the GIG CLMoA also assisted in the eradication of misconceptions, to which Black and McCormick (2010) suggest feedback should contribute. Students reported feeling comfortable asking questions for clarification in their groups.

Although most participating students showed their willingness to partake in this method of assessment and indicated that it broadened their horizons – which could have an effect on their future learning – a few students indicated that they did not see any advantages for their own learning. They still preferred to work individually, which concurred with findings by King (1993) and Cox (2015). King (1993) found that high achievers tend not to be satisfied with working in a group, as they experienced not learning something new, always wasting time helping others. Cox (2015) found that these students were of the opinion that the collaboration might even have a detrimental effect on their own performance. The fact that only four of the 71 participants in this research commented negatively on group participation during the GIG CLMoA, might be an indication that more careful planning in terms of the inclusion of the two CL elements – positive interdependence and individual accountability – is needed. Although the GIG CLMoA accommodates individual (phase 2) as well as group accountability (phases 1 and 3), the recommendation of Gedamu and Shewangezaw (2020) – that there should be a balance between individual and group accountability when performing assessment within a CL environment – should not be ignored when planning to use this assessment method. It might be an indication that additional emphasis should be placed on planning, specifically to strengthen positive interdependence and individual

accountability. Students need to get used to working in groups (see Johnson & Johnson 2013), especially first-year students in South Africa, who come from a schooling system where they were not used to collaborating with their peers, and who are often reluctant to work cooperatively. From the students' comments, it seemed that some were negative about the method, preferred to work alone and did not want to waste time assisting others, as King (1993) also found. Because research data were obtained anonymously, no reference could be made to confirm the achievement pattern of these students. One of the students preferring to work alone complained that some students did not participate, and the ones who worked had to provide all the answers. This is a complaint commonly found in literature when positive interdependence and individual accountability within a CL environment are not structured well. Although only a few students complained about the free-riding of some students, this might be an indication that positive interdependence and individual accountability should be structured more carefully during planning. It might also be an indication that those students should have more practice and training in working together as a group. They clearly do not realise that the value of explaining difficult concepts to others contributes to the deepening of their own understanding. Nevertheless, no complaints about inadequate feedback were received from any student.

According to the participating students, an important aspect of the GIG CLMoA is the increased motivation for future learning. Motivation is one of the three broad outcomes of assessment feedback, as identified by Nelson and Schunn (2009). From the results of this study, no mismatch was noted between perceptions of the students and those of the educator in terms of feedback. Not even the students who complained that they did not like the GIG CLMoA, as they did not like working in a group, complained about incomplete or inadequate feedback.

In line with Deeley et al. (2019), little evidence could be found in students' narratives that they would be able to apply the feedback received in their future learning. This might be because no direct question was asked about it for students to report on. Although it cannot be stated that students would not be able to use the feedback in their future learning, this research did not find clear evidence of the measurement of feedback for future learning. The comment that the feedback they received equipped them with more than only knowledge might be an indication that it will assist in future learning. Clearly, more should be done in terms of planning and facilitation of the GIG CLMoA to ensure that the feedback provided is effective to support and enhance future learning. This research however confirmed the view of Gibbs and Simpson (2004) that the most effective feedback is feedback provided by students to themselves.

Conclusion

The results from this study indicated that the GIG CLMoA is in line with the social constructivist learning theory and complies with sustainable assessment practices during which feedback is timely, clear and useful and contributes to increased future learning and motivation. Based on this theory, we positioned assessment feedback as an integral part of the learning process within a CL environment. We found that assessment feedback is applicable within the GIG CLMoA to contribute to sustainable assessment practices.

From the empirical investigation, we determined the perceptions of students and educators regarding the value of the GIG CLMoA in terms of feedback received. The educator and the overwhelming majority of students agreed that feedback during implementation supported their learning and had a positive effect on students' learning motivation.

The results of this study also indicated that careful planning is vital for the success of this method. The five elements of CL should be planned carefully when preparing for the implementation of the GIG method. The assignment should include challenging problems, which require high-order thinking and reasoning. Students should be informed of their responsibilities and they should be allowed to bring any other sources related to the assessment to their group preparation.

The GIG CLMoA should be used more often in order to support learning and assessment feedback and to address the limitations of unfair assessment practices in cooperative groups. Although based on a relatively small population, this research could be an indication of the value of this method for future learning in general.

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Chapter 8

Assessment: The driving force behind self-directed learning in English teacher training

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Abstract

Based on the significant role played by the English language as an international tool for education, business, trade and commerce (Rao 2019:65), governmental policies on education in many parts of the world have prioritised the improvement of English language learning outcomes (Galaczi et al. 2018:5). This directly affects English language teacher training. Chong and Cheah

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(2009:16) emphasise that SDL should be established and nurtured during initial teacher training. They argue that it is during this phase that teachers are equipped for lifelong learning in an ever-demanding professional environment, and where they develop a problem-solving attitude and the skill to learn from experience through reflection. Based on the extended role of English in South Africa, English teachers need a high level of disciplinary knowledge in various subject-related fields, pedagogical knowledge and pedagogical content knowledge. This requires thorough training in the theory of language teaching and learning, including the theory on second language acquisition, linguistics and all literary genres. In light of this, pre-service English teachers should be equipped with SDL skills that allow them to perform cognitively demanding tasks. With a view to quality assessment that encourages SDL, this chapter critically explores the English for Education teaching, learning and assessment practices of a selected institution.

Introduction

In a multilingual country such as South Africa where English – as the mother tongue of a mere 8.1% of the population (BusinessTech 2019) – is preferred as the medium of instruction by the majority (Gordon & Harvey 2019), there is a pressing need to improve the effectiveness of English language teaching and learning at all levels of education. In order to achieve this, it is crucial that pre-service English teachers are trained well. Most important in initial teacher training is critical engagement and the establishment and nurturing of SDL. According to Chong and Cheah (2009:16), it is during this phase that teachers are equipped for lifelong learning in an ever-demanding professional environment, and where they develop a problem-solving attitude and the skill to learn from experience through reflection. Outcomes such as these ought to be facilitated by a curriculum and assessment system focused on unlocking and promoting rather than thwarting students' true academic potential, their ongoing learning and pre-professional identity development by means of current best or innovative practices (Burns 2011:132). It also means immersing pre-service teachers in high-quality learning experiences with instructors who model the characteristics of good teachers (Burns 2011:133).

This chapter examines a particular tertiary institution's B.Ed. Senior and Further Education and Training (FET) teacher training programme. This programme is aimed at immersing pre-service English teachers in quality, assessment-driven learning experiences focused on the promotion of critical engagement and SDL. The discussion starts with a look at English as the global lingua franca, the status of English in South Africa and its implications for English Senior and FET teacher training, and the qualities these teachers should exhibit.

English as the global lingua franca

Crystal (2003:6) states that there is no other language in the world that corresponds with English in terms of its growth as a global medium of communication. It is also seen as a language that helps with access to jobs and advancement (Van der Walt & Evans 2019:16). Graddol (2006) remarks that an 'English factor' is found:

> [/]n virtually every key macro trend: whether it is business process outsourcing, the rise of urban middle classes around the world, the development of new communications technology such as the Internet, the global redistribution of poverty, the changing nature and control of news media, or the reform of education in universities and school. (p. 20)

The latest statistics reported by the British Council (2020) indicate that more than 1.75 billion people speak English worldwide – this comes down to 1 in every 4 people around the globe. This figure is projected to grow to 2 in 4 by 2050 (The Economist 2001).

The increased growth and the status of English as a tool for communication in the 21st century have to do with the reciprocally connected nature of the continents of the world (Plonski, Teferra & Brady 2013:3). It follows that the more the countries of the world become connected through development, the more established the English language will become (Mydans 2007:2), and the higher the demand will become for English language instructors. Teaching English as a Foreign Language (TEFL) has already been established as a global industry with an estimated market value of $200 billion (International TEFL Academy 2020). Numerous service providers offer TEFL courses online and are working in close collaboration with various agencies that are looking to recruit TEFL instructors across the world to teach either remotely or in face-to-face environments. In most cases, the role of these instructors is simply to present prepared material, tailor-made in terms of content and pedagogical approach, to fit the needs of learners at any particular level of education in any particular country (International TEFL Academy 2020). Across the world, in countries like China, Brazil, Argentina, India, Russia and Singapore, English is spoken by a small percentage of the population (Graddol 2006:55–56; Smith 2017), but there is a pressing need to learn English as a foreign language as it is seen as the language that helps with access to jobs and advancement (Van der Walt & Evans 2019:16).

The notion of English as an international language corresponds with Kachru's 'expanding circle' of English (McKay 2018:10). Kachru (1985) identifies three circles: the inner circle (where English is spoken as a first language), the outer circle (where English is one of several official languages of a country) and the expanding circle (where English is required as a foreign language but has no special status as an official language) (cf. Kachru 1997:66–87). The official status of the English language in South Africa

places it in all of Kachru's circles. English is used and taught as a home language in public schools in South Africa, English First Additional Language (EFAL) is the subject with the highest number of enrolments of all subjects that form part of the National Senior Certificate examinations each year (Department of Basic Education 2014:71) as it enjoys official status and serves as a common medium of communication amongst people of all ages in all spheres of life in the multilingual context of South Africa and finally, English is the dominant medium of instruction in public schooling (Uys, Reyneke & Kaiser 2020:ii). This extended role of English in the South African community greatly affects English teacher training at institutions of higher learning in the country.

The role of English in South Africa and its implications for English teacher training

Based on the extended role of English in South Africa, English teachers need a high level of disciplinary knowledge in various subject-related fields, pedagogical knowledge and pedagogical content knowledge. This requires thorough training in the theory of language teaching and learning, including the theory on second language acquisition, linguistics and all literary genres. Furthermore, English Additional Language (EAL) is the dominant LoLT. It is often perceived as a barrier for learning and thus of learner attainment (DBE 2013:2). English language teachers in South Africa must therefore be equipped with the knowledge and skill to effectively teach and promote learners' basic interpersonal communication skills (BICS) as well as their cognitive academic language proficiency (CALP) (Cummins 2000:67). Basic interpersonal communication skill refers to the language skills that people need for social interactions. This language is not specialised and the context in which the language is used is normally 'rich', in other words, there are embedded interpersonal cues such as facial expressions, gestures and intonation that help with understanding and communicating a particular message. Cognitive academic language proficiency, on the other hand, develops in formal academic settings such as classrooms, where activities such as demonstrations, scientific experiments, calculations and explanations take place as subject content is taught and learned. The context is reduced as there are fewer non-verbal cues and the language is more abstract (Uys et al. 2020:17–18). It is important for English language teachers to note the difference between BICS and CALP development and to support learners in academic language learning. Van der Walt and Evans (2019:xiii) note that the foundation of academic literacy must be laid in the English classroom and remark that English language teachers are often 'perceived as, or unwillingly made, the gatekeepers to further higher education since a certain level of English proficiency is required for successful study and training after school'. It is

important for English teachers to be aware of these expectations and to be prepared to justify their decisions in terms of assessment (Van der Walt & Evans 2019:23), content and pedagogy.

As far as pedagogy is concerned, student teachers have to learn *how to teach* each component of an English school curriculum in culturally and linguistically diverse settings. This implies that student teachers, in preparation for teaching English literary texts in the South African context, ought to be challenged to critically engage with the curriculum, heeding calls for decolonisation and the appreciation of indigenous knowledge. Kramsch (1993:357) believes that there are benefits to be derived from a language pedagogy that does not only present authentic documents but also the contexts of production and reception. The teacher thus focuses on the circumstances in and the purposes for which a text was produced (*context of production*) as well as the different interpretations by readers or hearers of a text (*context of reception*). It is important for learners in diverse contexts to experience that different interpretations are possible and valid and that different opinions are valued and not criticised as they contribute to academic discourse. This allows learners at school and English student teachers to develop their voices in expressing their understanding and in defending their interpretations, also during formal assessments. Linked to the notion of diversity, Van der Walt and Evans (2019:17) caution that English teachers should constantly be aware of other languages around them and when they teach English, they should realise that their learners also use other languages and different patterns of thinking, even as they complete tasks in English. Whilst literature is seen as a cultural artefact, it is important to remember that culture is dynamic and that what is valued in one culture is not necessarily valued in another culture (Van der Walt & Evans 2019:211).

Violetta-Irene (2015:75) and Dominguez Romero, Bobkina and Stefanova (2019:36) argue that literature is taught for three main reasons. The first is to build language proficiency (focus on linguistics), the second is to develop learners' critical thinking (focus on methodology) and the third reason why we teach literature is to raise learners' awareness of the human condition (motivational reason). Van der Walt and Evans (2019:215) add that literature has a social function (it is a socially acceptable way of communicating and by studying various texts, learners learn about the history, society and politics of the setting); literature is stimulating and interesting; it engages the imagination and creativity of learners; it is a vehicle for language enrichment and vocabulary acquisition; and it gives depth and meaning to the language learning experience. With specific reference to English literature study in South Africa, these authors highlight the fact that literature teaching and learning can lead to cultural enrichment and insight into human nature (Van der Walt & Evans 2019:215). They argue that literature studies promote

multicultural understanding, which plays an important role in a budding democracy. English teachers can only realise these aims of literature teaching when they are self-directed in their search for and analysis of appropriate texts in terms of linguistic value and their suitability to promote both critical thinking and understanding of the human condition. With this goes the ability to implement assessment aimed at the promotion of learning in each of these aspects.

The arguments above highlight the fact that English language teachers in South Africa ought to be prepared to teach English Home Language (EHL), EFAL as well as English across the Curriculum, empowered by deep disciplinary knowledge across various components of the different language curricula and in a variety of subject-related fields. They furthermore require critical language awareness, thorough knowledge of language pedagogy (which includes theories on language acquisition and a variety of methods and approaches to language teaching that developed over time), and a high level of assessment literacy in order to promote learners' meaningful engagement with content and the acquisition of listening, speaking, reading and writing skills. The English language teacher's ability to implement assessment practices that are of a high quality and that drive sustainable learning becomes particularly important in the FET phase (Grade 10 to Grade 12). It is during this phase that English is seen as 'a tool for thought and communication', 'a cultural and aesthetic means' that learners use 'to make better sense of the world they live in', a medium to 'acquire knowledge, to express identity, feelings and ideas, to interact with others, and to manage their world' (DBE 2011:8). In a general education context, the term 'assessment literacy' refers to the knowledge teachers should have about assessment (Berry, Sheehan & Munro 2019:113). In practical terms, this means that the teacher should have a clear understanding of what should be assessed and how it should be assessed. In the context of the language classroom, it is about understanding what should be assessed and how it should be assessed in effectively promoting the acquisition of linguistic knowledge and skills. The implication is that the language teacher must be able to evaluate diverse learners' individual responses to and interpretations of texts and give due credit. Language assessment is never as exact as is the case in, for example, the sciences.

Subsequently, the third-year English for Education modules of a higher education institution in South Africa are examined to explore how they have been designed in the quest for critical student engagement to advance cognitive and affective student development in preparation for the practice of English language teaching in the FET phase. The ways in which assessment contributes to quality teaching and learning and SDL in these modules are emphasised.

English teacher training in the third year of the B.Ed. Senior and Further Education and Training phase at a higher education institution in South Africa

As pointed out above, Chong and Cheah (2009:16) emphasise that SDL should be established and nurtured during initial teacher training. They argue that it is during this phase that teachers are equipped for lifelong learning in an ever-demanding professional environment, and where they 'develop a problem-solving attitude' and the skill 'to learn from experience through reflection' (Chong & Cheah 2009:16). The call for the developers of the English curriculum at this particular institution was to set outcomes that would ensure student immersion in quality, albeit cognitively challenging, learning experiences to unlock and promote their academic potential and their personal growth in preparation for the profession. As the third-year modules in the B.Ed. Senior and FET programme, which are offered in contact as well as distance mode, are rolled out each year, the presenters carefully plan the programme of assessment, fully aware of two important facts: students' academic performance and development and the curriculum are dependent on the assessment of the students (Mohan 2016:33) and instructors have to model the characteristics of good teachers (Burns 2011:133).

Outcomes of the English for Education third-year modules

The English for Education course at the selected university exposes students to linguistics, literature and didactics, which all become progressively more advanced from the first to the fourth year of study. This English for Education course follows an integrated approach, where didactics and content are learned in tandem and not as isolated strands of the teaching course. During the first semester of the third year, the students:

- learn about semantics and pragmatics
- critically analyse the novel *Disgrace* by J.M. Coetzee
- engage with a variety of short stories, with a focus on applying literary lenses
- critically analyse the play *Julius Caesar* by William Shakespeare.

In the second semester of the third year, students:

- learn about tenses and textual editing
- critically analyse the novel *The God of Small Things* by Arundhati Roy
- critically analyse the novel *Atonement* by Ian McEwan
- analyse a variety of postmodern poetry
- develop their teaching skills, with a specific focus on teaching visual literacy.

It is thus clear that these third-year students are expected to develop extensive knowledge of the English language and to develop their skills as teachers of the language.

Before elaborating on how high-quality learning experiences are ensured, it is necessary to provide a brief overview of the outcomes for these third-year modules. In the first semester, the outcomes include:

- accounting for the central concepts in semantics
- accounting for the difference between semantic and pragmatic meanings
- analysing words and sentences using semantic methods and concepts
- offering opinions on the actions and characters in the novel *Disgrace*
- discussing the major themes and symbols in *Disgrace* and how these contribute to the message of the novel
- applying literary theories to short stories
- understanding the themes, characters, language, background, literary devices and dramatic devices of the play, *Julius Caesar*
- having awareness of the major critical debates around the play.

The outcomes of the second semester include:

- knowing why EFAL learners struggle with tenses
- designing worksheets that are suitable for learners, focused on the tenses
- applying the rules of grammar and editing common errors in texts
- differentiating between modern and postmodern literature, with a specific focus on poetry
- understanding how *The God of Small Things* qualifies as a postmodern novel
- evaluating the unique writing style of Arundhati Roy as proof of her own voice
- discussing the political and social structures in *The God of Small Things*
- evaluating *Atonement* as a postmodern novel, specifically focusing on the text as a metafictional work
- applying knowledge of linguistics to a novel
- designing pre-, whilst- and post-reading activities for a visual literacy lesson
- assessing visual literacy effectively
- designing an entire visual literacy lesson plan.

Even though not all of the outcomes of the third-year modules are included in the previous paragraph, it is clear that these outcomes address a variety of skills and various cognitive levels of performance. It is apparent that students are expected to perform at higher cognitive levels by analysing, evaluating and creating (Anderson et al. 2001:149). Encouraging the development of critical thinking is a prominent characteristic of quality teaching and learning.

It is thus necessary to explore how these modules ensure high-quality learning experiences whilst developing students' SDL skills.

High-quality learning experiences promoting critical engagement and self-directed learning

Tadesse, Manathunga and Gillies (2018:2) state that quality is a complex and multifaceted concept. It is therefore necessary to determine what qualifies as high-level teaching and learning. Tadesse et al. (2018:2–3) conducted a qualitative study for the purpose of determining what Ethiopian students and lecturers believed constituted quality teaching and learning. One of the main themes contributing to students' perceptions of ideal quality teaching and learning was that they desired an active and participatory approach to teaching and learning (Tadesse et al. 2018:4). In their interviews, students used terms such as student-centred, problem-solving, group learning, independent learning, hands-on learning and interactive instruction to describe their views of ideal quality learning and teaching (Tadesse et al. 2018:4).

The third-year modules of the selected higher education institution in South Africa promote outstanding teaching and learning in that they are developed to encourage discovery learning, which is indeed student-centred, as active engagement with content and peers is required. For each module, the English for Education students are provided with an Evidence of Performance (EP), which is a SDL workbook. In contrast with the traditional study guides, which contain merely theoretical information, the EPs contain theoretical information combined with prompts to help students come to their own conclusions and understandings of the topics. Students are also provided with ample resources (articles, videos, PowerPoints, websites, peer discussions, etc.) to consult, as they are expected to critically engage with resources and peers to successfully complete the EP. Two brief examples (Figure 8.1 and Figure 8.2) from the EP for the first semester of the third year are provided:

The first example indicates that students are expected to do their own research and apply the research to the content of the module in order to come to their own interpretation of the concepts. The second example requires learners to draw on their personal experiences and opinions to realise the real-life importance of learning and teaching the content. Both of these brief examples illustrate that the EPs demand active involvement from the students. Additionally, the type of tasks and questions provided in the EP encourage active participation and independent learning, and are student-centred, which are characteristics of high-quality learning and teaching (Tadesse et al. 2018:4). In most instances, the EPs are not used for assessment by the lecturer, but

1.6. **Processes of semantic change: self-study:** As we can see from our discussion so far, words do not have an absolute sense, as their meanings differ across cultures and across time. Conceptual sense is the most stable, but even here there are a variety of ways in which the meaning of a word may change over time. This branch of semantics that has to do with these changes of words over time, is called *diachronic* semantics. There are a few of these processes, namely **extension, limitation, pejoration, amelioration and transference.**

1.6.1 Do self-study and find out what these processes entail as well as general examples for each. Now, try to find examples of words from your set works which have been subject to these processes. Use the space below to record your research (Romylos, Kaiser & Cushman 2020a:25–26).

Process	Extension	Limitation	Pejoration	Amelioration	Transference
Explanation					
Example					
Example from set works					

FIGURE 8.1: Processes of semantic change: Self-study (Example 1).

Activity 8

Why should teachers of English be familiar with grammar structures?

How was grammar taught at your school?

What do you think? How should grammar be taught?

Suggest reasons why some teachers are reluctant to teach grammar.

FIGURE 8.2: Pertinent questions: Speaking and writing (Romylos et al. 2020a:18–19).

rather serve as students' SDL guides. In the study conducted by Tadesse et al. (2018:5), the researchers found that lecturers viewed quality teaching and learning as students being facilitated and guided so that they could organise their own learning, make their own notes and learn by themselves. In this way, lecturers model the type of practice that would be expected from English language teachers in working towards realising the general and developmental aims and the subject-specific outcomes of the CAPS for EHL and EFAL in the FET phase (DBE 2011). Even though the third-year modules at the particular higher education institution also rely on direct instruction to a limited extent, students are provided with sufficient guidance and structure to direct their own learning. Additionally, during the direct instruction sessions, students in the contact programme are seated at round tables and engage in group discussions and activities, which also enhances quality teaching and learning in that active engagement and participatory learning are ensured. Interaction amongst the distance learning students is also promoted, as they are expected to participate in online video discussions with peers and lecturers and to work together on written group tasks.

In addition to providing opportunities for interaction during learning and teaching and providing students with prompts to direct their own learning, using a variety of teaching and learning methods also contributes to quality learning and teaching (Loughran 2018). The third-year English for Education course caters for various learning styles: students are expected to provide their opinions on particular topics in writing (in the EP), as well as verbally (during contact sessions). Students are also expected to present posters in groups, plan, prepare and present micro-lessons, enact scenes from their plays, write traditional tests, write academic essays, conduct online group debates and so on. Thus, students are exposed to various learning opportunities whilst, likewise, teaching varies from facilitation, direct instruction and concept capturing with the use of electronic platforms. In addition to this, the learning management system used by the students at this university contains sites for each individual module. The sites for the English for Education students contain electronic sources (articles, videos, quizzes, online forum discussions, etc.) that support what is contained in the EP. Students are expected to not only decide which information in these resources should be used for the completion of specific tasks but also to find their own resources in many instances, as previously indicated in the first example from the third-year EP. The online platform that contains a vast array of resources that students can consult is also used by the distance students to interact with their peers. Thus, various resources, teaching methods and learning opportunities ensure a well-balanced, high-quality teaching and learning experience. Moreover, this promotes SDL as students are encouraged to select which resources they would like to consult in an effort to successfully complete the EP or other

activities (learning goals), which enhances student autonomy (Knowles 1975:18). Students are also encouraged to employ various learning styles as a means to meet the learning goals (Knowles 1975:18). Organising one's own learning also calls for critical thinking skills.

According to Soulé and Warrick (2015:183), higher cognitive thinking and personalised learning are essential components of learning in the 21st century. In a study conducted with first-year English for Education students at this higher education institution, it became apparent that students did not have sufficient critical thinking skills necessary to perform the cognitively demanding tasks of the English course (Strydom 2020:70). Insufficient critical thinking skills also signifies a lack of self-directedness, as these two concepts are interdependent (Paul & Elder 2005:7). It is thus vitally important that the English for Education modules challenge student teachers to think critically and learn independently, as these are skills they will have to apply to cope with 21st-century teaching and learning and that they will have to develop in their future learners (Guglielmino 2013:2). The EP, online learning management system site and contact sessions contain pertinent questions at the start of each instructional unit. These pertinent questions prompt students to think critically, as they are open-ended and require students to evaluate various responses before providing their own. An example of such a pertinent question in the didactics unit of the second semester is: 'Do you believe visual literacy should form an integral part of the English (EFAL and EFL) FET phase CAPS? Justify your answer' (Romylos et al. 2020b:82). Such questions enhance students' critical thinking skills and ensure active engagement, as these questions are discussed in groups during contact sessions.

Quality assessment that enhances critical engagement and self-directed learning

This section explores four characteristics of assessment that enhance critical engagement and SDL. Winstone and Carless (2020:3) postulate that SDL requires receiving and interacting with feedback. Thus, the first characteristic explored in this section is effective feedback. Secondly, to encourage independent learning, assessment should be innovative and cater for a variety of 21st-century students (Tadesse et al. 2018:10). In addition, critical thinking, which encapsulates problem-solving and the assessment thereof, is necessary for improving one's learning (Paul & Elder 2005:7) and is discussed thirdly. Lastly, the importance of assessing content holistically, which often reveals the real-life relevance of the content (Deneme & Ada 2010:9; Murthy & Ram 2015:102), is discussed. Table 8.1 below provides an overview of how each of these assessment characteristics enhances SDL, as well as guidelines that could be applied across the curriculum to ensure quality, self-directed learning-driven assessments.

TABLE 8.1: Guidelines for employing the four characteristics of quality assessment to enhance self-directed learning.

Characteristics of quality assessment	Link to the development of SDL	Guidelines when creating assessment opportunities
Effective feedback	Feedback is defined as a process in which the students gain insight into the differences and similarities of the expected standards for learning and the quality of their work, in order to improve their performance in future assessment tasks (Boud & Molloy 2013:6). Additionally, Morris (2018:637) states that feedback enhances independent learning. Feedback is thus used to reflect on one's learning progress, which is integral to SDL.	• Use multiple sources of feedback (Hamilton 2019:571), such as peer feedback, feedback from rubrics, immediate lecturer feedback, etc. • Ensure students' active engagement with and interpretation of the feedback (Winstone & Carless 2020:8).
A variety of innovative assessment tasks	Costa and Kallick (2004:2) state that alternative and authentic assessments are required for the assessment of self-directedness. Moreover, because of the ever-changing educational environment, adapting and varying assessments are of utmost importance (Greenstein 2012:2). Providing students with a variety of innovative tasks will ensure that all learning styles are accommodated and will ensure adaptability, which is necessary for the development of SDL.	• A variety of task types should be given to ensure that a variety of skills are assessed, for example longer writing pieces, oral assignments, electronic posters or websites, group performances or debates, traditional tests, etc. • Set assessment tasks that allow students to be creative and innovative, whilst realising the real-life value of the skill/s being assessed.
Critical thinking and problem-solving	Cash (2017:2) postulates that critical thinking skills will enable students to maintain functional relationships, manage individual goals, make wise choices and participate meaningfully to society. Additionally, Geisinger (2016:246) states that 'problem-solving skills are essential in a rapidly-changing world'. Thus, to develop one's SDL skills, one should have the ability to manage one's learning goals and employ strategies to solve problems that arise during the learning process.	• Set assessment tasks that allow students to do their own research, evaluate the resources and come to their own conclusions. These tasks are usually set on the analysing, evaluating and creating levels of Bloom's Revised Taxonomy (Anderson et al. 2001:149). • Set assessment tasks that allow for a variety of responses to a particular problem or scenario, so that students will be able to select and employ strategies to find solutions to the problem or scenario.
Integration of topics and their relevance	According to Arndt (2017:38), SDL requires students to make decisions about how to progress their learning beyond the traditional classroom context. In addition to this, Schleicher (2012:34) says that the integration of various skills and disciplines is a characteristic of the 21st century. Self-directed learning is not restricted to monitoring one's learning progress in an isolated task or topic but rather manifests as reflection on one's overall learning (Arndt 2017:45), which includes one's ability to make connections amongst various strands of knowledge and skills. Moreover, SDL entails monitoring one's learning progress in real-world situations (Greenstein 2012:22).	• Ensure that students are expected to make connections between different topics and skills in your subject, but also topics and skills outside the discipline. • Make certain that the integration of topics and skills will allow students to see the relevance of the topic and/or skill in its real-world context.

SDL, self-directed learning.

Additionally, more detailed accounts of each of the four characteristics are provided.

Feedback[2]

Feedback could be described as a process where students obtain information about completed tasks or activities so as to gain insight into where they met, exceeded and fell short of the expected standards of a task (Boud & Molloy 2013:6). Feedback then provides information on the quality of the student's work in order to improve performance in future learning tasks (Boud & Molloy 2013:6). In the study conducted by Tadesse et al. (2018:8), student participants complained that they never received feedback on their assessments – they only saw their scores. In light of this, Bull (2017:15) avers that learning is rarely successful if no feedback is provided. In the English for Education course, a variety of feedback methods are employed after or during assessment. Some examples from the third-year modules are provided in the next paragraph.

Before elaborating on the use of rubrics as a valuable source of feedback, it is also necessary to understand the link between interpreting these rubrics and developing SDL skills. Self-directed learning requires feedback to inform the learning process (Costa & Kallick 2004:2; Jossberger et al. 2010:430). In the study conducted by Strydom (2020:60) with first-year student participants from the English for Education course, it became apparent that feedback was the main catalyst for students' engagement in SDL, thus highlighting the necessity for feedback in ensuring quality assessment that improves learning. However, whilst providing feedback is essential, it is just as important for students to actively seek feedback and to critically engage with it. Winstone and Carless (2020:8) emphasise that feedback is effective when there is a combination of being presented with valuable input and interacting with the received input. Thus, it is not enough to merely receive comments as feedback, unless the feedback is interpreted and there is interaction with the feedback to improve future learning. This underscores the importance of feedback as part of the SDL process, where the student is responsible for active engagement throughout the learning process so that future learning can be improved and adapted. This interaction is expected when students receive rubrics as a source of feedback.

In the English for Education course, feedback is mostly generated from the use of analytic rubrics. Analytic rubrics with fixed criteria and clear level descriptors are primarily used as assessment tools in language teaching as they clearly express the level of performance expected for an assignment

2. This section stems from another thesis and permission was granted to reproduce text from this thesis: https://repository.nwu.ac.za/bitstream/handle/10394/35058/24116297%20M%20Strydom.pdf?isAllowed=y&sequence=1

(Winterscheid 2016:6) and allow for better feedback on multiple aspects of students' language performances (Brown 2017:24). Most of the assessment tasks are on higher cognitive levels and require the students to analyse, evaluate and create. Prominent examples of the type of assessment tasks that are assessed with analytic rubrics include academic essays, PowerPoint presentations, mock trials, mini-newspapers and speeches. In the study conducted by Strydom (2020:65), first-year English for Education students were observed during contact sessions. The researcher found that in all instances, students were provided with the rubrics that would be used to assess particular tasks (the rubrics were either included in the EPs, shared with students during contact sessions or provided on the learning management system) (Strydom 2020:65). Sharing the assessment tools as a means of ensuring transparency regarding assessment is common practice during all years of English teacher training at this specific institution. It was shocking to find, however, that the first-year student participants did not refer to their rubrics as sources of feedback (Strydom 2020:65). The study highlights that feedback can only effectively feed back into the learning process and enhance SDL once students become active assessment agents in their own learning processes. What is needed from students is to interpret and actively engage with feedback, for example, study level descriptors, and to reflect on performance in order to obtain a clear understanding of what needs to be done to fill gaps between poor and good performance.

Another form of feedback often employed in English for Education is peer feedback. Working in groups or pairs is in and of itself a valuable form of feedback (Wind 2018). If students are actively involved in the completion of the group or pair assignment, they will receive feedback from their peers whilst working on the task. Peer feedback is a valuable learning tool and should serve as assessment that takes place continuously during the learning process and not merely after assignment completion. In the English for Education course, students are encouraged to work in groups or pairs on a regular basis. For example, in the first semester of the third year, students are expected to, in pairs, write a dialogue between a student and lecturer, in which the student flouts Grice's maxims of quantity, quality, relation and manner. The students are expected to role play the dialogue for assessment by the lecturer. In the second semester, students are expected to work in groups of four and to select (from a list provided by the lecturer) two discussion points on *Atonement* to discuss and present in their groups. Whilst the contact students may perform this during contact sessions, the distance students are expected to organise Zoom, Google Meet, and/or Skype sessions and record their live group discussions. These are two examples from many. Nonetheless, students are expected to actively engage with peers during group work, which serves as a form of feedback during task completion.

A similar form of feedback that features in the third-year modules is the lecturer providing immediate feedback whilst assessing. For example, the English for Education students receive holiday assignments to complete before commencement of the following semester so that they have ample time to read the prescribed novels and actively engage with the content. The holiday assignment for the third-year, second semester module, contains a question that requires students to select a character and theme from *The God of Small Things*. During a live broadcast via Google Meet, students then, in smaller groups, present their individual character analysis and exploration of the theme to their peers and their lecturer, who is also present in the online session. Each student is then expected to answer two, thought-provoking questions that the lecturer asks after the student's presentation. For the contact students, this usually takes place in face-to-face group sessions with the lecturer. It is during such live sessions that the lecturer provides immediate feedback on students' responses and interpretations of the novel. This then serves as an example of immediate, verbal feedback during assessment. Thus, it is clear that various forms of feedback are used to inform the learning process and to ensure quality learning. However, because of students' lack of exposure to critically engaging with feedback at secondary level (Strydom 2020:56), students do not always know how to reflect on, interpret and use the feedback they receive.

A variety of innovative assessment tasks

Another characteristic of quality assessment, as mentioned by the student participants in Tadesse et al.'s (2018:10) study, is that assessment should be innovative. This also denotes that a variety of tasks that assess various language skills should be incorporated. In the English for Education course, students are assessed not only on their writing skills but also their speaking skills. A variety of assessment tasks do not only ensure that various learning styles are accommodated, but also that all linguistic skills are assessed whilst maintaining innovation and creativity. Examples of creative writing assessment tasks in the first semester include writing a paragraph on how his/her self-image was formed and whether he/she thinks that this self-image is an accurate view of his/her character (in response to the short story *The Lady in the Looking-glass: a Reflection* by Virginia Woolf); writing a diary entry in which he/she reflects on Um Sabir's role as a woman in an Egyptian society (in response to the short story *Sandpiper* by Ahdaf Soueif); designing a mini-newspaper in groups, where each group member is responsible for a different article (in response to prominent themes and issues in *Disgrace* by J.M. Coetzee); rewriting Brutus' speech by incorporating rhetorical devices (in response to Shakespeare's *Julius Caesar*); and analysing the visual literacy questions in a previous Grade 12 EFAL exam paper. In addition to this, students

also write tests, especially on linguistics. These tests also incorporate creative questions that require students to apply their linguistic knowledge in particular contexts.

As mentioned, students are not merely assessed on their writing skills, but also on their speaking skills. Creative speaking assessment tasks include:

- A live PowerPoint presentation (the distance students add voice-overs to their presentations) on the themes and symbols apparent in *Disgrace.*
- A mock trial on *Disgrace* (for this task, students perform the mock trial at the law faculty and they are expected to dress appropriately, use the correct law terminology and fulfil their respective personas – they should enact a real trial, with David Lurie accused for the rape of Melanie Isaacs).
- Creating posters on Padlet (an online platform for creating posters and pages) and add voice notes to these posters.
- Conduct group discussions on specified discussion points on *Atonement*.

It is clear that students are exposed to a range of assessment tasks that play to different strengths and assess different skills. This is in contrast to what the literature reveals about English assessment at secondary school level. In most classrooms, learners are not exposed to a variety of innovative assessments, but rather coached for high-stakes examinations, which leads to assessment tasks that replicate probable examination questions (Berry 2011:98; Kapp & Arend 2011:8; Reyneke 2016:1). This denotes that assessment at secondary level does not encourage learners to think critically.

Critical thinking and problem-solving

According to education experts, assessment is shallow if it does not promote critical thinking and problem-solving skills (Reyneke 2016:1; Tadesse et al. 2018:8). Most first-year student teachers in South Africa are not self-directed learners, as they favour 'spoon-feeding' to approaches that promote critical thinking, active engagement and lifelong learning (De Beer & Gravett 2016:46). This is a result of a secondary education system where too much emphasis is placed on rote learning in preparation for high-stakes examinations (Breed 2016:1; Chetty 2015; Frempong, Reddy & Mackay 2013; Reyneke 2016:1). In light of this, the study conducted by Strydom (2020:86) found that first-year English for Education students were challenged to critically engage with assessment tasks, but that they did not know how to do so effectively. With critical thinking being a prominent criterion for assessment tasks in the English for Education course, it is necessary for students to develop critical thinking skills that allow them to engage with the content actively and deeply.

The type of assessment tasks that students are expected to complete at a third-year level are dependent on critical thinking for successful execution.

In every semester of the English for Education course, students are expected to write academic, research-based (from the second year onwards) essays. Below is a list of the academic essay topics on *The God of Small Things*, provided to the third-year students in 2020 (these topics change every year) (Romylos et al. 2020b:40):

1. Gender inequality is no doubt prevalent in the novel. However, this inequality is not just supported and accepted by the men, but also by some female characters. Discuss this statement in an essay of 1000 words. Provide your essay with its own title.
2. Love between man and woman is a failed union when considering the relationships in the novel. Argue this point in an essay of 1000 words. Provide your essay with its own title.
3. Consider the following statement: The politics of Baby Kochamma, Inspector Matthew and of K.N.M. Pillai in relation to Ammu and Velutha highlight their own interest in self-preservation at the cost of Ammu and Velutha's lives. Discuss this statement in an essay of 1000 words. Provide your essay with its own title.

Students are also expected to use at least two sources in addition to the primary source, which is the novel. These essay topics require students to consider a variety of stances, to do research to inform their opinions, to select a thesis statement for the topic and to develop arguments to support the thesis statement. In addition to this, students are expected to reference their sources correctly and to write coherently and grammatically correctly. This assessment task requires higher-order cognitive skills and the application of a variety of skillsets. It also encourages the development of SDL skills, as students are obliged to find sources that could assist them in attaining the learning goal (Knowles 1975:18). They also have to make decisions regarding the topic selection, the planning of the essay (using the most effective learning style), the inclusion or exclusion of sources and information, the arguments that will contribute to the thesis statement and so forth.

All the assessment tasks of the third year require and develop students' critical thinking skills in different ways. English for Education students write linguistics tests every semester, with the linguistics becoming progressively more complex with each semester. The questions included in these 'traditional-type' tests encourage students to analyse, evaluate and create. For example, students are expected to add their own, specific types of phrases and/or clauses to sentences; classify sentences according to their clausal structure; evaluate specific fictitious classroom scenarios and assist 'learners' with the errors they made; and rewrite whole, contextual passages in reported speech in an authentic manner. Additionally, more creative assessment tasks such as the *Disgrace* mock trial and the *Disgrace* mini-newspaper encourage the use and development of critical thinking skills. For the mock trial, students are

expected to assign various roles to their group members (analysing); do research on these roles, the terminology and the procedures of real-life trials; conceptualise coherent arguments for and against David Lurie's accusation; closely study the characters that they have to represent; practise performing the mock trial (this includes effective presentational skills); and, eventually, perform the mock trial in front of a panel of lecturers and their peers, acting as the audience. This assessment task encapsulates every level of Bloom's Taxonomy as students are expected to remember, understand, apply, analyse, evaluate and create (Anderson et al. 2001:149). This once again confirms the importance of developing critical thinking skills to perform at the expected level in the third year of English for Education. One way, in which assessment tasks that develop critical thinking skills are ensured, is to integrate the topics being studied, as opposed to teaching and assessing these as isolated components of language (Deneme & Ada 2010:9; Murthy & Ram 2015:102).

Integration of topics and their relevance

In order to ensure quality assessment and learning, various strands of studying the English language should be assessed and taught in an integrated manner that reveals the real-life relevance of these topics (Deneme & Ada 2010:9; Murthy & Ram 2015:102). In Tadesse et al.'s (2018:6) study, an educational expert mentioned that practical skills and theoretical knowledge need to be well integrated to ensure quality teaching, learning and assessment. In addition, Goodman (2015) maintains that teaching through relationships embeds formal knowledge in the world in which it actually exists and from which it originates. This places emphasis on considering the context within which the particular topic/s could be encountered in real-life situations. In the English for Education course at the particular higher education institution, the assessment tasks signify real-life application of the skills being learned (examples follow in the next paragraph). Additionally, language skills are assessed in an integrated way (e.g. with the *Disgrace* PowerPoint presentation, speaking skills and writing skills are assessed simultaneously). In addition to this, the language topics being taught are also integrated to ensure that students make meaningful connections amongst the various topics.

If one considers the linguistics tests that the third-year students are expected to write in the second semester, it is apparent that the questions situate the content (tenses and textual editing) in the real-life scenarios the student teachers will encounter in their future careers, for example: *Mr Ndala teaches his learners the present indefinite tense and informs his learners that the time word, 'always', is associated with this tense. Comment on why this may confuse learners by referring to examples*. This clearly situates the students in a probable classroom scenario, whilst expecting them to apply their knowledge and skill pertaining to the content (tenses). Moreover, the

language questions are not asked in isolation, devoid of context, as is usually the norm with traditional language tests. These tests include questions that are based on extracts from the prescribed literature of the semester, thus integrating language and literature (as suggested by CAPS for EFAL Grade 10 to Grade 12) (DBE 2011:15) so that a meaningful context is created for language assessment. For example, a particular question provides students with an extract from *Atonement* and students are expected to comment on the use of the past tense in this extract and to indicate in which instances other tenses could have been applied successfully. The dialogue assessment task, where students are expected to create and perform a dialogue between a student and lecturer in which the student flouts Grice's maxims of quantity, quality, relation and manner, is also an example of how language is assessed in an integrated way, with its relevance made apparent. In this assessment task, students are placed in a real-life situation (a conversation between a student and lecturer) and expected to apply the content knowledge and skills in context. Assessment tasks such as these force students to make connections amongst various topics of study and to see the everyday relevance of the content and skills they are learning. These assessment tasks also allow lecturers to assess students' critical thinking skills as opposed to merely applying remembered or studied rules and content.

Thus, the third-year English for Education modules at the particular higher education institution ensure quality assessment and the development of SDL skills in that feedback is regarded as essential, a variety of innovative assessment tasks are administered, critical thinking skills are developed and language is assessed in an integrated manner, which ensures that the real-life relevance of the tasks become apparent.

Conclusion

Quality English teacher training in preparation for teaching the language as a tool for communication in diverse linguistic and cultural societies (promoting learners' BICS) and as an academic language (promoting learners' CALP) that is used across the curriculum places a huge responsibility on the shoulders of teacher trainers at institutions of higher learning in South Africa. Student teachers should become aware of the fact that English language teachers are often 'perceived as, or unwillingly made, the gatekeepers to further higher education since a certain level of English proficiency is required for successful study and training after school' (Van der Walt & Evans 2019:xiii) and that proficiency in English not only helps to secure jobs but also allows for active participation in international business, trade and commerce (Rao 2019:65). In South Africa, where English is not only taught and learned for functional purposes (as a tool for communication and education, addressing proficiency in listening, speaking, reading and writing) but also for aesthetic purposes for

example in literature study, student teachers have to be prepared to equip their learners with linguistics and literary knowledge and skills, as well as the ability to think critically, solve problems and consider various opinions of and approaches to any particular topic. Attaining these high-level outcomes in English teacher training requires quality assessment that promotes critical engagement and SDL. In addition, it is important for teacher educators to model to the students the type of practice that educators would like to see being implemented in English classrooms in basic education (Burns 2011:133).

This chapter considered the third-year English for Education modules at a particular tertiary education institution to establish how teaching, learning and the curriculum can be structured to enhance quality assessment and SDL. Four characteristics of quality assessment were highlighted in the discussion. Firstly, feedback, which necessitates active engagement by the student, was discussed as a vital component of quality assessment and SDL. Additionally, a variety of assessment tasks that encourage critical thinking and problem-solving were discussed as components that enhance quality assessment and SDL. Lastly, encouraging the study of language as a holistic field instead of isolated components, as well as making the real-life relevance of the content pertinent were established as contributing factors to quality assessment and SDL. The guidelines provided in this chapter could be used to assist lecturers with the development of quality assessment opportunities for the purpose of developing self-directedness in their students.

Chapter 9

Using digital technology as formative assessments to enhance self-directed learning

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Abstract

With the outbreak of COVID-19 during the first quarter of 2020, several universities found themselves in a situation where their doors were closed and a remote online teaching strategy was adopted. COVID-19 left several academics and lecturers in a constant state of anxiety, where the resounding choir sang, '*But how will we assess our students*?' This prevailing question has

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merit, as lecturers who were used to assessing paper-based assessments were left puzzled as to how they could effectively carry out assessment tasks and give useful feedback. A critical factor in moving to a digital approach, or online teaching and learning, came with a new need to expose lecturers to several new technological approaches to teaching, learning and assessment. The main aim of the chapter was to determine and explore the consequences of online marking and feedback in a school-wide community of practice project, utilising teaching strategies for the development of SDL amongst pre-service teacher students. As SDL is the core variable, it is crucial to understand the relationship between adult learning and SDL, which is a topic investigated in the literature review. The literature review indicated that synchronous e-learning was complicated because of a lack of infrastructure. Literature and the findings revealed that feedback is only beneficial on academic assignments if comments and specific changes given to the students concentrate on the criteria of the assignment rather than just get the correct answer to the student. The students' voice through reflection on feedback has been outlined as well.

Introduction

In the education sector, it is well recognised that there is a significant interest in providing reliable and effective formative assessment, making it a crucial element of learning (Spector & Yuen 2016). According to Bhagat and Spector (2017:314), however, several prior studies focusing on formative assessment did not focus on the use of technology. The use of a technology platform as a tool for online classroom formative assessment is a valuable benefit, as it allows a way to make the subject more engaging and enables students to get detailed individualised feedback. 'Feedback is seen as a process that makes a difference to what students do' (Henderson et al. 2019:4). When students' work is returned to them, feedback does not end. Without the student's action, feedback cannot be meaningful. This shift in thought 'from a teaching-centred process to a learning-centred process' suggests different ways of thinking about feedback quality (Henderson et al. 2019:4). Besides instant and thorough feedback, the application of technology provides valuable data to teachers/lecturers (Dakka 2015:17) because it provides a quick, visual review if students are making progress or having difficulties. Bhagat and Spector (2017:315) predict that improving students' achievement, disposition and encouragement amongst various subjects could help teachers/lecturers to implement formative assessment. Although technology is increasingly utilised when linking resources to student, it can also encourage formative assessments (Robertson, Humphrey & Steele 2019).

Several applications could be considered such as Adobe Acrobat comments and emphasis on feedback aspects that affect: (1) the way feedback is observed, (2) the recipient's acceptance of it, and (3) the recipient's eagerness to react to the feedback.

Problem statement

A school-wide community of practice project, incorporating an online digital marking tool to support the development of lecturers' SDL, was launched by the School of Commerce and Social Studies in Education. The question arises how exactly lecturers can provide useful feedback to students after the marking of formative assessment activities. The COVID-19 pandemic affected the teaching and learning mode of delivery, which changed to remote online learning across the globe. Because of the COVID-19 pandemic, governments and tertiary institutions around the world needed to initiate numerous policy programmes to continue teaching practices in order to contain the spread of the virus. There was uncertainty and disagreement on how to teach, what to teach, lecturers and students workload and the teaching environment because of several academics not being familiar with using technology to teach (Zhang et al. 2020:1). During the COVID-19 pandemic, comprehensive nationwide attempts to use technology as a tool for remote learning (asynchronous), distance education (asynchronous and synchronous) and online learning (synchronous) were emerging and developing rapidly. Romero-Ivanova et al. (2020:81) explained COVID-19 developed new expectations during the first semester and transformed the lives of individuals towards a 'new normal'. Higher education institutions with lecturers and students transitioning to online synchronous and asynchronous teaching and multimedia activities were impacted by these changes (Romero-Ivanova et al. 2020:81). Most of the lecturers were not familiar with remote learning, especially the use of an online marking tool. The Centre of Teaching and Learning (CTL) (2020) from the North-West University (NWU) provided online training to lecturers who requested to get training to utilise the online marking tool.

How adequately will the digital feedback develop SDL? With this question in mind, the study has the following primary question: What are the consequences of online marking and feedback in a school-wide community of practice project, for the development of SDL amongst first- to fourth-year pre-service teachers in different subjects within the School of Commerce and Social Studies in Education?

The secondary questions of this investigation were as follows:

- How self-directed was the first- to fourth-year pre-service teacher students before the intervention?

- What was the influence of online feedback on students' SDL skills?
- What were the perceptions of pre-service teacher students regarding online feedback?
- What were the perceptions of lecturers using an online digital marking tool?

The use of Adobe Acrobat comments on PDF files, embedded voice notes, feedback through social media, as well as the use of video recordings, will be outlined in this chapter.

The chapter subsequently focuses on the theoretical and conceptual framework adopted in the research.

Theoretical-conceptual framework

As a central element of the theory of adult learning, the authors will explore SDL (Louws et al. 2017:171). Mattar (2018:213) explained that 'social connectivism or distributed learning should be considered as an updated version of social constructivism, understood as a general philosophy of education for the digital age'. The authors took that into consideration but decided to keep their focus on social constructivism because of Mattar's findings (2018) that 'further research is needed to explore the application of social connectivism in education technology'.

Vygotsky's approach of the social constructivist theory was used as a lens by exploring the impact of the Zone of Proximal Development (ZPD) and scaffolding of learning with students with the focus on effective feedback using technology as an assessment strategy to develop self-directedness. According to Shabani, Khatib and Ebadi (2010):

> [*T*]he primary purpose of scaffolding (techniques used to move students progressively toward more robust understanding and, ultimately, greater independence in the learning process) in teaching and learning is to assign responsibility for the assignment to the student. (p. 241)

Self-directedness does not mean that learning occurs in isolation, but rather that a student should work with or without the help of others (Brookfield 2009). The project focused on the theory of social constructivism, which relates to collaborative learning and social interaction in order to assist in developing SDL (Geduld 2014:15). Individuals develop knowledge through social experiences and mutual learning, which increase cognitive levels (Bozkurk 2017:211).

This research concentrates on the following key concepts: SDL, digital learning, formative assessment and feedback.

Self-directed learning

As SDL is the core variable in this study, it is crucial to understand what it entails. According to Candy (1991), 'the interaction between adult learning and SDL is worth exploring for both theoretical and practical purposes'. Since the term SDL was first formulated by Knowles (1975) almost 40 years ago, several academic works of literature have been released, each including various definitions.

Mezirow (1985:17) specifies that 'no concept is more central to what adult education is all about than SDL'. Knowles (1975) defines SDL as:

> [*A*] process of learning in which individuals have the ability to identify their learning needs, set learning objectives, identify human and learning resources, choose and implement effective learning strategies, and assess their learning objectives with or without the support of others. (p. 18)

Self-directed students exhibit several specific and observable characteristics. King (2011:259) listed 'intrinsic motivation, the capacity to choose personal goals, self-discipline, self-assessment ability and metacognitive skills are key features of self-directed students'. He (King 2011) goes on to further state that:

> [*S*]elf-directed students, who are emotionally engaged in the learning process, retain high rates of self-generated encouragement to achieve their objectives and priorities and are easy to track and change their own learning. (p. 259)

Self-directed students thus have a high degree of commitment, perseverance and self-motivation (Guglielmino 2013:6). In other contexts, self-directed students can apply subject information independently, have a significant level of self-efficiency and can communicate successfully with peers during the task's completion.

Individual students will be attracted to SDL as a function of their persona, but all students can be driven towards successful SDL in this way, as more self-motivated and reflective thinking students would want to direct their own learning. 'Intrinsic motivation is the energy that encourages students to seek self-directed, independent learning' (Guglielmino 2013:6). Amongst the most significant, basic educational objectives could entail determining situations that move towards intrinsic motivation, which foster an SDL mentality. An individual who does not possess many of these abilities as outlined by Knowles (1975) and is unable to demonstrate adequate competence with regards to displaying goal setting, implementing effective strategies and identifying adequate resources will be described as a person with a lower level of self-directedness (King 2011:259).

Rogers (2004) suggests:

> [*S*]elf-directed students undertake their own learning by figuring out what they need to know and how to do so, by preparing and tracking their learning through different resources, and by documenting it and collaborating with peers and advisors to support their learning. (p. 8)

Self-directed learning does not happen naturally in an environment. The setting, society, culture and educational facilities can stimulate or hinder the key features of the process of SDL.

Knowles' (1975) adult education philosophy has shown that adults prosper in settings where they are extremely inspired, they can contribute to learning and where learning resources have realistic purposes. According to Knowles (1975:18), adults prefer a comfortable learning environment. They want accurate descriptions of what they want, ways to bring their novel knowledge and skills into practice and constructive feedback into their learning experience. Knowles (1975) argues that students are valuable teaching resources themselves; they enable and incorporate rich experience into the teaching content, making it more meaningful. The teaching of adult students must also go beyond the diffusion of information to support individuals to handle and develop their own learning, which is the cornerstone of SDL. Adult education focused on skills that should also provide a work-friendly social climate (Manning 2007:104). Amongst the founders, Tough (1978:250) and Knowles (1975) described how adults learn on their own and outlined the main decision-making factors on how to choose what, how and where to learn. They were the pioneers to urge the integration of SDL into adult structured learning (Abdullah et al. 2008:68). Greater autonomy of learners means that learners are given ample opportunities and the ability to think what they would like to learn (which is essential or beneficial to them), how they want to learn (strategies, resources required, venue and tempo), and what measures would be selected to decide whether the learning process was adequate and beneficial (Abdullah et al. 2008:68).

The influence of seven years of work on adult learning, change and growth was published by Tough (1978:253). The research of Tough was not just about why individuals learn; it is also about how they learn. According to Tough (1978:253), adults based their learning experiences on assignments, which were presented as a set of interrelated events to develop and retain explicit knowledge and ability, or to establish some permanent improvement. Tough (1978:255) recommended that adult learners pass through several phases of the learning process. Manning (2007:106) speculated that one successful way to enhance students learning might be to decrease assistance, which could be one effective way to improve their SDL. Several scales can assess these degrees of self-directedness in learning. The scale of Guglielmino (1978) tests SDL learner readiness, whilst Williamson's self-rating scale of self-directed

learning (SRSSDL) (Williamson 2007) tests learners' levels of self-directedness. The SRSSDL was selected as the measurement tool in this research (Mishra et al. 2013):

> A lot of research on self-directed learning has been done, but the context has changed with the growth of online learning, greater access to technology and connections to information and resources. (p. 11)

According to Guglielmino (2013:5), 'online learning has offered a rich opportunity for increasing SDL skills and attitudes'. Students appear to overestimate their knowledge and skills in contrast to the perception of their lecturers or mentors about the knowledge and skills of their students (Dunning, Heath & Suls 2004:94). Kruger and Dunning (1999:31) confirmed that students wrongly score themselves at a far higher level than is right when they rate themselves. This phenomenon is called the effect of illusory superiority. According to Pietroni and Hughes (2016:252), 'illusory superiority, also known as the above-average effect, superiority bias or leniency error, is a cognitive bias whereby individuals overestimate their own qualities and abilities, relative to others'.

A technological approach is advocated in this chapter, which will make use of digital learning.

Digital learning

Anyone who has ever worked in a conventional classroom setting as a teacher or facilitator knows first-hand that with different classes or individual learners, the same content will never yield the same results (Shahabadi & Uplane 2015:132). In addition, information may be relevant to the learning style of an individual, whilst the same information may be worthless in fulfilling the learning goals in the case of another individual (Masie 2002; Zenger & Uehlein 2001:56). The researchers can suggest the following argument from this empirical reality and from considering its ramifications for any means of delivering teaching materials through online platform: in the end, it is the behavioural indicators of students who need to be considered when creating and implementing e-learning programmes to develop SDL (Shahabadi & Uplane 2015:132). Consequently, the researchers agree with Codreanu and Vasilescu (2013) that the emphasis is on the student and their needs and requirements, and given the point of this study which is to focus on developing SDL through digital assessment, it is crucial to evaluate the effect on any programme developed and delivered through Internet-based technology. From this point on, we will use the broad term of e-learning.

According to Rosenberg and Foshay (2002:51), e-learning is described 'as the use of information communication technology to provide information and guidelines to individuals, predominantly via the intranet or the Internet'.

Research has shown that, whilst terminology such as computer-based learning, remote learning, digital learning or web-based training is sometimes used, e-learning will ultimately prevail as most organisations preferred concept.

Less prominent is synchronous e-learning, which is 'absolute' and necessitates all participants to be at the same time in front of their computers. There are a number of synchronous e-learning types. Shahabadi and Uplane (2015:131) describe 'synchronous e-learning [as] live, real-time (and usually scheduled), facilitated instruction and learning-oriented interaction. In this type of learning, learning experiences are in real time'. Another popular method includes actual 'chat' session times when students sign in simultaneously to collaborate on certain themes (Shahabadi & Uplane 2015:131).

Today, the bulk of e-learning is asynchronous in nature. Shahabadi and Uplane (2015:132) describe 'asynchronous e-learning as a learner-centred process, which uses online learning resources to facilitate information sharing regardless of the constraints of time and place amongst a network of people'. The benefits of asynchronous e-learning are (Shahabadi & Uplane 2015):

> [*C*]omputer-mediated communication to achieve the promises of learning anytime and anywhere through asynchronous online discussions, which is based on the constructivist theory, a learner-centred approach that emphasises the importance of peer-to-peer interactions. (p. 132)

The researchers argue that in order to develop SDL in an online environment, the system needs to cater for learner-centeredness, which is embedded in constructivist theory, as alluded to above. The researchers utilised this asynchronous method in this project, by using screencasting or interactive PDFs and PowerPoints of study units, which has been pre-recorded for students. This learner-centered method was difficult to follow because of a lack of infrastructure.

Comer and Lenaghan (2013:262) argued that asynchronous online learning offers an excellent probability to build a learning-centred surrounding that stimulates rich interactions between lecturers and students and amongst students. Through an online asynchronous panel, 'computer and Internet technologies enable communication via the generation of discussion messages amongst participants' (Han & Hill 2006:30), which will generate more constructive engagement and connection compared to many conventional face-to-face environments. This links to the constructivist approach advocated in the intervention, which is to develop SDL through the use of online formative assessments. Students can interact with the lecturer by asking live questions. Synchronous coordination (via chat rooms and WhatsApp groups) between team members is taking place as they work together to create and present evaluations as a part of this study. In order to facilitate the assessment of these sessions, the researchers turn their attention to the use of online marking.

Online marking

Online testing is gaining prominence. All major e-Learning environments, such as WebCT or BlackBoard, offer resources to assist with online student evaluation (Zhou et al. 2016:2463). Because of advantages such as reduced time compared to paper-based assessment, increasingly educational institutions are preferring online assessment rather than traditional paper tests (Heinrich & Wang 2003). There are two important aspects of the online assessment. In the first place, it means that students submit their answers online, and in the second place, an automated system marks those answers. However, this second part restricts online assessment, as is usually known, to really limited types of online assessment, consisting of multiple-choice questions, ordering or matching questions or simply filling in blank questions (Heinrich & Wang 2003; Zhou et al. 2016:2463). This online evaluation approach is not sufficiently advanced to evaluate the perception of complex content and cognitive traits of students. (Heinrich & Wang 2003; Zhou et al. 2016:2463). According to Nicol and Macfarlane-Dick's (2006:205) principles of good formative feedback practice, the feedback is not simply giving the correct answer, it is also part of the teaching and learning strategy to encourage SDL. Therefore, the students received immediate feedback, with reference to the page in the prescribed book for incorrect answers. This should help them to track and change how they learn theoretical concepts. Tests in the form of assignments, reviews or essays are expected to assess the abilities of students in a more comprehensive way.

Automatic marking is not successful if lecturers follow this route of using essay assignments, as the processing of information today is not advanced enough to analyse and understand this kind of complex intellectual content (Zhou et al. 2016:2463). Human markers who manually review essay-style assignments in a friendly online environment are the requirement. Therefore, the online marking of these assignments by a human marker should continue with a framework with the most essential features of the online submission of essay-type assignments and advanced feedback to students. On the basis of this core structure of digital marking, an open atmosphere must be created that gives students access to comprehensive evaluations and peer assessment (Heinrich & Wang 2003). This does, however, only focus on summative assessments, and the researchers are aware that the students themselves can also assess each other in an online setting. The researchers could not control whether the students themselves could use digital marking, hence only the focus on the lecturer assessment. This is mostly focusing on the lecturer marking more extended questions.

Limited research specifically discussed the problem of 'the impact of mode effects on online and traditional forms of a course-based assessment' (Hewson 2012:490). Eighteen years ago, research conducted by Goldberg and Pedulla

(2002:1065), discovered a 'pen and paper group outperformed a computer group when taking a test'. A more recent study by Backes and Cowan (2019:97) 'estimate online test effects of −0.10 and −0.24' when compared to traditional pen and paper tests, controlling for prior test scores. This implies large effect sizes when comparing the two groups, meaning there is a big difference in taking an online test versus a pen and paper test. Hewson (2012:490) reported evidence for performance effects inside a test setting that more trained students outperform those with little exposure to online learning. Therefore, students who are appropriately oriented towards an online assessment will perform better when online marking is carried out. Goldberg and Pedulla (2002:1066) also reported finding evidence that the time to complete the test had a more negative effect on results in computer-based modes than in paper-based modes, concluding that it is vital to evaluate whether more time will be needed when carrying out computer-based assessments than in traditional paper-based modes. More recent research conducted by Karay et al. (2015) found that:

> [*T*]he test results from the paper and computer versions did not differ. The groups remained within the allotted time, but students using the computer version (particularly the high performers) needed significantly less time to complete the test. (p. 57)

A text in PDF format can be converted to almost any printable text. As they can be accessed on any platform and any Internet browser, PDF documents are ideal for the online environment. Choosing PDF as a paper format means that only one software package, PDF Writer software, needs to be purchased by the university to convert student submissions into PDF format. The software of their choice can be used by students to compose assignments (Grieve, Padgett & Moffitt 2016:11). After they have been created from the source content, PDF documents cannot be easily updated. Compared with the use of a word processing format as the basis of our online marking system, this is an essential advantage. Using word processing tools to mark essays, such as Microsoft Word's 'Comments' or 'Track Changes' functionality, the marker may unintentionally alter the initial assignment (Grieve et al. 2016:11).

Adobe Acrobat Reader is a PDF file opening and reading programme and has proven to be efficient for students sharing one-way audio input files (Zhou et al. 2016:2463). The software is a free download that requires minimal functionality without the entire Adobe Acrobat software being purchased. No configuration of the account or additional online hosting is needed (Grieve et al. 2016:12). The documented comments can be added as needed after the lecturer saves the uploaded student paper as a PDF file and opens it using Adobe Acrobat Reader. The comments are portrayed by the icons of tiny speakers in the written assignment. Text and audio files become a single packaged text when saved and can be re-shared via email or learning management system (LMS) as an attachment (Zhou et al. 2016:2463).

Grieve et al. (2016:11) summarise a few other advantages of the PDF format as follows:

- 'Neutral Platform: can be used across different platforms
- Widespread: one of the Internet's most popular file formats
- Integrity and correctness: protects records from modification, automatically adds up total marks
- Easy to publish: it is possible to convert any printable text into PDF
- Efficient: provides compression of data, usually limited in size and easy to transmit over the Internet
- Secure: provides the data encryption Privacy Protection System'.

Based on the previous discussions on digital learning as well as online marking, it is now crucial to understand formative assessment, in order to ensure that the online marking feedback and tasks given to students assist in the development of SDL.

Formative assessment

Black and Wiliam (1998:10) describe formative assessment in a specific manner to cover all tasks that lecturers and students perform to 'gain knowledge that can be used diagnostically to change teaching and learning'. Regarding this definition, the evaluation requires lecturer observation, classroom conversation, and review of student performance, including all smaller activities and assignments which informed the teaching and learning experience.

Hardiman and Whitman (2014:39) and James (2008) provide the following sociocultural general assessment guidelines:

- learning and assessment should not be divided
- group learning assessment is just as critical as individual learning
- in the use of resources or instruments (intellectual, human and material), the emphasis should be on how well a person is self-directed
- the assessment should be more comprehensive and qualitative, not segregated and quantified
- the assessment should determine the abilities and provisions and not merely determine the amount of knowledge/facts memorised
- assessment should entail a challenge and promote SDL
- assessment should include clear activities or concerns
- assessment should not just focus on what students should know about an imminent test or examination.

As experts, lecturers are used to adapting teaching and learning to meet the needs of students. They will use this assessment data to make the necessary curriculum improvements, such as exploring new learning strategies, or offering an extra opportunity for practice if lecturers know

how students are doing and when they are having difficulties. Such practices can lead to better SDL.

Because formative assessment aims to obtain a better awareness of what students know and do not know to allow responsive teaching and learning changes, techniques such as observation and discussion play a significant role alongside performance review and homework (Hardiman & Whitman 2014:39). However, in a digital learning context, these strategies became increasingly more challenging to use. Hardiman and Whitman (2014:39) emphasise that when an assessment is created, long-term learning, deep thinking, problem-solving and the cognitive skills of students should be promoted.

According to Earl (2013), assessment has 'three interwoven but distinct approaches to assessment: assessment *of* learning, assessment *for* learning and assessment *as* learning'. Each of these approaches plays a role to enhance learning.

In all education sectors, AoL is predominant (Hardiman & Whitman 2014:39). The goal is to provide summative grades, regarding the progress of students, typically in comparison with other students. Teachers and lecturers set assessments to measure the quantity and precision of the work of students to cover a broad spectrum of skills and expertise (Earl 2013). These forms of assessments take place at the end of the learning process. According to Earl (2013):

> Assessment for learning moves the emphasis from summative to formative assessments, which continually occurs during learning and encourages teachers to change teaching and learning practices to meet the needs of individual learners. (p. 27)

Teachers and lecturers use various methods to gather a wide range of data, such as group activities, peer assessment, worksheet completion, individual assignments, test and quizzes and online activities. Students are provided with input on their strengths and shortcomings, with different forms of feedback in order to improve further learning.

Assessment for learning focuses not only on what students know but also on how, when and whether the knowledge and skills they have obtained are used and applied (Earl 2013). This is the type of assessment, where students develop their skill of SDL.

'Assessment as learning is an extension of assessment for learning', which uses assessment to promote the growth of metacognitive skills of students (Earl 2013). Regarding their own success and development, students serve as critical thinkers. Students assess individual learning growth and success against previous performance (Earl 2013).

Table 9.1 summarises the main characteristics of assessment *of*, *for* and *as* learning.

TABLE 9.1: Assessment OF, FOR and AS learning.

Assessment of learning	Assessment for learning	Assessment as learning
Summative – at the end of learning	Formative – during learning	Reflective – self-monitoring
Learning = to be taught	Learning = constructing meaning	Enhance motivation and commitment to learn
Judging learning against norms	Constructive feedback to enhance future learning	Self-assessment
Focused final results	Based on meeting the needs of individual learners	Learners are involved in learning, tracking their own growth and progress - Transformation oriented

Source: Earl (2013).

Based on Earl (2013), it is suggested that substantial consideration should be given to the FOR and AS learning assessment in order to improve SDL through digital assessment.

Assessment for learning is based on constructive feedback to enhance future learning. It is, therefore, crucial to understand how quality feedback ought to be given to students which can enhance their motivation and commitment to direct their own learning, which could lead to assessment as learning.

Feedback

Askew and Lodge (2000) describe feedback as 'all dialogue in both formal and informal situations to facilitate learning'. Feedback is a reciprocal mode of communication, not a one-way form of communication. Feedback contributes to higher-order skills growth, relating new information to what students already know and to the building of information (Nicol 2010:506).

Feedback is one of the most essential methods for lecturers to affect learning (Hattie & Timperley 2007:81). According to Bahari (2020:4), in 'exploring the potential affordances of multimodal digital feedback, it is reported to develop fluency and accuracy of learners' oral feedback, promoting more interaction, enhancing attentive engagement and personalised learning'. Feedback enables to eliminate the gaps 'between the students' current understanding or achievement and anticipated understanding or achievement' (Hattie & Timperley 2007:82). 'However, once the feedback is provided, the receiver must analyse and react to the feedback. The feedback to students is as important as the planning of the feedback' (Ilgen, Fisher & Taylor 1979:379).

Feedback is described as a two-way conversation by Boud and Molly (2013:703). Planar and Moya (2016:198) define feedback as 'the one that facilitates and the one that receives'. Input should be accompanied by discussion and events (Geitz, Brinke & Kirschner 2015) which:

> [*N*]ot only informs students about their current performance but also support them to seek and ask for feedback on possible results. This will give more control

> for students. It will also encourage them to add sense to the feedback and to discuss the feedback with their peers. (p. 278)

They not only inform students about their present results but also encourage them to get feedback on current performance. This will give students better control over their learning. It would also encourage students to 'add meaning to the feedback through reflecting and communication to their teammates about the feedback' (Geitz et al. 2015:278).

According to Hattie, Gan and Brooks (2017), for feedback to be obtained and used by the student, 'the quality of feedback is more important than the quantity'. Feedback does not guarantee learning, but the quality of the feedback was evaluated (Brookhart 2012:25; Sadler 2013:535). Carless et al. (2011:406) indicated that most research findings show that the majority of feedback from lecturers is rarely used and adopted by students. A crucial prerequisite for efficient feedback practice is clarifying the requirements and criteria for the students (Molloy & Boud 2013). Students also say that they value data that are consistent with the assessment criteria (Peterson & Irving 2008:240).

In order to facilitate SDL, there are many resources that teachers can use, 'such as, using thinking maps (Hay 2007:43), cross-cultural communication (Osman & Herring 2007:133), podcasting (Pegrum, Bartle & Longnecker 2015:145) and asynchronous online conversations' (Du, Harvard & Li 2005:208). Feedback given after the formative assessment allows students to identify and direct those strategies through the actions required to achieve the aim of the feedback, in order to address any gaps existing between their desired goal and their current experience, understanding or ability (Sadler 2010:538). According to Henderson et al. (2019:4), the quality of comments made by lecturers can no longer be exclusively concerned, 'but whether these comments and indeed comments or knowledge from other outlets have a positive effect on student learning'. The importance of feedback is captured in the 'quality of the whole process, including the active position of students', instead of just concentrating on the quality of the lecturer's feedback. The emphasis needs to be on: does it make a difference, and how does it make a difference? (Henderson et al. 2019:4).

The most beneficial feedback on academic assignments involves detailed comments and specific changes and allows students to concentrate on the assignment carefully rather than just get the correct answer. Reflection is based on aspects that a student can focus on in future assignments as a form of feeding forward feedback. For instance, it may be more beneficial for students to reflect and give three strategies on how they can improve in the next assignments, instead of providing detailed information on the particular assignment the lecturer is busy marking (Hounsell 2006; Torrance 1993:336).

Research methodology

Research approach

A concurrent mixed-method triangulation approach was applied in this study. Both a quantitative descriptive survey and a qualitative experiment were used to investigate responses to a range of content presentations for data collection. The various quantitative and qualitative data sets were triangulated to identify whether there are convergences, variations or combinations (Creswell & Plano Clark 2018).

Population and sample

In this study, the researchers purposively focused on first to fourth-year pre-service teachers in Business Studies, Economics, Accounting and History from the NWU on the Vanderbijlpark Campus within the School of Commerce and Social Studies in Education.

The manner in which the project was implemented was asynchronous, as not all students had access to data or hardware, and all assessment tasks were communicated at least a month in advance, to give students sufficient time to complete them.

To keep students interested, multiple interactive strategies (e.g. hyperlinks and buttons) have been implemented for the student to engage with the module content (Subandi et al. 2018:246). Engagement and understanding, including multiple choices and transfer files, are also encouraged by different modes of instruction.

The researchers chose the PDF from Adobe Systems Integrated (Grieve et al. 2016:10) for the implementation of online marking.

However, because of the essence of the teaching and learning during the COVID-19 pandemic, the university opted for a fully online remote teaching strategy, as no classroom-based learning could be used. In order to facilitate this specific online assessment (testing) approach, the researchers allowed students a month to complete their work, so that they had sufficient time to plan and complete their work. The specific format that students needed to submit their work is in PDF. Feedback plays a crucial role in this online learning approach, specifically in a digital environment. Several strategies were implemented to facilitate user feedback using the institution's own LMS platform. Chatroom discussions, PDF annotations and WhatsApp groups all served a purpose in giving feedback to students.

The sample could also be considered convenient, as the participants were located on the same site where the researchers work. The aim of the research was to determine and establish the consequences of online

marking and feedback in a school-wide community of practice project for the development of SDL. Although 407 students enrolled for the school-based project which focused on effective teaching strategies which may support the development of SDL, only 277 of them completed the quantitative questionnaire although the school-based project was compulsory as part of the course; however, it was not compulsory to complete the measuring instruments. The scores of all participants in this study were included in the data analysis to take into account students' propensity to overestimate their abilities to be a self-directed learner, as no student scored low in the pre-test.

Quantitative methods and instruments

Participating students were invited to complete the Williamson's SRSSDL. The SRSSDL includes '60 items divided into five distinct SDL domains, namely awareness, learning strategies, learning activities, evaluation and interpersonal skills' (Williamson 2007). Using a four-point scale, responses for each item were classified. The researchers modified the Likert scale to prevent students from choosing option 3 in the five-point scale, namely, 'sometimes' to get clear and precise answers from the participants. In the research, Simms et al. (2019:7) 'show that changing the number of response options has a non-negligible impact on basic scale norms'. The modified Likert scale was statistically approved by a qualified statistician from the Statistical Consultation Services of the NWU.

Qualitative methods and instruments

After the completion of each summative assignment, the application of the assessment strategies of the participants was assessed through an online marking tool by giving them thorough feedback. The participants were requested to reflect on the feedback they received by explaining how the feedback affect their SDL. The purpose of these reflections was to explore if the participants became more self-directed and if the feedback they received become less comprehensive. Participants were also requested to write reflections to support their development of SDL. Reflections were written immediately after the completion of a summative assessment. Reflections were also requested from lecturers how they experienced the online marking and the effect of the feedback made to the students' SDL.

Questions asked to the student participants were as follows:

1. Explain in short how did you experience the online marking of your assignments in comparison with manual marking by your lecturer.
2. Explain in short, how did you experience the feedback on your assignments from your lecturer (positive or negative and why).

3. Could you understand your mistakes from the feedback you got from your lecturer? (Y/N)
4. Please explain why you answer yes or no in the previous question.
5. The feedback you got, did it help you to make fewer mistakes in the next assignment? (Y/N)
6. Explain your answer from the previous question.
7. With the feedback you got, could you become more self-directed by using the strategies you have learned? (Y/N)
8. Explain your answer from the previous question.

Questions asked to the lecturer participants were:

1. How would you compare marking by hand to marking digitally?
2. In terms of time spent, how do you feel about marking digitally?
3. How do you provide feedback whilst marking digitally?
4. How have the students reacted or engaged with your digital feedback? Has it been constructive?
5. Please explain whether learning to mark digitally and provide feedback digitally was difficult or not.

Findings

In this section, both quantitative and qualitative findings will be outlined.

Quantitative finding

Figure 9.1 indicates the number of participants per year group. Most of the participants 71.33% was third or fourth-year students. Figure 9.2 indicates the number of participants divided into different subject areas that were exposed to digital feedback and assessment.

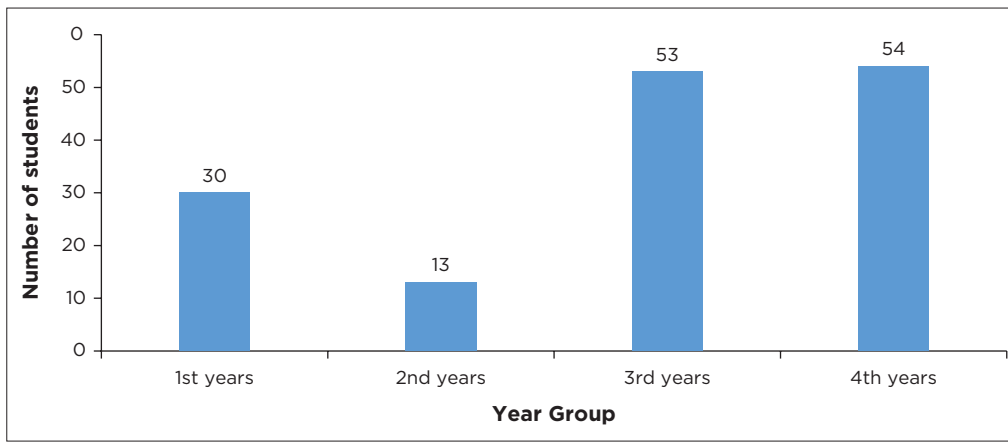

FIGURE 9.1: Number of student participants per year group.

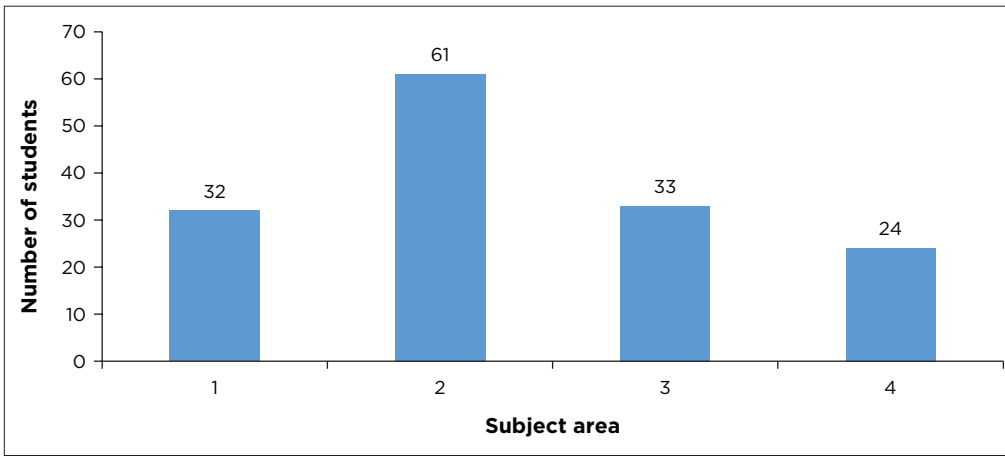

FIGURE 9.2: Number of student participants per subject area.

The largest group of participants represent the Business Studies subject area (*n* = 61). Economics is the second largest group (*n* = 33) with Accounting (*n* = 32) shortly behind, whilst History shows the lowest number (*n* = 24) of participants. All of these students who participated ranged from first to fourth-year BEd students.

For the SRSSDL questionnaire (Williamson 2007), the student participants were divided into three particular groups regarding their SDL, namely low (48–112), moderate (113–176) and high (177–240). Figure 9.2 shows the number of student participants divided into the three distinct groups of SDL, according to Williamson (2007). As no participants were identified within the low group, the emphasis of this study was on the results attained by the moderate and high groups.

According to Figure 9.3, the majority of the participants fall into the group, which shows a high rate of self-directing skills before the application of the digital feedback and pre-test assessment.

According to Taber (2018:1282), 'Cronbach alpha values of 0.7 or higher indicate as acceptable as internal reliability'. All the reported Cronbach alpha values according to Table 9.2 were above the guideline value of 0.7, which indicate that they are reliable. As part of a bigger research project, the SRSSDL has already been used at the same South African university (*n* = 403), and they obtained a Cronbach's alpha coefficients between 0.76 and 0.88 for the SRSSDL for the five categories of the questionnaire indicating the SRSSDL was reliable in the South African context (Petersen & Mentz 2016:49). The means of the resulting factors ranged between 38.57 (SD = 4.73) and 40.15 (SD = 4.24) and the reported means of the overall SRSSDL score is 196.87 (SD = 18.18) indicating that participants' SDL is high.

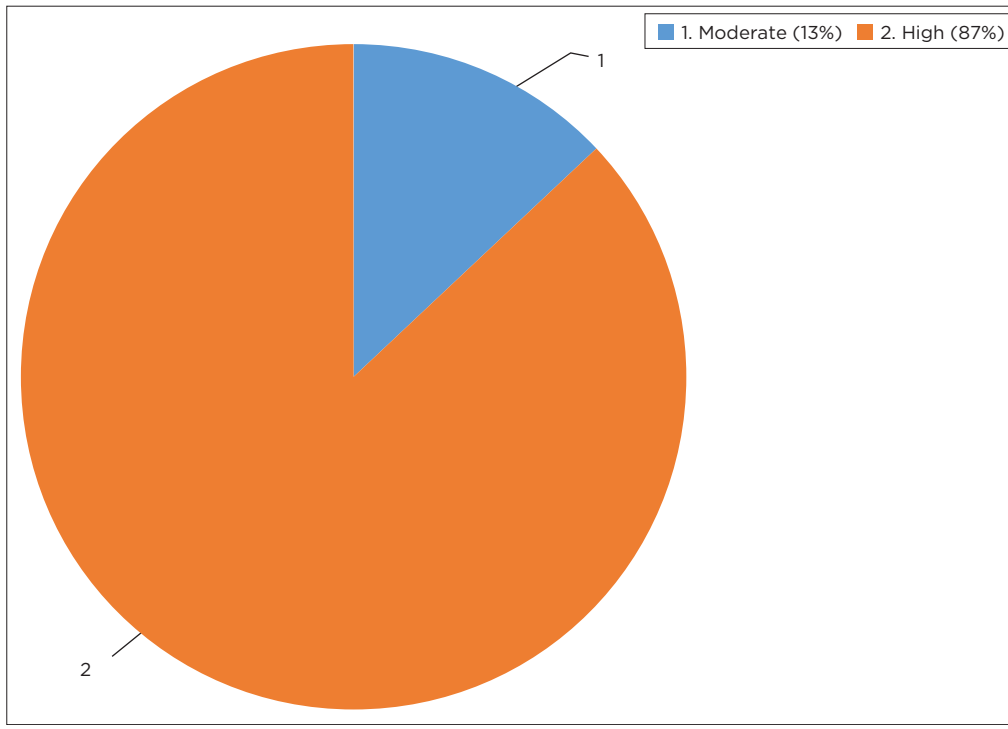

FIGURE 9.3: Number of participants in a specific category of self-directed learning.

TABLE 9.2: Construct reliability for each section.

Construct	Questions	Cronbach's alpha	Mean	SD
Awareness	Q1.1 – Q1.12	0.755	40.15	4.24
Learning strategies	Q2.1 – Q2.12	0.714	38.60	4.33
Learning activities	Q3.1 – Q3.12	0.800	38.57	4.73
Evaluation	Q4.1 – Q4.12	0.749	39.85	4.44
Interpersonal skills	Q5.1 – Q5.12	0.806	39.71	4.80
SRSSDL	**Q1.1 – Q5.12**	**0.867**	**196.87**	**18.18**

SD, standard deviation; SRSSDL, self-rating scale of self-directed learning.

Qualitative findings

The student and lecturer reflections on electronic feedback were analysed by means of inductive thematic analysis. From the data, meaningful parts were grouped under initial codes followed by grouping the initial codes under categories. From the categories, the themes emerged (Braun & Clarke 2006:77). The categories under each theme will be supported by verbatim quotes from the various year groups.

TABLE 9.3: Themes and categories.

Themes	Categories
The effect of electronic feedback on student's learning	• A basis for being independent • Detailed feedback, self-assessment and self-reflection • Feedback to guide the improvement of learning • Improved end product
Experiences of electronic marking and feedback	• Quality of feedback • Speed of feedback
Future implementation of electronic marking	• Attitude towards electronic feedback
Factors that influence the electronic marking and feedback experience	• Emergency remote teaching and learning • Minimal interaction for students

The effect of electronic feedback on student's learning

A basis for being independent

Student participants indicated that the electronic feedback acted as a basis for them to become the initiators of their own learning, which is a core characteristic of SDL. Self-directed students can apply subject information independently; have a significant level of self-efficiency and can communicate successfully with peers during the task's completion (Guglielmino 2013:6):

> 'It allows me to be in control of my own work and to see how I can improve myself when working.' (Student, 1st Year, History)
>
> 'Because it encourages me to do research on my own.' (Student, 2nd year, Business studies)
>
> 'Now I'm confident to work alone.' (Student, 3rd year, Economics)
>
> 'The feedback guided for my next assignment in terms of what to do and what not do without consulting the lecture.' (Student, 4th year, Accounting)

Detailed feedback, self-assessment and self-reflection

Student participants indicated that the feedback made it easier to self-assess and also to reflect on their own learning:

> 'The feedback has helped me learn where my problems areas are and where I can improve.' (Student, 1st Year, Accounting)
>
> 'Positive, I am able to reflect on my mistakes and fix them.' (Student, 2nd Year, Business Studies)
>
> 'I saw my mistakes that I'm doing more and more.' (Student, 3rd Year, History)
>
> 'Encouragement of self introspection is what I've noticed with online learning [...] He explained where I made a mistake and how I should improve on my learning.' (Student, 4th Year, Business Studies)

Feedback to guide the improvement of learning

Student participants indicated how the feedback improved their own learning by pointing out that the feedback contained additional instruction on how to improve not just what to improve:

> 'The feedback has helped me learn where my problems areas are and where I can improve.' (Student, 1st Year, Accounting)
>
> 'I need less help with the next assignment.' (Student, 2nd Year, Business Studies)
>
> 'Because they really help me to improve on my work.' (Student, 3rd Year, History)
>
> 'This is because I can work on my own and be able to correct myself by using what the lecture showed and taught me.' (Student, 4th Year, Business Studies)

Improved end product

Lastly, the students indicated that their marks improved with the next assignments when they paid attention to the feedback:

> 'My marks on the next assignment improved because of following the guidelines from the previous feedback.' (Student, 1st Year, Accounting)
>
> 'Yes because next time I will be able to answer in detail and answer correctly.' (Student, 2nd Year, Business Studies)
>
> 'It allowed me to improve my marks.' (Student, 3rd Year, History)
>
> 'I made fewer mistakes in the next assignment and got good marks.' (Student, 4th Year, Business Studies)

Experiences of electronic marking and feedback

Perceived quality of feedback

Most of the student participants reported that the quality of the feedback in terms of knowing what they did wrong and in terms of using the feedback to improve learning was high:

> 'It is a more efficient way as I am able to see where I had made mistakes and where I can improve.' (Student, 1st Year, History)
>
> 'It was positive because she managed to explain thoroughly to us where we gone wrong and helped us on how to improve.' (Student, 2nd Year, Business Studies)
>
> 'Online marking is the best because you get feedback on where you went wrong, manual marking the is no feedback.' (Student, 3rd Year, Economics)
>
> 'Positive as it was very clear and detailed in terms what to improve and what I did right.' (Student, 4th Year, Accounting)

The above-mentioned affirmed most of the lecturer participant's responses that they gave quality feedback using multiple applications:

> 'I provide general feedback to all the students via WhatsApp or efundi Announcements and individual feedback via PDF comments.' (Lecturer 3, date unspecified, subject unspecified)
>
> 'Track changes and voice notes in Pdf Reader.' (Lecturer 5, date unspecified, subject unspecified)
>
> 'I usually type out text comments next to the area that needs correction, or I also like to use the free hand pencil in Adobe, where I cross out incorrect paragraphs or sentences. I also like to mark on the Turnitin report, offering another layer of feedback.' (Lecturer 8, date unspecified, subject unspecified)

Speed of feedback

Most of the student participants indicated that the rate at which they received feedback on their assignments was fast:

> 'Online marking is faster than the manual.' (Student, 1st Year, Accounting)
>
> 'It is good and fast.. giving us an opportunity to early evaluation of your own performance, to improve on the coming assignment.' (Student, 3rd Year, History)
>
> 'Is the best method ever as the lecturer gives feedback faster.' (Student, 4th Year, History)

Even though most of the student participants were satisfied with the pace of the feedback, the lecturer participants mostly indicated that the electronic marking was taking longer to complete than the manual marking:

> 'Marking by hand is much more quick and effective. Marking digitally takes up more time.' (Lecturer 7, date unspecified, subject unspecified)
>
> 'Marking digitally takes much longer than marking by hand.' (Lecturer 8, date unspecified, subject unspecified)
>
> 'Digital marking is more time consuming.' (Lecturer 6, date unspecified, subject unspecified)

The sentiment of the lecturers was shared by a few students:

> 'It take time for the lecturer to finish marking, but the job gets done.' (Student, 1st Year, Accounting)
>
> 'It is time consuming because our lecturer take more time to give us our script back when using online marking.' (Student, 4th Year, Accounting)

Future implementation of electronic marking

Attitude towards electronic feedback

Compared to manual marking, the majority of student participants reported that the feedback they got was the same as the manual feedback. Students have suggested that they prefer the electronic platform rather than the manual and that they would not mind permanently converting to the electronic platform:

'It is a more efficient way as I am able to see where I had made mistakes and where I can improve.' (Student, 1st Year, History)

'Positive, now I can know my mistakes as there are comments teachers.' (Student, 2nd Year, Business Studies)

'I guess its different from the manual one but better.' (Student, 3rd Year, Economics)

'It's still the same for me and I actually prefer online.' (Student, 4th Year, Fourth Year)

The lecturer participants also indicated that even though electronic marking is more time consuming, that with practice they will permanently switch over from manual:

'I feel that with the correct software and support, I would really consider shifting all marking in future to electronic (which saves paper and space).' (Lecturer 2, date unspecified, subject unspecified)

'Marking digitally allows me more control over the management of submissions and administration.' (Lecturer 3, date unspecified, subject unspecified)

'It was difficult for me, but I am getting there. I learned a lot from my younger colleagues and my own kids. And still learning. I actually prefer marking digitally.' (Lecturer 13, date unspecified, subject unspecified)

Factors that influence the electronic marking and feedback experience

Emergency remote teaching and learning

The student participants that responded negatively had a bad experience with the current emergency remote teaching and learning mode of delivery.

These student participants indicated that their own performance dropped significantly:

'It hard and it seems like it very strict, the passing rate is low now.' (Student, 1st Year, History)

'Online marking requires a lot, lost lot of marks with it.' (Student, 2nd Year, Business Studies)

'I feel like some lectures are strict marking our assignments even in online learning.' (Student, 3rd Year, History)

'Feedback is not as effective as personal interaction.' (Student, 4th Year, Accounting)

Minimal interaction for students

There was a clear indication of insufficiency with communication during the emergency remote teaching and learning between the lecturer and some of the student participants when using the online platform:

'Some students take the feedback to heart and apply it, while other tend to ignore and make the same mistakes.' (Lecturer 2, date unspecified, subject unspecified)

> 'Some respond others are thankful, most are unresponsive.' (Lecturer, 4, date unspecified, subject unspecified)

> 'No feedback from students.' (Lecturer 7, date unspecified, subject unspecified)

Discussion

The School of Commerce and Social Studies in Education at the Vanderbijlpark Campus of the NWU follows a digital asynchronous approach with an online teaching and learning strategy. The school-based project aimed to implement digital feedback and assessment to enhance SDL to support pre-service teachers to think and work on their own without direct instructions from the lecturers. Although the project-based approach was compulsory as part of the course, it was not mandatory to complete the questionnaires and only 277 student participants out of 407 (68%) took part in this study.

According to the quantitative results which were obtained from the Williamson's Self-Rating Scale of SDL, the majority of the student participants (cf. Figure 9.2) specified high self-directedness when beginning the project. The findings showed there were none of the participants with a low SDL level before the intervention. When comparing the results of the qualitative data analysis to the quantitative results, the qualitative results indicated that the student participants overestimated their own self-directedness, perhaps because of a misunderstanding of the key characteristics of what SDL entails. The literature predicted that the students would overestimate their own self-directedness, as students who are not fully aware of what SDL entails tend to make assumptions regarding their own levels of SDL (Petersen & Mentz 2016:52). The prediction came to fruition when the qualitative and quantitative findings were compared, as the qualitative results were oftentimes in complete contradiction to what was found in the quantitative results.

Literature reveals that, amongst other things, greater autonomy of learners, as a fundamental cornerstone of SDL (Guglielmino 2013:6), means that learners are given ample opportunities and the ability to think about how they want to learn using various strategies (Abdullah et al. 2008:68). From the qualitative findings, it is clear that the students are using multiple strategies to assist them in improving their own learning, which is a characteristic of self-direction (Knowles 1975:18). This is evident as students are quoted as saying 'It is a more efficient way as I am able to see where I had made mistakes and where I can improve'.

From the qualitative findings, several themes emerged from the data analysis. The first theme identified was the effect that the electronic feedback had on SDL. A category emerged from the data, namely that electronic feedback formed the basis for being independent. Students participants felt

that the feedback they received digitally acted as a foundational basis for them to become drivers of their own learning. This is clearly apparent from the quotation below: 'Because it encourages me to do research on my own' (Student, 3rd Year, History).

Literature reveals that students can work with or without the help of others to promote SDL (cf. Brookfield 2009). Self-directed learning requires the need for the theory of social constructivism, which relates to collaborative learning and social interaction in order to intensify self-direction. From the student responses, as well as when comparing the quantitative data, it is evident that independence was encouraged when providing electronic feedback to students. It seems that the feedback enabled students to do their own research, as it allowed them to take the initiative and direct their learning goals.

Another qualitative finding that emerged was that the students deemed the feedback to be detailed enough to contribute towards their learning. Furthermore, student participants alluded to the fact that the electronic feedback they received helped them to reflect and self-assess their own learning. This is noticeable in the next quote: 'The feedback has helped me learn where my problems areas are and where I can improve' (Student, 1st Year, Accounting).

Literature reveals that the concept of reflection (cf. Hounsell 2006; Torrance 1993:336) relies on what a student can focus on in future assignments to alleviate errors. Self-assessment ability and metacognitive skills are key features of self-directed students, who are able 'to identify their own learning needs and set learning goals' (cf. King 2011:259), as well as (Knowles 1975):

> [*H*]ave the ability to identify their learning needs, set learning objectives, identify human and learning resources, choose and implement effective learning strategies, and assess their learning objectives with or without the support of others. (p. 18)

Thus, it is possible to infer that digital feedback assisted students in becoming more self-directed, as they were displaying self-assessment and reflective characteristics.

Strategies to improve learning is another qualitative category that surfaced. A major SDL characteristic is the ability to 'choose and implement effective learning strategies' (Knowles 1975:18). Student participants felt that the feedback they received helped them to enhance their learning. This is clear in the following quote: 'Because the strategies give directions on how to answer the questions without making any mistakes and also the lecturer is giving us good practice through his powerpoint presentations' (Student, 4th Year, Business Studies).

Improving the end product of learning was another qualitative finding. This could be translated into student participants believing that useful online/

electronic feedback leads to an improvement in marks obtained in their assignments. According to Guglielmino (2013:5) 'online learning has offered a rich opportunity for increasing SDL skills and attitudes', which would be evident from the findings. This is apparent in the following quote: 'My marks on the next assignment improved because of following the guidelines from the previous feedback' (Student, 4th Year, Accounting).

The literature reported that feedback given through the formative evaluation allows students to identify and direct those through the actions required to achieve learning aims, as well as to address any gaps existing between their desired goal and their current experience, understanding or ability (cf. Sadler 2010:538). With regards to SDL, this also points to students 'having the ability to identify their learning needs and set learning objectives' as stated by Knowles (1975:18). This is apparent in the responses of the students, as they felt that the feedback and instruction supported them to achieve their learning aims.

From the qualitative findings, the theme on the experiences of electronic marking and how the feedback was given to students, the majority of students saw electronic marking as a tool to improve learning and to highlight errors where they went wrong, as seen with the following quote: 'Online marking was in depth, the lecturer unlike manual marking with just a tick or cross with no comment' (Student, 1st Year, History).

Even lecturer participants were positive in their evaluation of the quality of online feedback. The question asked was '*How do you provide feedback whilst marking digitally?*'. The type of feedback was detailed, as is seen from this lecturer's quote: 'By making comments as well as indicating whether or not answers were right or wrong' (Lecturer 2, date unspecified, subject unspecified

According to previous research, online feedback is not sufficiently advanced to evaluate the perception of complex content and cognitive traits of students (cf. Heinrich & Wang 2003). Human markers are required when dealing with advanced assignment types, such as essays. Therefore, when comparing the quantitative results with this qualitative finding, it is evident that the addition of detailed comments assisted students in developing SDL. This could have also assisted in scaffolding student learning, and anticipating where errors could occur in future assignments. Manning (2007:106) speculated that one successful way to enhance students' learning might be to decrease assistance, which could be an effective way to improve their SDL. This approach, with the detailed feedback, could allow students to scaffold their learning and improve on future tasks.

Another facet of electronic feedback that was noted, from both student and lecturer participants, was the issue of turnaround time for the feedback. Majority of the student participants agreed that they received their assessments

back digitally a lot faster than paper-based assessments. It is evident in a quote: 'The online marking is quite faster than the manual marking, the marking tools my lecture use are very effective and reliable' (Student, 2nd Year, Business Studies). However, a discrepancy is noted between the student and lecturer participants, as the majority of lecturers stated that the online marking was taking far too long, as is evident in the following quote: 'Marking by hand is much more quick and effective. Marking digitally takes up more time' (Lecturer 7, date unspecified, subject unspecified).

Literature states that online assessments have restrictions, which limit the types of online assessment used to mark automatically to save time, which consist of multiple-choice questions, ordering or matching questions, or simply filling in blank questions (cf. Heinrich & Wang 2003). However, this means that very comprehensive and detailed feedback is not given, but the participants received immediate feedback, similar to the formative assessment, with reference to the page in the prescribed book for incorrect answers. This feedback is not simply the correct answer; it is also part of the teaching and learning strategy to encourage SDL (cf. Nicol & MacFarlane-Dick 2006:205).

The lecturers themselves also want to assess higher-order thinking, and therefore the assessment of essays will require more time to assess.

When interpreting the qualitative findings, another major theme emerged, relating to the future implementation of electronic marking, and their views of moving to implement it fully. As is evident from a student participant quote: 'It's still the same for me And I actually prefer online' (Student, 3rd Year, History).

Several lecturer participants indicated that despite the longer turnaround time, they might consider switching over permanently to digital marking if given the proper support. This is evident from the following quote: 'I feel that with the correct software and support, I would really consider shifting all marking in future to electronic (which saves paper and space)' (Lecturer 5, date unspecified, subject unspecified).

Further analysis of the qualitative findings revealed another theme, relating primarily to the variety of factors that could influence the electronic feedback experience. With regard to the emergency online remote teaching adopted by the institution, it is evident that the student participants had a negative experience regarding their performance. This is evident in the following quote: 'My marks dropped with the online marking compared to manual marking' (Student, 3rd Year, Economics).

Literature reveals that the 'level of computer experience was also found to have an impact on student performance; more trained students outperform those with little exposure', implying orientation towards this mode would improve performance (cf. Hewson 2012:490). As mentioned in a previously,

SDL requires computer literacy skills in this modern world (cf. Mishra et al. 2013:11). Therefore computer-related skills are necessary to still perform at an optimal level (Han & Hill 2006:30).

Another factor that influenced the electronic feedback was the minimal interaction with the students in the online learning mode of delivery. From the responses obtained from student participants, a clear indication is noted that there was very little interaction on the part of the lecturers, as is evident in the following quote: 'Online marking is good, the only disadvantage is that we can't go through our work with our lecturers' (Student, 4th Year, Accounting).

The findings and literature (Carless et al. 2011:406) indicated that the feedback from lecturers was seldom used and adopted by students. Rogers (2004:8) suggests that SDL does not happen naturally in an environment and that the setting, society, culture and educational facilities can stimulate or hinder the key features of the process of SDL. This may have happened in this case, where the environment and facilities hampered student SDL.

From the responses of the lecturers, the following quote is evident: 'Did not receive a lot engagement from them. I receive more in contact class' (Lecturer 1, date unspecified, subject unspecified). Therefore, it can be interpreted that the student was not too willing to reach out and find assistance and to interact with the lecturer, which might indicate that they might not be highly self-directed and that this intervention did not enhance their SDL as much as what was hoped. Knowles (1975:18) defines SDL as 'a process of learning in which individuals have the ability to identify human and learning resources', which from the evidence, it would appear that students are not able to identify human resources, such as their peers of lecturer, for assistance, implying a low-level SDL. This is also true for the majority of feedback received from the students.

Literature reflected asynchronous online learning offers an excellent opportunity to build a 'learning-centred environment that stimulates rich interactions between lecturers and students and among students' (cf. Comer & Lenaghan 2013:262). This may not have occurred in this study, perhaps because of the difficulty experienced with using the technology, both on the part of the lecturer as well as the students.

Conclusion

In terms of the research questions, the first of which focuses on the level of self-directedness of students, it was evident that the students overestimated their SDL levels at the beginning of the study. In terms of the research question that focused on the influence of online feedback on student SDL, it was also clear that various perceptions emerged, some students stating that the feedback assisted them to avoid mistakes in future assignments, whilst others

stated that online assessment and feedback was more challenging to them and they scored lower than in a face-to-face session. The following research question looked at the perceptions of students regarding the online feedback. Several students felt that the feedback was clear and more detailed, as opposed to mere ticks and crosses. Lastly, the lecturers themselves were asked about their perceptions of using online marking. The majority found that in the beginning, the use of digital marking and feedback was challenging and that they still fail to communicate with students, but a good point was that the feedback was still useful, some even claiming more valuable compared to face-to-face sessions.

The 21st-century students of today live in a modern environment with technology in every aspect of life. Although technology is mostly utilised to link resources to students, it may furthermore enable formative assessment. Therefore, it is natural to expect a paradigm shift towards digital online marking. With sufficient practice and support, the future looks promising for online feedback, as the responses from students indicate positive trends with regards to the quality of the feedback they received. Self-directed learning, as an attainable goal, necessitates the understanding of the types of learning that could facilitate 21st-century skills, such as computer literacy and technologically rich environments. It can be argued that the paradigm shift towards online feedback is in the best interest of developing SDL.

Chapter 10

The role of teachers' assessment beliefs in fostering self-directed learning skills within the school learning context and its implications for higher education

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Abstract

In this chapter, the authors look at the role of teachers' assessment beliefs in fostering SDL skills within the school learning context, and its implications for higher education. The chapter reports on empirical findings obtained from five purposively sampled teachers consisting of two males and three females from five different schools located around the Bojanala school district in the North-West province. In each school, five randomly selected learners also participated with a total of 25 learners consisting of 11 male and 14 female learners. The data were collected based on individual semi-structured teacher interviews and learner focus group interviews, and the data were analysed by means of inductive content analysis. The analysis of the data revealed that teachers' assessment beliefs were more focused on the improvement of teaching and learning, learner accountability and less on teacher accountability and relevance to teaching and learning. The influence of teachers' assessment beliefs on learners' SDL behaviours were conceptualised based on Weiner's (2000) interpersonal theory of motivation. The findings revealed that the *belief that assessment improves teaching and learning* has a positive influence on learners' SDL behaviours. These behaviours include the willingness to take responsibility for learning, displaying an ability to use effective learning strategies, displaying an increased motivation, displaying effort attributions and engaging in self-evaluations. In contrast, the assessment beliefs of *holding learners accountable* and *irrelevance of assessment to teaching and learning* again impede the development of learners' SDL behaviours. The authors advocate for higher education to include more structured programmes for teachers that would support them in becoming cognisant of their beliefs and changing negative belief systems that work against appropriate learner developmental needs.

Introduction

In the context of science education in the South African school curriculum (the Curriculum and Assessment Policy Statement, or CAPS) (Department of Basic Education 2011), learners are expected to:

> (a) identify and solve problems and make decisions using critical and creative thinking, (b) work effectively as individuals and together with others as members of a team, (c) organise and manage themselves and their activities responsibly and effectively, (d) collect, analyse, organise and critically evaluate information, (e) communicate effectively using visual, symbolic and/or language skills in various modes, (f) use science and technology effectively and critically showing responsibility towards the environment and the health of others; and (g) demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation. (p. 5)

These skills are typical aspects of SRL, a feature of SDL (Saks & Leijen 2014:191). This implies that to achieve the above-mentioned goals stipulated in the South African school curriculum, science education instruction needs to be tailored

to address SDL. Fostering SDL in school is of great importance and has far-reaching benefits, such as developing skills that will enable learners to adjust and cope in higher education when they become tertiary students.

Self-directed learning within the school context is viewed from a 'collaborative constructivist' perspective, namely, that a 'learner takes responsibility for constructing meaning whilst acknowledging the participation of others (peers and teachers) in confirming worthwhile knowledge' (Garrison 1997:19). Considering this collaborative perspective, teachers bear, in part, the responsibility to assist learners in developing SDL capabilities. This chapter considers the role that teachers' assessment beliefs play in fostering SDL skills in schools. The focus on assessment beliefs is based on compelling evidence from literature that beliefs are related to classroom behaviours, because they influence the way teaching, learning and assessment is approached (Barnes, Fives & Dacey 2015; Brown 2002; Jane 2013; Remesal 2011). There has not been much formal discussion on the impact of teacher assessment beliefs in fostering SDL skills. This chapter will address this void, by reporting on an empirical study on the influence of teachers' assessment beliefs on learners' SDL behaviour. The purpose of the study was to obtain a greater understanding of how Grade 9 Natural Sciences (NS) teachers' assessment beliefs influence learners' SDL behaviour in schools in the Rustenburg area. The following empirical research questions were developed to guide the study:

1. What are the assessment beliefs of Grade 9 NS teachers in the Rustenburg area?
2. What is the influence of Grade 9 NS teachers' assessment beliefs on learners' SDL behaviour in the Rustenburg area?

The rest of the chapter will unfold as follows: the conceptual and theoretical framework on which the empirical study was based will be briefly discussed. Next, the methods used and the results obtained will be discussed. Finally, the results are discussed, by exploring the implications of the findings for higher education. There is strong empirical evidence of the link between educational beliefs and educational practice (Northcote 2009) in higher education, and the methods used to assess students in higher education institutions (HEIs) are often not linked to student learning (Carless 2015; Rawlusyk 2018). This might negatively influence SDL.

Conceptual and theoretical framework

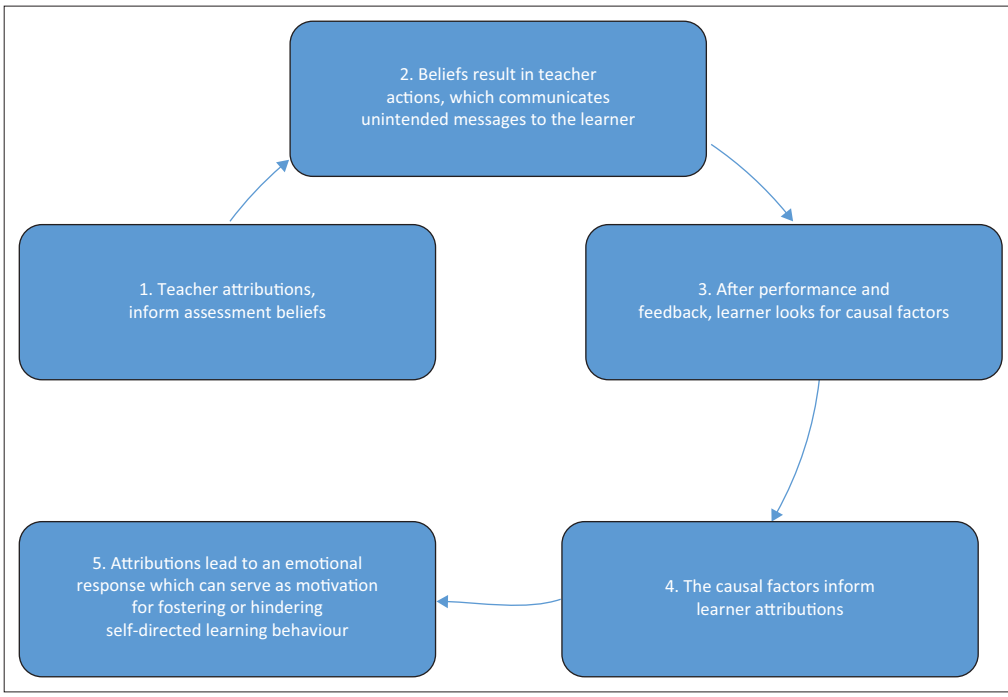
The theory on beliefs was utilised as a theoretical framework for exploring teacher assessment beliefs. Beliefs are described as 'part of a group of constructs that describes the structure and content of an individual's thinking presumed to drive his/her actions' (Bryan & Atwater 2002:823). Beliefs are said to be far more influential than knowledge in discerning how individuals

make and enact decisions (Nespor 1987:323). In this regard, many studies related to teacher beliefs have reported on how teachers' beliefs about teaching, learning, curriculum and teacher efficacy impacts on the quality of their classroom practices (Belo et al. 2014; Calveric 2010; De Vries, Van de Grift & Jansen 2014; Remesal 2011; Wallace & Priestley 2011).

The focus of these studies centred on the link between teacher beliefs and classroom practices, whereas the focus of the study by Kamanga (2020) centred on exploring the influence of teacher beliefs on learner behaviour. This study uses Weiner's (2000) 'interpersonal theory of motivation'. This theory is concerned with an individual's desire to search for the causes of their successes and failures, known as attributions (Hunter & Barker 1987:51). These attributions serve as an important stimulant for motivation, which in turn drives learner behaviour (Kamanga 2020:42). The focus was on learner behaviour that reflects SDL skills, and teacher beliefs on assessment.

Figure 10.1 illustrates the way the study was theorised and conceptualised by looking at the connection between teachers' assessment beliefs and learners' SDL behaviour.

Figure 10.1 depicts the link between assessment belief, actual assessment practices and SDL behaviour which is built upon the attribution theory.



Source: Based on Kamanga (2020:40).

FIGURE 10.1: An illustration of the connection between teachers' assessment beliefs and learners' self-directed learning behaviour.

TABLE 10.1: Brown's (2002:27) categories of teacher assessment conceptions, which include Opre's (2015:229) implications for practice.

Assessment conception ('belief')	Implications for classroom practice
Assessment is 'useful because it can provide information that can improve instruction and learning' (Brown 2002:27)	Teachers with this belief would attempt to optimise the learners' learning process. They would tend to employ methods that give learners useful feedback 'through the process of self- or peer-assessment according to Dayal and Lingam (2015)' (Opre 2015:229). Teachers would also use feedback to obtain information to optimise their own teaching activities. Therefore, assessment methods are perceived as serving a formative role.
'Assessment is a necessary process for making learners accountable for their learning' (Brown 2002:27)	Teachers with this belief would favour formal summative assessment as the focus is not on learners' learning processes but on 'the position learners occupy in comparison with other learners who are in the same year of study' (Opre 2015:229).
Assessment is a process of making schools and teachers accountable	Teachers would emphasise the generation of marks that can be reported to external agencies.
Assessment is 'irrelevant to the work of teachers and the lives of learners' (Brown 2002:27)	Teachers would avoid formative assessment and 'take a haphazard approach to summative assessment, creating a self-fulfilling prophecy that assessment is a waste of time' (Brown 2002:27).

Source: Kamanga (2020:8).

According to Hunter and Barker (1987:51), the attribution theory is 'concerned with our constant search for the causes of our successes and failures'. In other words, this theory puts emphasis on what individuals think is the cause of a certain outcome, known as perceptions of causality. According to Hunter and Barker (1987:51), these perceptions of causality influence individuals' self-concept, feeling of potency, expectations for future situations and subsequent motivation to put forth effort. To this end, the attribution theory can be applied to learners and teachers based on the assumption that, in forming perceptions of causality (also known as attributions), individuals make use of situational cues of the meanings they have acquired through prior experiences (Schunk 2012:370). In other words, teachers can hold assessment beliefs relating to the purpose of assessment, which are influenced by their attributions, which can then give rise to feelings of potency and subsequent motivation to put forth the assessment practice. Similarly, learners can also develop attributions through situational cues obtained from their teacher's beliefs and their learning environment, which can influence their belief system, which, in turn, drives their behaviour (Hunter & Barker 1987:51).

The link between assessment beliefs and actual assessment actions

A study conducted in South Africa by Vandeyar and Killen (2007:110) revealed that teachers' observed assessment actions appeared to be highly consistent with the assessment beliefs that were expressed during follow-up interviews. Another study by Jane (2013) conducted in South Africa also revealed that teachers' actual assessment practices were a reflection of their assessment beliefs. Using Brown's (2002) model, teachers' differing assessment beliefs

could be conceptualised and identified. Because having identified four basic beliefs regarding assessment, researchers have formulated models of assessment beliefs which correspond to the potential enactment of their assessment practices (see Table 10.1).

Table 10.1 provides a description of the four categories associated with teachers' assessment beliefs which could provide a better understanding of the nature of a teacher's subsequent assessment practices. The authors of this chapter acknowledges that there could be a variation between what teachers believe and how they act in classroom settings. This fact was observed in Jane's (2013) study, whereby the two teacher participants conducted assessments to adhere to what is expected from them , and thus incorporated practices that went against their belief system. Jane (2013) attributed this variation because of certain contextual factors that were mediating the dynamics between the assessment beliefs and the assessment practice. This implies that when examining the issues of assessment beliefs, there is a need for more explicit discussion and understanding that recognises the interaction of individuals with other people and with their context.

The link between attributions and learner behaviour

According to Weiner's (2000) 'interpersonal theory of motivation', after a performance a learner and observer (teacher, parent or peer) can consciously or unconsciously look for causal factors observed from their classroom interactions. For example, a (Hunter & Barker 1987):

> [*T*]eacher's annoyance with a less-than satisfactory performance could say to a learner that he or she has the ability to perform successfully and his or her lack of effort is responsible for the low performance. (p. 53)

n so doing, this convinces a learner of the teacher's belief that he or she has the ability to be successful when he or she puts forth more effort. Consequently, such beliefs can result in learner behaviour that is proactive and motivated to put forth more effort in order to obtain future success (Hunter & Barker 1987:53). On the other hand, sympathy and understanding for a less-than satisfactory performance could say to a learner that he or she cannot accomplish the task regardless of how much effort he or she puts in (Hunter & Barker 1987:53). In so doing, this convinces a learner of the belief that, even with effort, he or she does not have the ability to meet the expectations. Such beliefs could result in learner behaviour that is reactive to the environment and not motivated to put forth any effort, thereby perpetuating future failure (Hunter & Barker 1987:53). This shows that the concept of motivation is important because it is intimately linked with learning and subsequent learning behaviour (Schunk 2012:340).

Thus, motivation can be regarded as an explanatory concept that can assist us in understanding the reason why learners behave in a specific manner (Schunk 2012:346). For example, learners who feel they have little control over academic outcomes have an external locus of causality and believe that the ability to be successful emanates from unstable factors like luck and help from others (Hunter & Barker 1987:53). Consequently, learners who hold such negative attributions would unlikely be motivated to engage in task-appropriate activities that encourage SDL behaviours. The assumption is that such negative attributions can be promoted by assessment beliefs that emphasise summative assessment practices that promote surface-level learning strategies such as memorisation and rehearsal of information. This is because the feedback obtained from summative assessment emphasises current 'learner achievement and may not highlight the importance of the processes, skills and strategies underlying task completion' (Schunk 2012:376).

Contrariwise, when the factors attributed to their outcomes are regarded as internal, stable and controllable, learners believe that their 'successes are primarily due to their effort and ability and would therefore have stronger motivation and staying power to complete challenging work' (Cauley & McMillan 2010:5). Such positive attributions can thus be promoted through assessment beliefs that favour formative assessment practices. This assumption is based on the fact that formative assessments inform learners 'about their own learning and their progress in meeting their goals' (Cauley & McMillan 2010:2). This is important because formative assessments can allow learners to see concretely how they can improve, which leads to increased motivation and involvement (Cauley & McMillan 2010:2). Therefore, articulation and identification of assessment beliefs can serve as a lens for understanding how learners' SDL behaviour is impacted by their teachers' assessment beliefs using the theory of attributions. To achieve this goal, the study by Kamanga (2020) characterised SDL behaviour according to the 'process' and 'person' elements of SDL and is based on many researchers' contributions to SDL models (Garrison 1997; Hiemstra & Brockett 2012; Long 1989, 2000). The person element includes individual characteristics such as motivation, enthusiasm, creativity and critical reflection. The process element focuses on the learner activities. Organising SDL behaviour into these elements served as a guide for identifying learner SDL behaviour within the school context. According to Hiemstra and Brockett (2012), a holistic understanding of learners' self-direction requires the interactions of three elements (process, person and context). Thus, the study included the SDL context element using sociocultural elements from cultural-historical activity theory (CHAT).

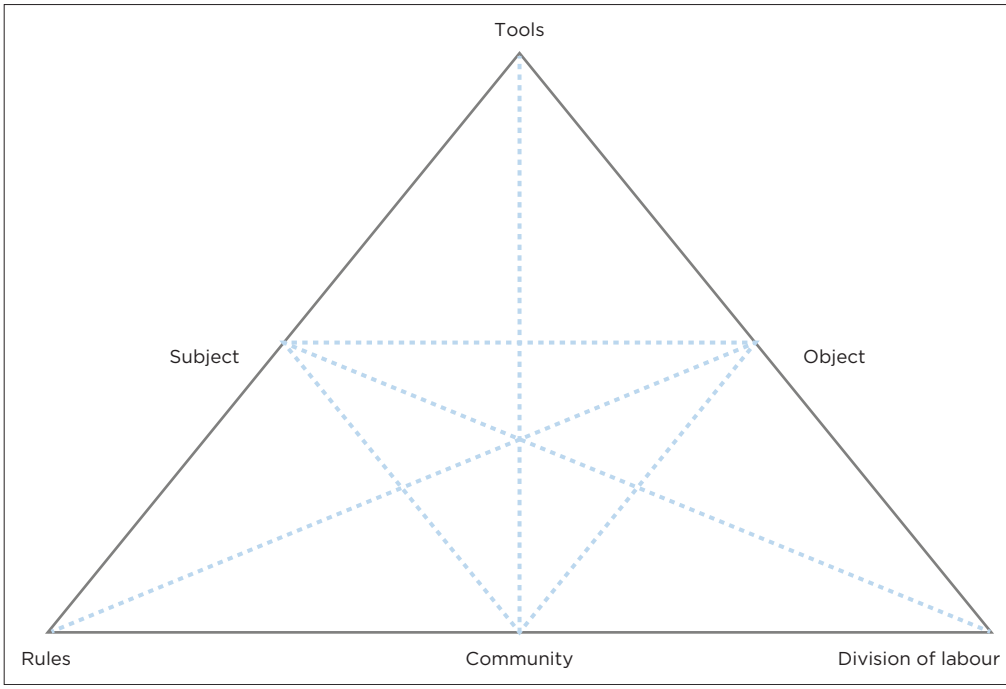
The CHAT framework offers a cross-disciplinary perspective for analysing what individuals do in a specific context, the roles that individuals have in this particular context and the interpersonal relationships in which learners learn (Mentz & De Beer 2017:101). It is important to note that there are other factors

other than teachers' assessment beliefs that can also affect classroom actions and behaviour, and that a teacher's assessment belief may not necessarily reflect what is actually done in practice (Luft & Roehrig 2007:41). These shortcomings can be addressed by using data collection methods that allow the researcher insight into the thinking of participants. The data obtained can then be further analysed using CHAT. This framework helps to (Taylor 2014):

> [*D*]irect attention to who is carrying out activities (division of labour), what tools are at their disposal, which cultural norms and rules govern their behaviour, and what the desired outcomes are. (p. 98)

In the CHAT framework, the activity system is the primary unit of analysis, which comprises the following sociocultural elements: subject, object, outcomes, tools, rules, community and division of labour (Engeström 2009). Activity theorists make use of an activity triangle to depict and explain the levels of contradictions that the subject might experience in an activity system (Roth & Lee 2007), depicted in Figure 10.2.

Figure 10.2 depicts the six activity system elements. The 'subject' is described as the individual or group of individuals whose viewpoint is adopted; the subject is the protagonist who works towards the achievement of the 'object' as the object is described as the problem at which the activity is directed and which is moulded and transformed into 'outcomes' with the help



Source: Authors' own example, based on third-generation cultural-historical activity theory as developed by Engeström (2009).
FIGURE 10.2: An example of an activity triangle used in the cultural-historical activity theory framework.

of tools (Bourke, Mentis & O'Neill 2013:36). The tools element is described as 'mediating artefacts that take part in the transformation of the object into an outcome, which can be desired or unexpected' (Murphy & Rodriguez-Manzanares 2008:443). Rules are 'explicit and implicit norms that regulate actions and interactions within the system' (Murphy & Rodriguez-Manzanares 2008:443). The community element refers to 'the participants of an activity system who share the same object'. The division of labour involves 'the division of tasks and roles among members of the community and the divisions of power and status' (Murphy & Rodriguez-Manzanares 2008:443).

Research methods

This chapter reports on a multiple-case study carried out in five schools which were randomly selected in the Rustenburg area in the Bojanala Platinum district, North West province, which comprised 139 secondary schools in total. From the five selected schools, the NS teacher(s) responsible for teaching the Grade 9 learners were purposively selected. The study sought to explore the complex issues around individuals' assessment beliefs (amongst teachers) and SDL behaviour (amongst learners). An understanding of these complex issues requires an approach that elicits the individual's views and opinions (Creswell et al. 2007:245). Therefore, the study used a qualitative methodology and data were collected by means of face-to-face interviews.

Capturing teachers' assessment beliefs

To elicit teachers' assessment beliefs, the study used face-to-face individual semi-structured interviews with five teachers who were purposively sampled from five different schools situated around the North West Bojanala school district which consisted of two male and three female teachers. The research on 'teachers' assessment beliefs: validation of an abridged instrument' by Brown (2006) guided the development of the following interview questions:

1. In your opinion, what is the purpose of assessment?
2. What do you think is the best way of assessing learners' understanding?
3. Tell me more about your experiences with assessment within the Grade 9 NS subject.

The first interview question probed for teachers' assessment beliefs. Once identified they could be categorised into four main assessment belief systems, namely, (1) assessment is irrelevant for teaching and learning, (2) assessment holds teachers and schools accountable, (3) assessment holds learners accountable, and (4) assessment improves teaching and learning (based on Brown's 2004 model of assessment conceptions) (Brown 2016).

The second interview question probed for teachers' beliefs related to specific choices of assessment methods, which provided access into the teachers' thinking regarding the purpose of assessing learners. The third interview question provided a further means of determining teachers' assessment experiences and uncovering their beliefs – specifically in the context of Grade 9 NS teaching and learning.

Capturing learners' self-directed learning behaviour

To identify learners' SDL behaviour, the study used focus group interviews with five randomly selected learners taught by the five teacher participants at their respective schools.[1] The following interview questions were developed to assess learners' SDL behaviours:

1. Describe your role as a learner during NS lessons?
2. What are some of the activities which enable you to understand the topics taught in NS lessons better?
3. What type of studying methods help you to perform well in NS?
4. What are your views about assessing your own NS activities instead of your teacher assessing your work?
5. Tell me a bit more of your experiences with assessment within NS?

The five questions were phrased to identify SDL behaviour amongst learners, specifically within the context of NS. In doing so, this helped to determine the influence of their teachers' assessment beliefs on their SDL behaviour in the analysis of the data.

Procedures

The first author developed the interview questions, conducted the interviews, and transcribed, analysed and interpreted the data. Informed consent was requested from all potential research participants after obtaining ethical clearance from NWU as well as the North West Department of Basic Education. The gatekeepers (school principals) were also consulted before collecting the data. Because the participating Grade 9 learners were under the age of 18, parental assent was requested. The primary researcher started with the data collection after an independent person (another teacher at the school) administered the informed consent process, and the willing participants have signed. Aspects covered in the consent form included: what the research was about; what was expected of the participants; benefits and risks of participating; assurance of confidentiality and protection of identity; dissemination of findings

1. In total, 25 learners were involved in the study consisting of 11 male and 14 female learners.

and a declaration section. Permission to use an audio-recorder was requested before interviews began. Participants were not subjected to any risk of loss of self-esteem, or embarrassment during the entire interview process. The primary researcher did not use descriptors or names that could lead to the identification of any of the participants during data collection, analysis and interpretation. The focus group participants were also requested to respect each other and to keep the discussions and other participants' identities confidential.

Once all recorded interview data were transcribed, the data were inductively analysed using open coding on convergent data from different participants to build a coherent justification of themes (Nieuwenhuis 2016:116). Passages in the transcribed interviews were further analysed and interpreted within their context to establish the influence of teachers' assessment beliefs on learner SDL behaviour by exploring the motivational consequences of learner attributions. Data were further analysed using third-generation CHAT as a lens, which exposed contradictions, intentionality, and the relationships amongst and between social elements. Teachers' views on assessment, as one activity system, was juxtaposed with learners' experiences of assessment, as the second activity system, as suggested by Mentz and De Beer (2017) based on the work of Engeström (2009).

When classifying data all codes were developed from the transcripts using participant words in order to establish trustworthiness of the data. Member checking with teacher participants was conducted, credibility was also enhanced by converging data from different participants during the analysis process to build a coherent justification of themes. Dependability was achieved by providing an extensive and detailed presentations and interpretations of the findings. Conformability was achieved by verifying the analysis and interpretations of findings by consulting the second and third author who served as knowledgeable peers in the field of assessment and SDL. Transferability was achieved through the triangulation process obtained from different participants' data as the study worked with five teacher participants and a total of 25 learner participants so as to obtain a wide variety of opinions as possible.

Research findings

Teachers' assessment beliefs

The following emerging themes were obtained inductively based on codes emerging from the interview data:

1. assessment is for the improvement of learning
2. assessment is for the improvement of teaching
3. assessment is for certifying learners

4. assessment serves as a way of certifying learning
5. assessment provides insight into teacher effectiveness
6. assessment has a negative impact on learners
7. assessment has little impact on teaching and learning.

Each of the themes will be discussed to articulate and understand teachers' assessment beliefs.

Assessment is for the improvement of learning

Teacher A, Teacher B, Teacher C and Teacher D believed that the purpose of assessment is to establish what learners know or what they have learned so that they can identify learners' areas of weakness in order to help them improve. It is worrying that teachers, in general, seem to be focused only on the cognitive domain in their assessment. Rotherham and Willingham (2010), state that the teaching for affective outcomes (and the assessment thereof) remains:

> [*A*] matter of chance rather than the deliberate design of our school system [...] we cannot afford a system in which receiving a high-quality education is akin to a game of bingo. (p. 17)

It is noteworthy that teachers in their assessment practices do not seem to pay much attention to the affective domain. Hiemstra and Brockett (2012) consider affective outcomes, such as enthusiasm and motivation, as important attributes of a self-directed learner; yet research shows that such outcomes are often marginalised because of this exclusive focus on the cognitive domain.

Assessment is for the improvement of teaching

Teacher B and Teacher D believed that the purpose of assessment is to guide or inform teachers' decisions on instruction, with the aim of advancing learning during teaching. Additionally, Teacher B used assessment results to group learners for differentiated teaching and learning with the aim of helping learners improve their performance. This suggests that the teachers realised that they could alter their teaching to improve the quality of learning.

Assessment is for certifying learners

Teacher A and Teacher C believed that the purpose of assessment is for placing learners into the next grade and assigning grades. This view of assessment is regarded as serving an administrative goal, which targets government agencies, parents and other stakeholders interested primarily in reports on the level of learners' work.

Assessment serves as a way of certifying learning

Teacher A believed that the purpose of assessment is to determine learning success at the end of a learning experience, with the aim of making learners accountable for their learning. Assessment is thus regarded as a way of establishing what learners have learned. Teacher A said:

> '[*T*]he problem is exams [...] this is a problem and we are not in control of it [...] because a child has to read at home [...] if he can't read at home [...] he cannot be disciplined enough to say I am going to study my work at home [...] they won't fail.' (Teacher A, male, 29 August 2019)

Teacher E considered assessment as a means of finding out how much learners have learned from teaching, which is shown by the following quote: 'to test whether the learner has captured what I taught them' (Teacher E, female, 10 September 2019).

This suggests that the measurement mission for the assessment of learners is to establish how well or how poorly they are doing based on what they have learned.

Assessment provides insight into teacher effectiveness

Teacher B believed that the purpose of assessment was to provide a personal indicator as to how well she is doing, whereas Teacher E believed that the purpose of assessment is to determine whether she is on a par with the content coverage. This shows that these teachers made use of assessment results to take accountability for their actions, which can contribute to positive pressure to improve performance.

Assessment has a negative impact on learners

Teacher A believed that assessment can be an obstacle to learners based on a bias in the weighting distribution used for assessment grading. None of the other teachers held the same view as Teacher A on assessments being unfair and being an 'enemy of learners'. Teacher A said:

> 'I want to tell you the biggest enemy of all these children is exams and they fail it [...] all the countries [...] exams is the problem [...] learners they don't read [...] teachers are teaching [...] we are giving them questions that are relevant but the enemy is the examinations.' (Teacher A, male, 29 August 2019)

Interesting to note is that Teacher A was also of the opinion that assessment could be used to establish whether learners have understood the work, yet also believed that assessment could be an 'enemy' to learners. This seems to suggest that the teacher assumed that one assessment is 'good' and the other 'bad', which could lead to a dysfunctional approach to classroom assessment.

Teacher A said: 'so the most important thing about assessment is to get the feedback from the learners whether they understood the work' (Teacher A, male, 29 August 2019).

These differing views about the purpose of assessment suggest that these teachers had naïve understandings of the purpose and principles of assessment.

Assessment has little impact on teaching and learning

Teacher A believed that assessment practices, which involved learners making models and projects, had a minor impact on teaching and learning, as they did not help learners develop the necessary memorisation and recalling skills. This teacher's viewpoint is cause for concern as, in the current and future job market, knowing basic facts are important, but knowing how to think critically, work collaboratively and solve problems are essential (Rotherham & Willingham 2010:17). This response suggests that this teacher's teaching approach emphasises recall and rote memorisation, providing little opportunity for learners to develop structures of knowledge for reasoning and problem-solving. This teacher probably had insufficient knowledge about learning, the principles of instruction, and the aims and purpose of education in a complex 21st century.

The identified themes were further organised into four families, based on Brown's (2004) model of assessment conceptions. In so doing, the study was able to address the research question: '*What are the assessment beliefs of Grade 9 NS teachers in the Rustenburg area?*' (Kamanga 2020).

Table 10.2 presents a summary of the teachers' beliefs about assessment, which revealed that teachers held assessment beliefs in different combinations.

The pattern of beliefs held by the participants shows that most of the participants believe that assessment improves teaching and learning, and that assessment holds learners accountable. Fewer believed that assessment holds teachers accountable, and only one teacher from this group of participants believed that assessment is irrelevant to teaching and learning. The pattern obtained also shows that teachers held more than one type of assessment belief. This finding corresponds with Brown's (2002) study which showed that teachers could simultaneously hold multiple interacting assessment beliefs as opposed to just having one assessment belief. According to Opre (2015:231), this finding can be attributed to the fact that 'assessment serves multiple purposes ranging from providing information about learning progress, teaching quality and institutional accountability'. In addition to characteristics of teachers holding multiple assessment beliefs, what is unknown at this stage is how these multiple interacting beliefs inter-relate and how strongly teachers may hold each of these assessment beliefs (Brown 2002:50).

TABLE 10.2: Summary of Natural Sciences teachers' assessment beliefs.

Natural Science teacher	Assessment beliefs
Teacher A	Assessment improves teaching and learning Assessment holds learners accountable Assessment is irrelevant to teaching and learning
Teacher B	Assessment improves teaching and learning Assessment holds teachers accountable
Teacher C	Assessment improves teaching and learning Assessment holds learners accountable
Teacher D	Assessment improves teaching and learning
Teacher E	Assessment holds learners accountable Assessment holds teachers accountable

Source: Kamanga (2020:79).

How do teachers' assessment beliefs influence the self-directed learning behaviour of learners?

To address the following research question: '*What is the influence of Grade 9 NS teachers' assessment beliefs on learners' SDL behaviour in the Rustenburg area?*' (Kamanga 2020); data relating to learners' SDL behaviour were identified. The transcribed interviews were analysed and interpreted in their context. The following themes with regard to learners' SDL behaviour emerged:

1. social skills should be developed in the NS classroom
2. learning strategies that foster transmission mode
3. learning strategies that foster making sense of ideas
4. approach to studying is characterised by lack of motivation
5. goal setting is focused on aiming for good results
6. taking responsibility for learning
7. learners could evaluate their own learning progress
8. learners have a strong dependency on teachers to evaluate their work
9. attribute success or failure to task difficulty
10. attribute success or failure to effort taken towards a task
11. the tendency of learners to become motivated.

The identified themes will be briefly discussed to demonstrate the SDL behaviour of Grade 9 learners.

Social skills should be developed in the Natural Sciences classroom

This theme is concerned with learners' social-behavioural implementation of the learning process. Most learners in this study identified 'listening' as their role during an NS lesson. It appears that learners identify with the role of

passive recipients of information presented to them by the teacher. Other social skills identified by some learners included communication, expression of feelings, cooperation and respecting their teacher's authority. This is depicted by the following quotes:

> '[…] there's nothing that we can know without communicating […]' (Learner C3, male, 04 September 2019)

> '[…] to listen and express my feelings with what my teacher has taught me […]' (Learner D2, female, 06 September 2019)

> '[…] to cooperate in class and respect the NS teacher.' (Learner B1, male, 02 September 2019)

> '[…] focusing in [*sic*] answering as many questions as you can.' (Learner D1, female, 06 September 2019)

> '[…] to listen and concentrate in class.' (Learner A2, female, 29 August 2019)

Learning strategies that foster transmission mode

Learners indicated that their classrooms were characterised by learning strategies that foster basic reproduction of surface learning, such as, recalling, memorising and revising. This finding suggests that classroom activities are dominated by three modes of learning – reading, writing and correcting – none of which encourage SDL. This does not bode well for the development of 21st century skills or the effective preparation of learners for a complex 21st century. This is depicted by the following quotes:

> '[…] to read your notes and to study them and revise your classwork.' (Learner A2, female, 08 August 2019)

> '[…] I read my notes and make my own notes out of what my teacher as taught me.' (Learner D4, male, 06 September 2019)

> '[…] you write what you remember, and you refer back to your NS book […].' (Learner B5, female, 02 September 2019)

> '[…] every time after each lesson, I go and read it over and over again and that's how it stays […].' (Learner B4, female, 09 September 2019)

> 'After each lesson, go home practise the work that we did in the class […].' (Learner C2, female, 04 September 2019)

Learning strategies that foster making sense of ideas

Learners used learning strategies that foster deep transformation of learning, including researching, working in groups, experimentation and seeking help

from peers or teachers. Such learning strategies are consistent with the social constructivist view of learning, as cognitive interactions are regarded as being developed through socially supported interactions. This is depicted by the following quotes:

> '[...] it's good if you work with someone else like your classmates so that you can understand each other.' (Learner B2, male, 02 September 2019)
>
> 'For me, the easiest way to learn is to doing [*sic*] things practically and experimenting [...].' (Learner C3, male, 04 September 2019)
>
> 'I read, when I don't understand I go to another person to help me.' (Learner D5, female, 06 September 2019)
>
> 'I use my phone to research, and it gives me more information one that's even not in the notes and the textbook.' (Learner E5, female, 10 September 2019)
>
> 'I get into research; I maybe go to the library and take books for Science [*sic*] [...].' (Learner C4, male, 04 September 2019)

Approach to studying is characterised by lack of motivation

Learners expressed a lack of motivation to study, as they were easily distracted, felt lazy to read, had limited concentration and preferred to play. This is depicted by the following quotes:

> 'I want to go to play [*sic*] [...] instead of studying NS.' (Learner A5, male, 29 August 2019)
>
> 'I'm still facing some problems' cause I'm lazy to read [...] I don't like reading [...] it's not my stuff [*sic*].' (Learner B2, male, 02 September 2019)
>
> '[...] we don't put our full concentration on the studying [*sic*].' (Learner A4, female, 29 August 2019)
>
> '[...] that's why most of us fail [...] we just read for the sake of studying.' (Learner A1, male, 29 August 2019)
>
> 'I'm tired [...] will be reading things for the sake of studying [...] not like [...].' (Learner A3, female, 29 August 2019)

This is a cause for concern because low motivation is associated with low levels of learner engagement (Demetriou 2011:16), which is evident from this theme. Whilst analysing the data from the interviews with teachers, it became clear that the teachers did not pay attention to the assessment of affective outcomes (such as values and interest). It is, therefore, not surprising that learners lack affective skills as teachers, in Rotherham and Willingham's (2010) parlance, go about teaching the affective domain as if it is a game of bingo – hoping learners will achieve affective outcomes, but not identifying these outcomes for their lessons.

Goal setting is focused on aiming for good results

Passing Grade 9, improving grades and career choices were some of the goals that were identified. This is depicted by the following quotes:

> 'I always read stuff about NS, because when I grow up, I want to do […] I want to be a doctor […].' (Learner B1, male, 02 September 2019)

> 'I must like try [*sic*] to improve my levels of Natural Science.' (Learner E4, female, 10 September 2019)

> '[…] and getting to process that information and getting educated and then getting to pass.' (Learner B4, female, 02 September 2019)

> 'I know Grade 9 is a very challenging grade […] so many learners must work very hard […] to go to the next grade.' (Learner C5, female, 04 September 2019)

> '[…] so I heard that to do engineering, you need physics and maths […]' (Learner B2, male, 02 September 2019)

When goal setting is focused on improving grades and passing this is associated with a performance-oriented classroom that prioritises demonstration of competence over the gaining of competence, which is associated with mastery-oriented classrooms (Daniels & Poth 2017:837). Best practices related to goal setting involves learners thinking about their own work in terms of goals to develop the capacity to work at a metacognitive level (Schunk 2012:346) as this further develops a mastery-oriented classroom.

Taking responsibility for learning

This theme is concerned with learners' capability of taking responsibility for the construction of personal meaning. Learners expressed a capability of taking initiative for the construction of personal meaning. This is evident in the following quotes:

> '[…] the topics that we are going to talk about next week, I read it earlier […].' (Learner C4, male, 04 September 2019)

> 'I do my own work personally at home […] maybe before the lesson […].' (Learner C4, male, 04 September 2019)

> '[…] on my phone, I have the learning application to help me – that's how I assess myself.' (Learner D2, female, 06 September 2019)

> 'I use my phone to research, and it gives me more information; one that's even not in the notes and the textbook […].' (Learner E5, female, 10 September 2019)

Other learners expressed a passive learning orientation (as noted in the social skills theme).

Learners could evaluate their own learning progress

This theme is based on specific attributes of a learner's ability to evaluate and assess the quality of learning outcomes and to improve strategies for further learning activities. Learners expressed that assessing their own work, instead of the teacher, was a good idea. Learners were in support of learner self-evaluations. This is evident in the following quotes:

> '[...] we get to assess our activities [...] we get to see our mistakes better than when the teacher is assessing our activities.' (Learner B1, male, 02 September 2019)

> '[...] you can see where your weak points are and strong points are [*sic*] [...].' (Learner B5, female, 02 September 2019)

> '[...] assessing yourself, it's much better because you understand yourself more than anybody else.' (Learner B4, female, 02 September 2019)

> '[...] when I fail the formal task, I learn from my mistakes from them.' (Learner D4, male, 09 September 2019)

> '[...] for example, my class works I use to take them and compare them how am understanding [*sic*] [...].' (Learner E3, male, 10 September 2019)

Learners have a strong dependency on teachers to evaluate their work

Learners were against self-evaluations and seemed to believe they were incapable of assessing their own work as they emphasised that they needed their teacher's guidance. This is evident from the following quotes:

> 'I think it's best for teachers to assess our work, because we need their guidance and they must correct us.' (Learner C5, female, 04 September 2019)

> '[...] it's better to have someone who's going to judge you with your work.' (Learner D3, male, 06 September 2019)

> 'Because assessing your work [...] you can cheat ma'am [...] on yourself.' (Learner A3, female, 29 August 2019)

> 'I prefer the teacher to assess my work [...] so that he or she can explain to me why I went wrong [...] where I need to fix my mistakes.' (Learner A1, male, 29 August 2019)

This theme suggests that these learners were not active in critiquing their own work as part of their learning; hence, they did not see the important supporting role that self-assessment could play in improving their learning. The latter is supported by the fact that none of the participating teachers made mention of using self-assessment methods as part of learning.

Attribute success or failure to task difficulty

This theme involves how learners interpreted the causes of their successes and failures in reaction to their tasks. Learners attributed their failure to the task being difficult and attributed their success to the task being easy. This attribution is evident in the following quotes:

> '[…] when we write class works in NS, it's not that difficult […] but in exams ma'am […] it's more difficult and it's like its heavy […]' (Learner A3, female, 29 August 2019)

> '[…] what I have experienced, Natural Sciences is a very challenging subject – you can either pass or fail […].' (Learner D1, female, 06 September 2019)

> '[…] so you can understand those [*topics*] who are easy and fail those who are difficult […].' (Learner D2, female, 06 September 2019)

Such attributions can result in learner behaviour that is reactive to the environment and not motivated to put in any effort because learners ultimately believe that, regardless of how much effort they put in, they cannot accomplish the task because it is difficult (Hunter & Barker 1987:53).

Attributes success or failure to effort taken towards a task

With effort attributions, learners attribute their success to the ability to perform a given task successfully and attribute their failures to their lack of effort in a particular task. This is depicted by the following quotes:

> 'I pass them [*formal tasks*] because I read.' (Learner D4, male, 06 September 2019)

> '[…] it was really hard at first […] but then if you get more understanding about it […] you see that it's not that hard […].' (Learner B4, female, 02 September 2019)

> '[…] when it [*marks*] becomes low, I like ask myself where did I go [*sic*] wrong […] and I start reminding myself like [*sic*] I wasn't focusing on NS too much […].' (Learner E4, female, 10 September 2019)

The tendency of learners to become motivated

This theme is based on learners' perceived values, attitudes, feelings and goals towards their learning. Some aspects expressed by learners had the potential to influence their motivation, such as, love for the subject, finding the subject interesting and fun, and their teacher making lessons enjoyable. This is depicted by the following quotes:

> 'NS is my second favourite subject […].' (Learner A2, female, 29 August 2019)

> '[…] and NS is a very fun and interesting subject […].' (Learner C5, female, 04 September 2019)

> 'I love it [*Natural Sciences subject*] very much […].' (Learner C4, male, 04 September 2019)

> 'I always read stuff about NS, because when I grow up, I want to do [...] I want to be a doctor [...].' (Learner B1, male, 02 September 2019)
>
> '[...] in class, we pay more attention to her, listen to what she say [*sic*] so that it would be easier when we get to the next grade.' (Learner E5, female, 10 September 2019)
>
> '[...] he [*their Natural Sciences teacher*] makes sure that we enjoy the lesson [...].' (Learner C3, male, 04 September 2019)

The above-mentioned themes depict learner behaviour associated with both process and personal SDL elements. The contributions of teachers' assessment beliefs towards learners' SDL behaviour are discussed below by considering the motivational consequences arising from the learners' attributions. The discussion is based on literature that clearly establishes that attributions serve as important stimulants to motivation, which, in turn, drives learner behaviour (Demetriou 2011; Weiner 2000). The contribution of each of the teacher's assessment beliefs on learners' SDL behaviour will be discussed to demonstrate how teachers' assessment beliefs influence learners' SDL behaviour.

The influence of the belief that assessment holds learners accountable

The findings show that teachers who held the belief that assessment holds learners accountable, tended to favour summative assessments practices over formative practices, as was the case with Teacher A. Summative assessments promote feedback about current learner achievement and this encourages task-related attributions (Cauley & McMillan 2010:1). This was evident in learner A3, taught by Teacher A, who displayed task-related attributions. This learner believed that success is determined by factors beyond her control, such as, the level of difficulty of a given task. Learner A3 said: 'when we write class works in NS it's not that difficult [...] but in exams ma'am [...] it's more difficult and it's like its heavy' (Learner, female, 29 August 2019).

Such task attributions promote low expectations for success, as learners believe that they are not in control of outcomes, which results in low levels of motivation (Cauley & McMillan 2010:1). Low levels of motivation were more prevalent amongst learners taught by Teacher A, which is depicted in the following quotes:

> '[...] we don't put our full concentration on the studying [...] because we just like [...] nah it's just for the test nothing more nothing less.' (Learner A4, female, 29 August 2019)
>
> '[...] when I study NS, I get distracted.' (Learner A5, male, 29 August 2019)
>
> '[...] that's why most of us fail [...] we just read for the sake of studying.' (Learner A1, male, 29 August 2019)

These low levels of motivation displayed by the learners negatively impacted the actualisation of meaningful SDL behaviour. This is evident from the findings, which showed that none of the learners taught by Teacher A expressed the capability of taking more responsibility for their own learning.

Vandeyar and Killen (2007:102) state that teachers who hold the belief that assessment holds learners' accountable 'tend to absolve themselves from responsibility for learner failure'. This is evident from the following quotation:

> '[*T*]he problem is exam [...] no we must face reality [...] is it fair? [...] that somebody must go home and read for the exam and he comes back and he did not read the exam and he fails exam now I must stand there and explain why this person [...].' (Teacher A, male, 29 August 2019)

This tendency to absolve himself from responsibility for learner failure suggests that this teacher regarded the success and failures of learners as occurring independently of how he behaved or taught, because he believed that he was not in control of learners' success or failure.

Teacher A said:

> '[*T*]his is a problem and we are not in control of it [...] because a child has to read at home [...] if he can't read at home [...] he cannot be disciplined enough to say I am going to study my work at home [...] they will fail.' (Teacher A, male, 29 August 2019)

Teacher A attributed learner failure to a lack of effort in studying for exams; hence, it is not surprising that he viewed exams as the learners' greatest enemy. Such attributions reinforce the belief that assessment holds learners accountable.

The influence of the belief that assessment holds teachers accountable

From the findings, the belief that assessment holds teachers accountable is linked to Teacher B and Teacher E. According to Brown's (2002) model of assessment belief (see Table 10.1), in this belief set, the purpose of assessment can be classified as summative because it serves to evaluate teacher effectiveness. When the roles of assessment focuses on forming or planning instruction and improving the learners' learning, then the purpose of assessment can be classified as formative (Atjonen 2014:239). When the roles of assessment focuses on demonstrating learner performance in order to make final judgements about learner achievement or instructional effectiveness, then the purpose of assessment can be classified as summative (Atjonen 2014:239).

However, in the case of these teachers, their focus on summative assessment seemed to serve a different measurement mission than simply indicating how well or bad the teacher was doing. This is evident from their responses, which

suggest that the summative assessment is used to make inferences about the learner for the purpose of prompting further learning and teaching when needed. Teacher B said: 'so it [common assessments] must be properly set [...] and the learner should be exposed to those papers so that I for one can see that I'm doing ok [and] my learners know what is expected from them' (Teacher B, female, 02 September 2019). Teacher B added: 'you know you have to actually see what the children can do and then how can you improve on it a bit further' (Teacher B, female, 02 September 2019).

Teacher E said: 'the one that is giving me the exact of what is happening in class is when they are writing the formal one, whereby they are sitting alone in their tables' (Teacher E, female, 10 September 2019). Teacher E also said: 'I assess so as to change the [...] if learners don't understand what I'm doing so as to change the method of teaching' (Teacher E, female, 10 September 2019).

When teachers use assessments either summative or formative to make inferences about learning improvement, unintended messages to learners can be conveyed which can convince them of the teacher's assessment beliefs. This is evident in the case of Learner E3, who was taught by Teacher E, made use of her summative results to evaluate her own progress, which led to positive pressure to improve performance. Learner E3 said:

> 'I use to take my reports and look from term 1 to term 2 or term 3 how far I am [...] for example my marks [...] I use to take my marks [*to see*] how far I am [...] If I'm low I start to improve my marks in the class.' (Leaner E3, male, 10 September 2019)

In the case of Learner E3, the summative results encouraged SDL behavioural processes related to learner self-evaluation, whereas in the case of Learner E4, the summative results encouraged effort-related attributions as the learner attributed her low performance to a lack of effort. Learner E4 said:

> '[*W*]hen we are writing assessments or formal [*sic*], the marks become low [...] when it becomes low, I like [*sic*] ask myself where did I go wrong [...] and I start reminding myself like I wasn't focusing on NS too much.' (Learner E4, female, 10 September 2019)

However, according to Loyens, Magda and Rikers (2008:415), the link between assessment practices and SDL lies in the fact that, in an educational setting, where learning is often attuned to summative assessment, learners come to view the teacher's approach to assessment and instruction as controlling. Consequently, the responsibility of ownership and self-direction in learning by learners are undermined (Loyens et al. 2008:415). Extending this argument, Mumm, Karm and Remmik (2016:787) assert that formative practices are inhibited when summative assessment practices are dominant, which inhibits maximum growth and possible development of self-directed learners. Based on the above-mentioned arguments, it can be concluded that the assessment belief that holds teachers accountable has no place in SDL because of its reliance on summative assessment, as such summative practices emphasise learner performance and may not necessarily highlight the importance of

strategies, skills and the processes underlying task completion. However, the findings obtained in this study confirm that summative assessment practices do offer some support in fostering SDL behaviour when such practices are used to make inferences about learner improvement.

The influence of the belief that assessment improves teaching and learning

From the empirical research findings, the belief that assessment improves teaching and learning is linked to Teacher A, Teacher B, Teacher C and Teacher D. Further, these teachers believed that the best way to determine learner understanding is through formative assessment practices, such as dialogue with learners, using technology and collecting written work. This is depicted by the following quotes:

> '[*S*]ometimes, I like making them write summaries [...].' (Teacher D, female, 06 September 2019)

> 'If you are teaching a particular topic [...] give them work on that day [...]' (Teacher A, male, 29 August 2019)

> '[*Y*]ou project, then underneath your projections they [*sic*] will be checkpoints [*sic*] activities [...].' (Teacher C, male, 04 September 2019)

> '[*W*]ithin the class the [*sic*] is oral questions and answers during a lesson [...] the next few days is recapping of what you know and what they don't know [...] so basically that's more of an informal oral type of testing thing [...] then daily homework is given.' (Teacher B, female, 02 September 2019)

The feedback obtained from such formative assessments informs learners about their own learning and their progress. Learner B5, who was taught by Teacher B, demonstrated SDL behaviour by evaluating his own work as part of his learning. Learner B5 said:

> '[*B*]y assessing yourself you can see where your weak points are and strong points are so then if the teacher also assess you will get more information on that topic and get better at it.' (Leaner B5, female, 02 September 2019)

Evaluating the quality of their learning through formative assessments can influence the factors to which learners attribute their success (Cauley & McMillan 2010:1). This was demonstrated by Learner B4, taught by Teacher B, who reported effort attributions because she recognised that a given task got easier when more effort was made to understand it. Learner B4 said: 'it was really hard at first [...] but then if you get more understanding about it [...] you see that it's not that hard' (Learner B4, female, 02 September 2019).

Such effort attributions led to learners feeling more in control of learning outcomes. This was also shared by the same learner, who felt the more she read, the more she was in control of her learning. Learner B4 said: 'I just feel like [...] I learn more when I read so every time after each lesson I go and read

it over and over again and that's how it stays' (Learner, female, 02 September 2019).

Learners who acquire effort attributions believe they can successfully apply strategies and are thus more likely to be motivated to take up more responsibility for their learning (Cauley & McMillan 2010:2). This is supported by Learner C2, Learner C1 and Learner C4, all taught by Teacher C and who all reported a tendency to take responsibility for the construction of personal meaning:

> '[*S*]o every time when I learn, I want to read things for myself [...] and I understand.' (Learner C2, female, 04 September 2019)

> 'I preferred reading a topic before a teacher explains it [...] because when I read, I gain knowledge and when the teachers read, I understand what I did not understand and I get it better.' (Learner C1, female, 04 September 2019)

> '[*T*]he topics that we are going to talk about next week, I read it [*sic*] earlier.' (Learner C4, male, 04 September 2019)

When learners take more responsibility for their learning, they are more likely to become successful in achieving their learning outcomes, which, in turn, leads to increased motivation and involvement (Cauley & McMillan 2010:2). This is also observed amongst the same learners taught by Teacher C, who reported more engagement with their learning activities and the subject matter:

> '[*I*]f I come across something that I don't understand it is then I go to a teacher and ask him or her.' (Learner C2, female, 04 September 2019)

> '[*Y*]ou know as you grow up [...] we have many myths how the earth was created [...] the moon is created [...] so in Natural Science we can prove those myths wrong.' (Learner C1, female, 04 September 2019)

> 'I research [...] I get into research I maybe go to the library and take books for Science [...] and [...] I do my own work personally at home [...] maybe before the lesson.' (Learner C4, male, 04 September 2019)

Therefore, according to Cauley and McMillan (2010:4) 'to ensure an optimal level of motivation, learners need to make facilitated attributions concerning the outcomes of their learning'. To this end, more specific principles of classroom assessment require that 'expectations and intermediate steps for improvement be made visible' to learners to enable active involvement in learners' evaluation of their own work (Cauley & McMillan 2010:4).

The influence of the belief that assessment is irrelevant to teaching and learning

From the findings, the belief that assessment is bad for learners is linked to Teacher A, which falls into the category of 'assessment is irrelevant to teaching and learning'. The teacher strongly believed that formal assessments are an

'enemy' of learners. Teacher A said, 'with Grade 9 my experiences eeh [...] the learners their [*sic*] greatest enemy is the final examination and the formal task' (Teacher A, male, 29 August 2019).

Such a belief can provide learners with attribution cues through feedback that have an emotional impact on them, causing them unwarranted worry and anxiety. In the case of Learner A3 and Learner A1, taught by Teacher A, they reported high levels of anxiety about writing examinations: Learner A3 said, 'and it's like its heavy [...] itjoo [sighs] ma'am [...] exam' (Learner A3, female, 29 August 2019), and Learner A1 said, '[exams] makes us sweat' (Learner A1, male, 29 August 2019).

These negative emotions can lead to feelings of resentment and great frustrations, which decrease motivation (Brown 2002:43). This is evident in the case of Learner A3, taught by Teacher A, who expressed how she struggled just to study her work:

> '[*L*]ike when I'm studying [...] I eish [...] ma'am I feel like I just open my book and I just look at it [...] I'll be like [...] aaaa I'm tired [...] then like [...] like when but no [...] I'm tired [...] will be reading things for the sake of studying.' (Learner A3, female, 29 August 2019)

When learners show a lack of motivation, they are not likely to engage in SDL behaviour, such as, planning, monitoring and evaluating their learning process. This is evident from the findings, which revealed that all the learners taught by Teacher A did not support the notion of self-evaluations and preferred the teacher to evaluate their work.

Discussion

In response to the research question, '*What are the assessment beliefs of Grade 9 NS teachers in the Rustenburg area?*', the following can be concluded: Teachers' assessment beliefs were focused on the improvement of teaching and learning, and learner accountability; and less focus was given to teacher accountability and the relevance of assessment to teaching and learning (Kamanga 2020). Further evidence from the findings showed that the teachers' assessment beliefs were shaped by their personal beliefs regarding (1) how learners learn, (2) perceptions of the nature of science, (3) beliefs about learners, and (4) how they attribute the success and failure of the learners they teach. This finding shows that teachers' assessment beliefs are linked to other salient beliefs about teaching and learning (Brown 2002:50). This finding is of significance as it shows that studies on teacher beliefs can use different approaches to elicit these beliefs, for example, by interrogating their beliefs about teaching, learning or knowledge acquisition. According to Luft and Roehrig (2007:41), researchers of beliefs should be looking for new ways of revealing teacher 'beliefs to understand the relationship between beliefs and practices'.

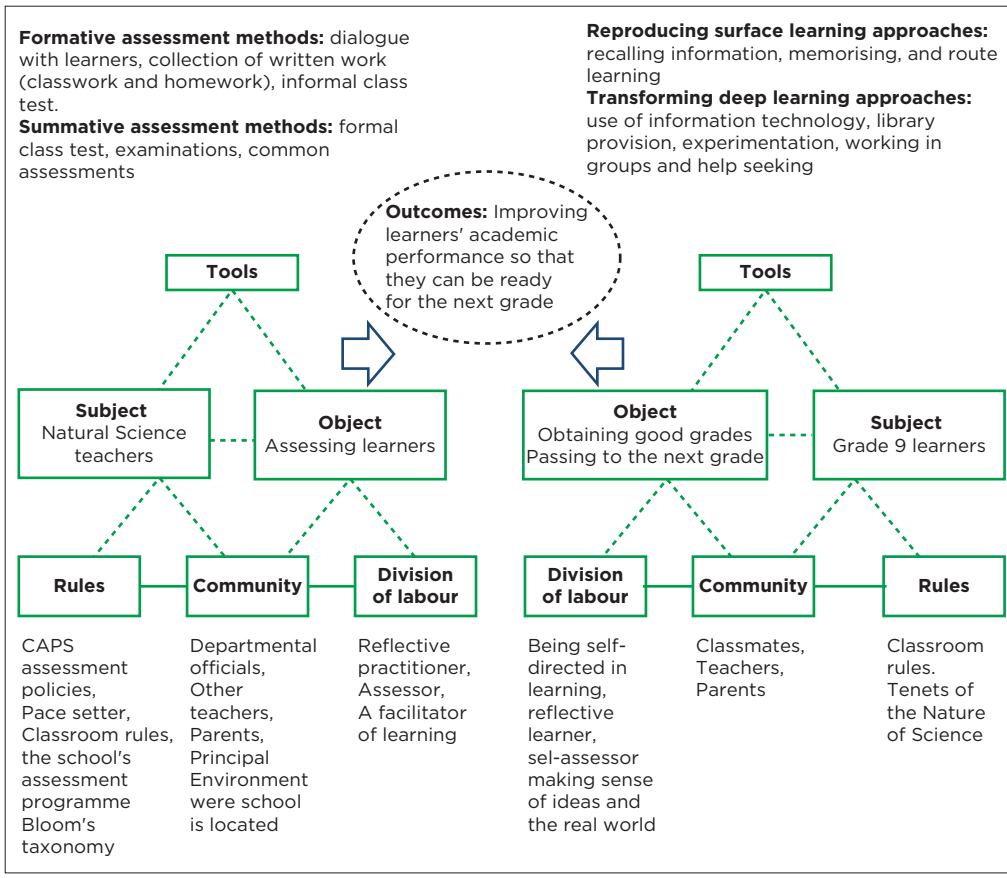
In response to the research question, '*What is the influence of Grade 9 Natural Sciences teachers' assessment beliefs on learners' SDL behaviour in the Rustenburg area?*', the following can be concluded: The belief that assessment improves teaching and learning promoted the following learner SDL behaviour – willingness to take responsibility for learning, displaying an ability to use effective learning strategies, displaying increased motivation, displaying effort attributions and engaging in self-evaluations (Kamanga 2020).

Whilst the belief that assessment 'holds learners accountable' and assessment is 'irrelevant to teaching and learning', influenced the following behaviour: lack of motivation, strong dependency on teachers to evaluate their work, lack of engagement with learning activities, frustration and anxiety, and task-related attributions. The belief that assessment 'holds teachers accountable', encouraged learners' SDL behaviour associated 'with effort attributions and self-evaluations'.

A limitation of this study was that teachers' assessment beliefs were not studied in the context of their classroom practices. Because factors outside of the classroom and unrelated to the teacher can impact practice, additional data sources would have enriched our understanding of the relationship between teacher assessment beliefs and classroom reality. However, the role of 'social context' in understanding the influences of teachers' assessment beliefs on learners' self-direction was investigated using an interpersonal third-generation CHAT analysis.

The CHAT framework is an interdisciplinary approach used for exploring and describing human activities through the use of an activity system which comprises of the following common elements: object, subject, tools, rules, division of labour, community and outcome (Greenhow & Belbas 2007). The CHAT framework has undergone a historical development referred to as generational (Nussbaumer 2012:38). The first-generation CHAT framework is rooted in a Vygotskian sociocultural understanding of learning, which looks at the influences of individuals and tools in developing understanding (Vygotsky 1978). The second-generation CHAT framework considers the 'interrelationships between the individual and the community, history, and context; and the interaction between the situation and the activity' (Taylor 2014:98). With third-generation CHAT, Engeström (2001) elaborated on a broader concept of activity to include interacting activity systems that 'deal with tensions and contradictions that encourage collective learning through change' (Nussbaumer 2012:39). According to Mentz and De Beer (2017:88), CHAT can be utilised as a research lens on an interpersonal level when the interactions involve subjects from different stakeholders, as in this study involving teachers and learners as different subjects of interest.

To establish the third-generation CHAT framework at an interpersonal level, two interdependent activity systems were used: Teachers' views on assessment



Source: Based on Kamanga (2020:108).

FIGURE 10.3: Cultural-historical activity theory as a research lens to further analyse data.

as one activity system, and learners' experiences of assessment in NS as the second activity system (depicted in Figure 10.3). All codes used when classifying the separate activity system elements of the two activity systems were developed by making casual links between the emerging themes obtained from the individual and focus group interview data. At no point were pre-existing codes utilised.

In Figure 10.3, we show how CHAT has been used on an interpersonal plane (with the respective subjects being the NS teacher and the learner), and juxtaposing two interdependent activity systems (namely teaching and learning). The following critical issues were identified when data were analysed and interpreted using CHAT as a lens: (1) emphasis by teachers is on preparing learners for examinations; (2) emphasis by learners is on obtaining good grades; (3) absence of assessment tools like peer- and self-assessment is evident; (4) dominance of teacher-centred approaches were observed; (5)

threatening learning environments; (6) contextual factors which hinder learning were identified, that is, large classroom sizes, learner discipline issues, syllabus coverage, inadequate parental involvement, poor learner engagement and lack of resources; and (7) inadequate implementation of the assessment policy was observed. The identified themes will be elaborated in order to show the critical issues that impede learners' SDL.

Emphasis by teachers was on preparing learners for examinations

In the third-generation CHAT framework, Engeström (2001) expanded CHAT to include a network of interacting systems with shared objectives resulting in a potentially shared outcome. Applying this explanation, the potentially shared outcome of NS teachers' assessment activity system and the Grade 9 learners' learning activity system is preparing learners for the next grade. This is evident from the following teacher and learner quotes:

> '[*T*]o check whether they ready for the next grade by that assessment.' (Teacher C, male, 04 September 2019)
>
> '[*A*]ssessment basically [...] it's as I said it's coached a lot more for this group of learners to try and let them progress into the next grade.' (Teacher B, female, 02 September 2019)
>
> '[*I*]n class we pay more attention to her, listen to what she say [*sic*] so that it would be easier when we get to the next grade.' (Learner D2, female, 06 September 2019)
>
> '[...] and getting to process that information and getting educated and then getting to pass.' (Learner B4, female, 02 September 2019)

The above-mentioned shared outcome by learners and teachers necessitates the use of assessment as a means of certifying learning, which offers little support in fostering SDL behaviour when such practices are dominant. The findings revealed that teachers' assessment tasks were not focused on developing 21st century skills to cope in a complex society, but rather on preparing learners to pass their examinations. Furthermore, the findings revealed that assessment was considered in terms of the cognitive domain with no consideration for the affective or psychomotor domains. This resulted in most learners showing a lack of motivation because of the absence of positive values, like interest, which develop as result of affective domain outcomes.

Emphasis by learners was on obtaining good grades

In the third-generation CHAT framework, the object in an activity system is described 'as the problem at which the activity is directed, and which is moulded and transformed into "outcomes" with the help of tools' (Bourke et al. 2013:36).

Applying this explanation, the 'object' of this group of learners' learning is centred on obtaining good grades, to achieve the outcome of passing to the next grade. This objective was congruent with that of teachers, that is, focusing on preparing learners for examinations. Both the teachers' and learners' objectives are contrary to the more conventional notion that learners should see their tasks as objectives to develop cognitive processes such as monitoring and planning their learning process, as required from a self-directed learner. The findings revealed that learners put more emphasis on recall and memorisation, which are lower-order cognitive skills and do not form part of a meaningful SDL approach.

Absence of assessment methods like self- and peer-assessment

The assessment methods used by teachers to assess learners did not include self- and peer-assessments. However, if the desire is for learners to become authors of their own understanding, and assessors of their own learning, then self- and peer-assessments need to be incorporated (Atjonen 2014; McMillan & Hearn 2008). This implies that extensive efforts must be made to raise awareness of the important role that self- and peer-assessment play in fostering SDL. Evidence from literature reveals that self- and peer-assessment promote SDL (McMillan & Hearn 2008).

Dominance of teacher-centred approaches

When examining the division of labour amongst learners and teachers, it was evident that teachers did not engage with SDL in the learning environment and relied heavily on teacher-centred approaches. This is illustrated in the following quotes:

> '[*W*]hen Miss TPE [*teacher participant from school E*] write [*sic*] the notes in the chalk board, I take them to my notebook.' (Learner E3, male, 10 September 2019)

> '[*S*]he shows us that if she's talking about the digestive system, she draws it on the board and then she labels it [...] that's how I understand my topics.' (Learner E1, female, 10 September 2019)

> '[*W*]hat makes me to understand all the topics in Natural Sciences is ma'am TPE [*teacher participant from school E*] always try to make us learners to understand by showing things on chalk board so that we can all understand.' (Learner E2, male, 10 September 2019)

> '[*What*] helps me understand the topics that ma'am gives us is that whenever we start a new topic, she will write notes on the black board and also makes examples about things in real life.' (Learner E5, female, 10 September 2019)

Evidence from the findings revealed that such teaching approaches encouraged learners to become passive listeners, which does not develop

social and communication skills, and which does not reflect a meaningful approach to SDL. This is illustrated with the following quotes:

> '[*S*]o my role as a Natural Sciences learner is to do class works and homework that the teacher gives us and answer in class when the teacher asks us questions.' (Learner E1, female, 10 September 2019)

> '[…] and my role is to listen while the teacher is teaching and take notes while she is teaching.' (Learner E2, male, 10 September 2019)

> '[*M*]y role in Natural Sciences, we are supposed to keep quiet in class so that we can understand what the teacher is saying.' (Learner E3, male, 10 September 2019)

> '[*M*]y role in Natural Sciences class is to listen and express my feelings with what my teacher has taught me.' (Learner E4, male, 10 September 2019)

> '[*W*]hile in the classroom other learners they don't listen to the teacher when they ask him question and they bully other learners in the class.' (Learner E5, female, 10 September 2019)

However, interesting to note is how the learners' social skills reflected affective outcomes – such as expressing one's feelings and cooperation in class – which were missing from the teachers' interview data. This finding implies that consideration should be given to understanding the type of connections learners make from their learning environment. This information could be very useful when designing learning environments that enhance SDL.

Threatening learning environments

The findings revealed that grouping low-performing learners to receive differential instruction for the purpose of helping them improve their performance has limited effectiveness in supporting meaningful classroom engagement. It was learned from the empirical study that such a grouping leads to a threatening learning environment as a learner was not free to ask questions in class. This is illustrated with the following quotes:

> '[*B*]ut this year we decided that we gonna take out the weaker learners and put them into one class so that we can basically move much further and better with other classes and the weaker class we wanted to help them cope.' (Teacher B, female, 02 September 2019)

> '[*T*]here is a problem because I can't ask Madam TPB [*teacher participant from school B*] […] because sometimes I feel scared to ask her cause [*sic*] some people they say NS is easy and it will look stupid if you ask […] so I don't usually ask her […] I just do it for myself.' (Learner B2, male, 02 September 2019)

For SDL to thrive in classrooms, the learning environment must change into a supportive and a non-threatening environment because teaching and learning are deeply embedded in interpersonal processes.

Contextual factors that hinder learning

Teachers reported the following factors as barriers that impacted on teaching, learning and assessment routines within the learning community: large classroom sizes; learner discipline issues; syllabus coverage; inadequate parental involvement; poor learner engagement and lack of resources. The insights gained from this study revealed that such factors may compel teachers to teach in ways that best suit their circumstances, which may lead to a 'watering down' of the prescribed syllabus content and an emphasis on minimum competencies that provide learners with limited opportunities to learn. Problem-based approaches are often replaced by transmission mode teaching. This is illustrated in the following quote:

> '[*W*]hen are you going to analyse stuff, when are you going to apply stuff, when are you going to solve a problem using [...] there is not a lot of time [...] there's just too many things.' (Teacher D, female, 06 September 2019)

Inadequate implementation of the assessment policy

When considering the social aspect of 'rules', it was revealed that the goals of CAPS have not materialised in NS classrooms, especially when it comes to the development of 21st century skills, higher-order cognitive thinking and affective outcomes (Department of Basic Education 2011:4). Teachers in this study did not focus on developing and encouraging critical and active approaches to learning but focused on rote learning of given facts and uncritical thinking:

> '[*A*]ssessing them with formal assessment it becomes a real problem because they can't memorize [...] they cannot recall information [...] eeh [...] they cannot [...] their memory is so poor to grasp the information.' (Teacher A, male, 29 August 2019)

The data obtained from learners' responses revealed that such approaches to teaching science fail to promote the development of thinking and reasoning skills in favour of mere recall of information. This is illustrated by learners' responses to the question, '*What are some of the activities, which enable you to understand the topics taught in Natural Science lessons better?*':

> '[*L*]et me think ma'am [...] by reading the notes [...] doing your classwork [...] ja.' (Learner A1, male, 29 August 2019)
>
> '[*A*]hmm [...] to read your notes and to study them and revise your classwork.' (Learner A2, female, 29 August 2019)
>
> '[*A*]hmm [...] is to go back to my notes and read them [...] and then I like [...] I go back to my classwork and revise them.' (Learner A4, female, 29 August 2019)
>
> 'I read my notes [...]. I go back to my classwork and corrections.' (Learner A5, male, 29 August 2019)

In addition, the lack of teachers' attention to affective learning outcomes results in learners' not developing positive values and interest towards NS activities. This finding suggests that teachers still struggle to meet the demands which are stipulated in the assessment policy, exacerbating their ineffectiveness in promoting SDL behaviour. Thus, one challenge lies in how best to assist teachers to implement the assessment policy.

Although the findings cannot be generalised to the whole population because of the small sample size, they can serve as a point of reflection on where we are now and where we are going in terms of the successful implementation of SDL in the Grade 9 NS curriculum.

Implications for higher education and conclusion

Research on teacher beliefs has attracted a lot of interest given the critical role that beliefs play in shaping classroom pedagogical acts (Bliem & Davinroy 1997:1). The findings from this study build on this knowledge by providing empirical evidence showing how various teacher assessment beliefs impact learners' SDL abilities. It was shown that some assessment beliefs serve to facilitate SDL behaviour, whilst some hindered SDL behaviour. It is, therefore, necessary to identify and address such negative beliefs by promoting assessment initiatives and teacher development programmes that seek to facilitate changes in teacher's assessment belief systems. This has implications for higher education in terms of how to help prospective teachers uncover and critique their own assessment beliefs, and help them become critically conscious of their beliefs before they enter the teaching profession (Bryan & Atwater 2002:823).

Although much has been written about the need for new ways of revealing the beliefs of teachers, very little has been done in examining the types of experiences that impact their beliefs (Luft & Roehrig 2007:49). Moreover, in reviewing literature on teacher assessment beliefs, there are few documented studies of higher education programmes which specifically address the infusion of teacher assessment beliefs in their educational courses/programmes. Thus, a goal for higher education, specifically in faculties of education, should be to design and implement teacher education programmes that attempt to facilitate a change in the belief systems of pre-service and practicing teachers.

Furthermore, the unfortunate reality, revealed by the findings, is that teachers' assessment practices within the school context are focused on preparing learners to pass their examinations. Hence, less opportunity for learners to develop the necessary 21st century skills needed to enable them to cope and adjust to the demands of higher education, is provided. This

unfortunate reality leaves higher education with the greater burden of bridging this gap by providing more innovative opportunities of fostering the SDL skills of prospective graduates across the different faculties.

Conclusion

In this chapter, we reflect on research that was carried out in five schools in the Rustenburg area in North-West province involving a total of five NS teachers and twenty-five (25) Grade 9 learners. The study was aimed at understanding the influence of teachers' assessment beliefs on learners' SDL behaviour using a semi-structured interview process (Kamanga 2020). The findings revealed that the belief that assessment improves teaching and learning and assessment holds teachers accountable positively influenced learner SDL behaviour (Kamanga 2020). Against this background, this chapter advocates for higher education to include more structured programmes for teachers that would support them in becoming cognisant of their beliefs and changing negative belief systems that work against appropriate learner developmental needs. The use of the CHAT framework as a research lens in this study has proven to be appropriate in research related to teaching beliefs because the complex interplay of institutional, managerial and discipline constraints often lead to a belief-practice divide.

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Chapter 1

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Chapter 2

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Chapter 10

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Index

This book aims to contribute to the discourse of learning through assessment within a self-directed learning environment. It adds to the scholarship of assessment and self-directed learning within a face-to-face and online learning environment. As part of the NWU Self-Directed Learning Book Series, this book is devoted to scholarship in the field of self-directed learning, focusing on ongoing and envisaged assessment practices for self-directed learning through which learning within the 21st century can take place. This book acknowledges and emphasises the role of assessment as a pedagogical tool to foster self-directed learning during face-to-face and online learning situations. Now more than ever, we need learners to be self-directed in their learning. Assessment plays a key role in learning and, therefore, we have to identify innovative ways in which learning can be assessed and which are likely to become the new norm even after the current global pandemic has been brought under control. The goal of this book, consisting of original research, is to assist with the paradigm shift regarding the purpose of assessment, as well as providing new ideas on assessment strategies, methods and tools appropriate to foster self-directed learning in all modes of delivery. Although all the chapters focus on assessment within a self-directed learning environment, different foci in each chapter contribute to the rich knowledge bank in this field. The target audience of the book includes academics and researchers in the field of self-directed learning in the education landscape.

The strength of this volume is the diversity of methodologies and points of emphasis/exploration brought to bear on the connection between self-directed learning and assessment. Not only is self-directed learning (in formal institutions) an underexplored area of research, but the role assessment plays (or can play) in the process is also often overlooked. This collection offers researchers a diverse set of interesting explorations in this area.

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