Cape Peninsula
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CONSIDERATIONS TO INFORM LEARNING DESIGNERS' DECISIONS WHEN SELECTING STRATEGIES FOR LEARNING EVENTS IN HIGHER EDUCATION

by

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DECLARATION

I, Alrike Claassen, declare that the contents of this dissertation represent my own unaided work, and that the dissertation has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

Alrike Claassen

Signed

17 November 2020

Date

ABSTRACT

The increasing number of unemployed youths in South Africa is a growing concern. In addition to high levels of poverty, restricted education provision and limited facilities have resulted in numerous students facing a bleak future. Against this background, higher education institutions should embrace change to accommodate more poor students. Some HEIs respond to this by adopting a multimodal approach through the designing learning of events across various modes of delivery, in order to maintain consistency. This in turn presents a challenge to learning designers. This study expatiates on the challenge faced by learning designers during the decision-making process when planning and designing a learning event with multiple modes of delivery. The main research question which underpins this study is: *What are the considerations which learning designers should take into account during the planning, designing and development of a multimodal learning event, taking into consideration the Cronjé four-quadrant model?* For this purpose, I conducted a single looped design-based research, comprising a partially mixed sequential dominant status design to ensure research rigor. Following a systematic literature review I was able to extract constructs to be used during the qualitative and qualitative phases of the study. The quantitative component provided a structured selection of participants. Using the Cronjé four-quadrant model as framework, I was able to map modules, using an instrument, the OCIA survey, developed by Elander. All of the quadrant related to the Cronjé four-quadrant model contains both constructivist and behaviourist elements. However, the immersion quadrant is low in both and was not further discussed in this study as it relates to incidental learning and therefore not applicable to higher education. The integration quadrant is high in both constructivist and behaviourist elements. The construction quadrant is high in constructivist elements. The injection quadrant is high in objectivist elements. The qualitative component comprised semi-structured interviews with the selected participants, and elucidated the relevant data in order to address the sub-research questions. At the outset of this study, it was unclear which aspects would influence the design of learning relating to any of the quadrants of the Cronjé four-quadrant model. Learning designers should be knowledgeable in order to consider the relevant aspects of how to apply the four-quadrants model during the design of learning at higher-education level. Therefore, this study elucidates the considerations important during the analysis phase. Following my interpretation of the results I obtained, I propose a Learning Event Analysis Framework (LEAF) tool for learning event design in higher education in this study. This analysis tool holds practical application value for learning designers working in the multimodal higher education field

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DEDICATION

I dedicate this work to my mother, Naomi, thank you for the many sacrifices you made allowing me to pursue my dreams. Additionally, to Rohan and Mienke thank you for being my inspiration.

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https://drive.google.com/drive/folders/1PZsgZK2Hot2TKY0bE6Iq9pDjHl-SIjQn?usp=sharing

[1] Signed permission forms are omitted to protect the anonymity of participants

GLOSSARY

Term / Acronym	Description
Instructional design (learning design)	Instructional design is a process used to generate curriculum, courses, teaching units and single episodes of learning (Branch, 1999:145)
Learning event	A learning event is seen as “a series of interventions or a combination of different elements that are designed to reach specific objectives”(Cronjé, 2006:412)
Learning designer (instructional designer)	Instructional designers can also be seen as learning designers. For the purposes of this study I referred to learning designers when instructional designers are implicated
Mode of delivery	Mode of delivery describes the way in which learning programmes are provided (Smith *et al.*, 2006:69)
Multimodal delivery (dual-mode, multi-mode)	Multi-modal delivery is an approach in which more than one mode of delivery is employed as a requirement to access aspects of the programme, or as an option for students (Smith *et al.*, 2006:69)
LEAF tool	LEAF is an acronym for Learning Event Analysis Framework
HEI	Higher Education Institution
PAR	Participatory Action Research
OCIA	Objectivist and Constructivist Integration Assessment (OCIA) created by Elander (2012:223-240)
SLR	Systematic Literature Review
CAQDAS	Computer-Assisted Qualitative Data Analysis Software
UP2U	A community of practice consisting of learning designers in South Africa HEI

CHAPTER ONE
CONCEPTUALISING THE RESEARCH

1.1 Introduction to the study

The aim of this study was to elucidate the considerations that learning designers should take into account during the decision-making process when planning and designing a learning event, relating to the Cronjé (2006:412) four-quadrant model. Using the Cronjé (2006:412) four-quadrant model, in combination with instructional elements as indicated by Elander (2012:183-186) as a lens, this study reports on the aspects that will determine when a learning event will relate to a specific quadrant. Ultimately, a Learning Event Analysis Framework (LEAF) tool was created that would guide the learning designer to use the most effective approach based on the Cronjé (2006:412) four-quadrant-model in the design of a learning event.

1.2 Statement of research problem

Learning designers in a multimodal context design learning events to attain specific learning objectives while the mode of delivery varies or fluctuates. Learning design teams should beforehand agree on a theoretical framework to be used during the design of interventions (Branch, 1999:150-151). This study attempted to address the gap in our understanding of how to translate theory into practice, since learning designers are often unable to make connections between learning theory and the design of learning interventions (Ertmer & Newby, 2013:65-69; Yanchar *et al.*, 2007:335). The Cronjé (2006:412) four-quadrant model is useful in articulating choices relating to the choice of a theoretical framework during the decision-making process. However, it was unclear which aspects would influence the design of learning relating to one of the quadrants of the Cronjé (2006:412) four-quadrant model (Cronjé & Elander, 2016:14). Learning designers should be knowledgeable in order to consider the relevant aspects of how to apply the four-quadrants model during the design of learning at higher education level.

1.3 Background to the research problem

1.3.1 Higher education institutional aspects

Various factors place pressure on higher education institutions to embrace change. Some of the changes higher education institutions face are:

- a drive to provide access to higher education to more people
- changes in students' needs
- technological innovation that opens up new possibilities
- the demands of the knowledge economy on higher education (Smith et al., 2006:69).

Some higher education institutions respond to pressure to change by adopting a multimodal approach where students could enrol at a higher education institution as on-campus or distance mode; online, paper-based or as a blended mode, depending on the students' specific needs (Smith *et al.*, 2006:69). Despite changes in the mode of delivery and their effect on teaching, underpinning learning theories remain unchanged (Ertmer & Newby, 2013:69). The role of learning designers comprises their understanding of the strengths and weaknesses of learning theory in order to optimally select and implement strategies which would support students' learning in a variety of contexts (Ertmer & Newby, 2013:69). Fyle *et al.* (2012:61) summarise the role of the learning designers in a modern multi-mode university as follows: With their experience and understanding of the three key components of a course, learning designers should be able to:

> use their knowledge of pedagogical elements to help and support the academics to design a strong learning experience tailored to the learner characteristics, including requirements, motivation, expectations, professional experience and cultures
>
> use their knowledge of administrative models and processes to ensure the course addresses rules, regulations, codes of practice, cost and other resource issues, and complies with governance, policy and quality assurance benchmarks
>
> use their knowledge of and access to advice about learning technologies to help identify the most appropriate technologies to deliver the course effectively to learners (Fyle et al., 2012:61).

1.3.2 Identifying a theoretical framework

The focus of this study is on the micro level, where the learning designers design learning and instructional strategies. This implies that both the curriculum and outcomes are agreed upon and in place. Branch (1999:151) proposes the following process of generating instructional strategies:

- Identifying of a theoretical framework
- Organising of strategies that will organise the events of instruction
- Striving for congruence throughout the design process.

Branch (1999:150-151) highlights the importance of identifying a theoretical framework to validate the reasons and motivation for those involved in the process in order to build consensus. In order to ensure congruence, learning designer teams have to agree on a theoretical framework before further planning of learning strategies can continue. Learning designers feel forced to make use of either one theory, for example objectivism, or another theory, e.g. constructivism; they believe the theories cannot be combined (Elander, 2012:42). Vrasidas (2000:2) argues that behaviourist and constructivist approaches relate to two opposite ends of a continuum and that they cannot be combined. Figure 1 illustrates the continuum.

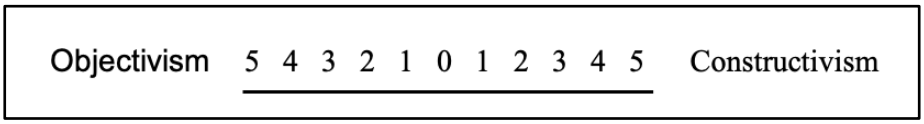


Figure 1.1: The constructivism-objectivism continuum

(Cronjé, 2006:412)

Alessi and Trollip (2001:38) and Cronjé (2006:412) contest that these theories can and in some cases should be combined. The Cronjé (2006:412) model resonates with ideas in literature of using an eclectic approach. Snelbecker (cited by Ertmer & Newby, 2013:62) posits that the designers' best option, when selecting an approach ultimately depends on the context. This type of *cherry-picking* has been termed *systematic eclecticism*. Cronjé (2006:412) indicates that learning could indeed simultaneously contain objectivist and constructivist elements. He proposes a model which could be useful while arguing the choices to be made when learning designers select elements of learning design during the planning phase of a new or redesigned learning event. The model could also be useful in a multimodal context for learning designers to describe, debate and ultimately agree on the nature of the learning before the development commences. Figure 1.2 shows the relationship of learning taking place from indirect to direct learning within simple to complex learning situations, indicating four possible independent yet interrelating moments of teaching and learning. Figures 1.1 and 1.2 were used with permission (Addendum 1.1)

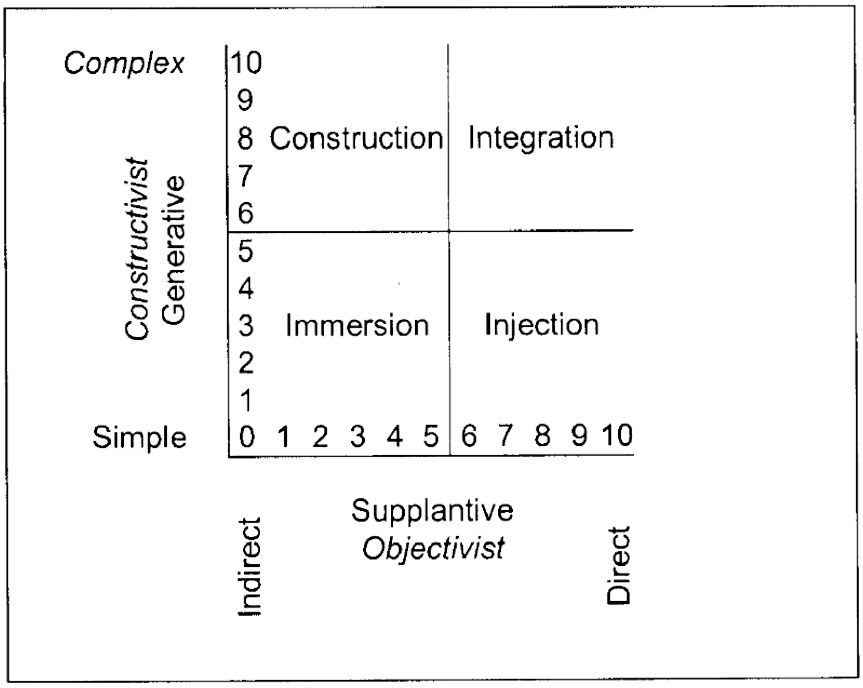


Figure 1.2: The four-quadrant model

(Cronjé, 2006:412)

The immersion quadrant is low in both constructivist and behaviourist elements. The immersion quadrant was not further discussed in this study as it relates to incidental learning and was therefore not applicable to higher education (Cronjé, 2006:412). The integration quadrant is high in both constructivist and behaviourist elements. The construction quadrant is high in constructivist elements. The injection quadrant is high in objectivist elements (Cronjé, 2006:396-398). Elander (2012) used the Cronjé (2006:412) model to conduct a quantitative study to establish whether practising learning designers integrate objectivist and constructivist elements. As opposed to Vrasidas (2000:2), the constructivism-objectivism continuum indicates that it is indeed possible for practitioners to integrate objectivist and constructivist learning approaches in learning events. Elander (2012:210) points out that:

> This study has shown that courses can exist in the integration combinations represented by the quadrants of Cronjé's matrix (2006), and the elements that have been used in combination have been identified. The table is set to explore how these findings can be a catalyst to advance instructional theory and practice.

In a follow-up article, Cronjé and Elander (2016:14) indicate that it remains unclear which aspects would determine when a learning event would relate to a specific quadrant. Learning designers and other role-players in a multimodal context would benefit from a planning tool which would guide them to choose which quadrant of the model would be useful during

which circumstances. In summary, when should elements of learning design be designed to fit behaviourist learning and when should they be designed for constructivist learning events, and finally, when and how would one combine these elements?

1.4 Literature review

1.4.1 Conceptual framework

Elander (2012:50) states that learning designers should be able to match the right approach to a learning situation. He identified objectivist and constructivist elements that have been most frequently used in his study as indicated in Table 1.1 (Elander, 2012:183-184). These elements directly relate to the four-quadrants of the Cronjé (2006:412) matrix. The results of his research provide a conceptual framework for the type of instructional elements that were referred to in this study. The highest scoring elements in the integration quadrant are objectivist elements (Elander, 2012:183-186). These elements of learning design contributed to the current study. The instructional elements were also used in combination with the Cronjé (2006:412) four-quadrant model as framework to establish which aspects would determine when a learning event would relate to a specific quadrant (Elander, 2012:183-186).

1.4.2 Learning theories as framework for generating instructional strategies

Theories are used to organise the principles, suppositions, empirical evidence and learning. These theories represent a way of thinking within the field of learning design (Branch, 1999:152). Branch (1999:150-151) posits that the identification of a suitable theoretical framework is the first step in generating instructional strategies. It would therefore be important for learning designers and other role players involved in the generation of an instructional strategy to agree on a learning theory as framework before moving forward in order to improve congruence. Table 1.2 provides a collated summary to indicate the way objectivists and constructivists view conditions necessary for optimal learning. Behaviourist and cognitivist theories relate to the objectivist epistemological position while constructionism relates to the constructivist epistemological position.

Table 1.1: The highest scoring elements used overall *

Objectivist elements most used overall	Constructivist elements most used overall
Students are given critical facts, principles, concepts, and tasks related to the topic in presentations	Instructors to offer support and serve as a resource as students explore the subject
The instructor provides instructions, direction, comments, answers to questions, and feedback throughout the course	Students are assessed by asking them to show what they have learned by using the processes and experiences from course activities to complete a project, develop a presentation, or find a solution to a problem
The developer predetermines and plans the order of topics, learning tasks, activities, and deadlines	Students construct their own knowledge of the subject by investigating and reflecting upon references, resources, and information, while solving a challenging task or problem
The instructor is responsible for directing and delivering critical subject information	Complex problems or scenarios with no predetermined answers or approaches are used in which students are challenged to formulate their own solutions
Learning is assessed through the recall of information, answering questions, performing skills, and/or completing assignments to prove mastery of performance objectives. Students are provided a logically-sequenced and comprehensive explanation of the course information for students to digest and remember	

* Elander (2012:183-186)

Table 1.2: The way objectivist and constructivist schools of thought view optimal learning

	Objectivist (Behaviourist and cognitivist)	Constructivist (Constructionist)	Reference
Goal of learning	Behaviourist are concerned with measuring behaviour. The designer will specify observable objectives and consequently evaluate the change in behaviour. Cognitivist are concerned with the constructs such as the mind, memory, attitudes, motivation, thinking and reflection	Constructivist are concerned with the way knowledge is constructed in our heads. Learning is seen as a process of students actively constructing knowledge	(Alessi & Trollip, 2001:19-32)
Focus of learning	The focus is on knowing facts: Instructional goal imposed	The focus is on the construction of knowledge Instructional goal negotiated	(Jonassen, 1991:61-62)
Analysis	Which reality should be learned and how it should be acquired by means of subject matter and task analysis Reductionist: Assessing students before designing instruction to determine starting point	Holistic approach: Provide tools and environment to allow students to create their own interpretation of the world	(Ertmer & Newby, 2013:49; Jonassen, 1991:54-62)
Type of learning environment	Intervening: Behaviourists focus on the design of the environment to optimise transfer. Cognitivists stress efficient processing strategies with emphasis on structuring, organizing, and sequencing information to facilitate optimal processing. Creation of learning environments that allow and encourage students to make connections with previously learned material	Supportive: Learning designer should create learning environments where knowledge construction can take place	(Jonassen, 1991:61-62)
Instruction	Instruction is structured around the presentation of the target stimulus and the provision of opportunities for the student to practise making the proper response Instructional explanations, demonstrations, illustrative examples and matched non-examples. Knowledge can be analysed, decomposed, and simplified into basic building blocks (chunked). Knowledge is mind independent Use of reinforcement to impact performance Humans acquire meaning	Knowledge is not mind independent Humans create meaning The goal of instruction is not to ensure that individuals know particular facts, but rather that they elaborate on and interpret information. Emphasis on the identification of the context in which the skills will be learned and subsequently applied Supporting the use of problem-solving skills that allow students to go “beyond the information given” The need for information to be presented in a variety of different ways Emphasis on student control and the capability of the student to manipulate information	(Ertmer & Newby, 2013:50-58)
Evaluation of learning	Reinforcement and control tool criterion-referenced assessment	Self-analysis tool Assessment focused on transfer of knowledge and skills	(Ertmer & Newby, 2013:49-58; Jonassen, 1991:61-62)

1.5 Aspects learning designers consider in the design of learning strategies

Literature indicates a number of aspects that should be considered when deciding on a theoretical approach to follow in the design of learning events. The educational approach should include the goals, students and the content to be studied (Rieber, Reigeluch, Jacobson and Spiro cited by Alessi & Trollip, 2001:40). When referring to students, the level of metacognition is specified as a consideration: “Constructivist methods work better for students with well-developed metacognitive skills” (Alessi & Trollip, 2001:39). Ertmer and Newby (2013:61-62) warn that the approach would depend on the context, proficiency level of the student and also the content. Jonassen (cited in Elander, 2012:48) contends that declarative, structural and conceptual knowledge is best suited to an objectivist approach while problem solving skills are best suited for a constructivist approach. The type of knowledge or skills is in this case the consideration for approach or theory used. The initial literature review suggested that aspects which could be taken into consideration are the:

- goals
- student’s proficiency and cognitive level
- content
- context
- knowledge or skills.

The preliminary literature review (§ Literature review 1.4) aided in the planning of the systematic literature review followed in the study. This study followed the systematic literature review process outlined by Kitchenham (2004). Conducting the literature review in this manner ensured that the evidence acquired from the systematic literature review was focused, robust and thorough (Kitchenham, 2004:2).

1.6 Research questions

The main research question which underpins this study is: *What are the considerations which learning designers should take into account during the planning, designing and development of a multimodal learning event, taking into consideration the Cronjé (2006:412) four-quadrant model?*

The following sub-questions will each contribute towards addressing of the main question:

- In which situation (type of content or context) would constructivist elements contribute towards optimal learning (construction quadrant)?
- In which situation (type of content or context) would objectivist elements contribute towards optimal learning (injection quadrant)?

- When a learning event contains elements from both constructivist and objectivist elements (integration quadrant), how would you move from one learning element to the other?

1.7 Objectives of the research

The aim of this study is twofold:

- To determine the aspects considered in the learning design decision-making process in order to create learning strategies suitable to specific courses/modules/learning events/disciplines
- To create a tool to choose elements and strategies suitable to specific courses/learning events/disciplines.

1.8 Research design and methodology

1.8.1 Role of the researcher

The North-West University aims to become a leader in the provision of multimodal education. Multimodal education at North-West University includes campus-based contact learning through a hybrid mode of provision to distance learning. This teaching and learning strategy aims at increasing access, keeping up with worldwide trends in education and creating more opportunities for life-long learning (North-West University, 2016:7). At the North-West University, I am a learning designer at the Centre for Teaching and Learning where we mostly operate at micro level. Lecturers from various campuses interact with one another to ensure that outcomes are aligned. Lecturers are mostly responsible for both distance and contact students and these lecturers request guidance from the learning designers in the selection of learning strategies. Learning designers assist lecturers in designing learning events. In some modules learning events should be aligned, i.e. the three university campuses must deliver the same module on three sites of delivery in a coherent manner.

1.8.2 Paradigm

The paradigm followed during this study was based on the Burrell and Morgan (1979:25) social paradigm. This paradigm is pragmatic in nature and it is aimed at the solution of a real-life problem; it provides a rational explanation of affairs and is objective in nature with the aim of solving problems (Blignaut, 2016:9). This approach will be taken because the goal of this research is to find a solution to a practical problem at the university where I work.

1.8.3 Research Approach

Participatory Action Research (PAR) is an approach to research that is concerned with collaborative knowledge construction and use (Morales, 2016:158). Morales (2016:159) states that the approach grounding PAR highlights the importance of

bringing together action and reflection, theory and practice in collaboration with people to find practical solutions to challenges people experience. Furthermore, it is an approach that is aimed at creating a personal or collective change, and results in action, change or improvement on the issue being researched (Morales, 2016:159). This study aims to improve the problems experienced by learning designers by researching the link between theory and practice and to create change by improving the current issues under research.

1.8.4 Methodology

The study followed a mixed-method, phenomenological approach as the issue under research is still largely unknown. Barab and Squire (cited by Van den Akker *et al.*, 2006:8-9) define design-based research as a "series of approaches with the aim of producing new theories, artefacts and practices that impact learning and teaching." With design-based research it is possible to create better educational interventions and to obtain an opportunity to learn from the research process (Van den Akker *et al.*, 2006:117). Van den Akker *et al.* (2006:117) state that:

> In the curriculum domain, design research is often selected to help improve understanding of how to design for implementation. By carefully studying successive approximations of ideal interventions in their target settings, insights are sought on how to build and implement consistent, harmonious, coherent components of a robust curriculum.

Design-based research assisted in the constructing of an intervention in the learning design domain in the form of a learning design tool based on the Cronjé (2006:412) matrix. The Learning Event Analysis Framework (LEAF) tool was created as a result of this study. The LEAF tool contains design principles and contributes to theory in a manner that is relevant and of practical use in accordance with design-based research principles (Van den Akker *et al.*, 2006:6-7). The research site included learning designers of different higher education institutions.

Purposeful sampling was used to gather qualitative data. By using a partially mixed sequential dominant status design, learning designers from the UP2U group became research participants in this study (Leech & Onwuegbuzie, 2009). Each of the group of willing learning designers was asked to complete the Objectivist and Constructivist Integration Assessment (OCIA) created by Elander (2012:223-240) in its online survey format. The data were analysed and each module or learning event was matched to one of the Cronjé (2006:412) four quadrants. A learning designer involved with the creation of a module or learning event from each of the Cronjé (2006:412) four quadrants was selected based on availability to participate in further interviews and relevant experience in the field. In-person semi-structured individual interviews were

held according to guidelines set out by Merriam (2009:170-173). Qualitative data were collected by means of audio recordings. The data were then transcribed verbatim and analysed in Atlas.ti™ according to the Boeije (2002:391-409) strategy of constant comparative analysis. The qualitative findings were used to design the LEAF learning design tool prototype.

1.9 Delineation of the research

The UP2U group is a community of practice consisting of learning designers working in higher education in South Africa (UP2U, UP2U). The participant selection comprises the UP2U group. The study did not include students and constitutes a once off cross-sectional study.

1.10 Significance of the research

The research is important because there is currently no tool available that could guide learning designers to use an effective approach to the design of a learning event according to the Cronjé (2006:412) model. The research contributed to theory by extending the Cronjé (2006:412) model. The study will benefit the higher education sector, especially in the field of learning design.

1.11 Expected outcomes, results and contributions of the research

The outcome of this study related to:

- a learning design tool: Learning Event Analysis Framework (LEAF)
- a contribution to theory
- ground breaking research on learning design functions
- a proposed article.

1.12 Chapters overview

I organised the chapters according to the following aspects:

- Chapter One**:** Conceptualising the research. This Chapter conveys the intention, the research problem and the context of the research study.
- Chapter Two: Making plans to address the research question. Chapter Two elaborates on the worldview of the research, describes the research approach, and explains the methodology followed during this study to address the research questions formulated in Chapter One.
- Chapter Three**:** Structured mining of the current literature. Chapter Three describes the mining of the current literature in order to portray the gap in the literature relating to the research question of this study.
- Chapter Four: Structured selection of research participants. Chapter Four conveys the structured selection of participants by communicating the results of the small-scale quantitative survey component of the study.
- Chapter Five: Talking to the identified participants. Chapter Five offers an account of the considerations that guide the decision-making process of the identified learning designers in higher education context.

- Chapter Six: Culmination of the research into an analysis tool. Chapter Six, a gestalt of the research journey, indicates the research steps taken, elucidates the contribution to learning design theory and presents the learning design analysis as well.

CHAPTER TWO
MAKING PLANS TO ADDRESS THE RESEARCH QUESTION

2.1 Introduction

This chapter elucidates on the worldview of the research, describes the research design approach, and explains the methodology followed during this study to address the research questions formulated in Chapter One: What are the considerations which learning designers should take into account during the planning, designing, and development of a multimodal learning event, taking into consideration the Cronjé (2006:412) four-quadrant model?

The following sub-questions collectively assisted in addressing the main research question:

1. In which situation would constructivist elements contribute towards optimal learning?
2. In which situation would objectivist elements contribute towards optimal learning?
3. When learning events contain elements from both constructivist and objectivist elements, how would you move from one learning element to the other?

The flow of this chapter relates to:

- The selected worldview for this study (§ 2.2)
- Participatory action research as the research approach (§ 2.3)
- Design-based research as research methodology (§ 2.4)
- Mixed method research methodology (§ 2.5)
- Research strategies followed during this study (§ 2.6)
- Research instruments (§ 2.7)
- Assumptions and limitations (§ 2.8).

2.2 The selected worldview of this study

The worldview I adopted for my research journey signifies the departure point of the study when I determined the research paradigm that would best suit the identified research questions. A world view provides a lens, a focus, from which one could amplify the facets encompassed in the research questions. The selected paradigm would assist in determining the subsequent research choices that I had to make. The Burrell and Morgan (1979:25) description of a worldview, based on four paradigms, was used. The four paradigms described by Burrell and Morgan (1979:25) comprise two variables; the first is the sociology of regulation versus the sociology of change. The research question was more embedded in the sociology of regulation as opposed to radical change (Blignaut, 2016:9). The second is the aspect of a subjective versus an objective worldview. Goles and Hirschheim (2000:251) point out that objectivism has served the scientific community well. However, for matters of a societal nature, the objective

viewpoint could be deemed restricting. The Burrell and Morgan (1979:25) description of the paradigm highlights that even within the social field, relationships exist and can be identified and studied objectively. Burrell and Morgan (1979:25) further refer to "social fact" that exists "outside of the researcher." This research is objective in nature because it aims to solve a problem by providing an accurate account of the collected data.

The most suitable paradigm to address the research questions is, therefore, the functional paradigm. The functional paradigm is pragmatic in nature; provides a rational explanation of affairs; and is objective in nature, intending to solve problems in society (Blignaut, 2016:9). Furthermore, it can address issues in both a quantitative and qualitative way.

2.3 Participatory Action Research as the research approach

This study aims to improve challenges that people experience while researching the intersection between theory and practice, and create change by adding to the body of knowledge. The suitable approach is Participatory Action Research because it concerns both collaborative knowledge use and the construction of new knowledge intending to solve the problem underpinning the research in cooperation with the intended community (Morales, 2016:158-159). Collaborative research transpired in three ways: first, the selected participants were asked to contribute not only their opinions related to the research question during the qualitative interviews but also their views on the "tool compilation constructs" derived from the systematic literature review. The latter enabled the link between the relevant theory and learning design practice and contributed to the collaborative problem-solving process. Secondly, the participants were asked to share their thoughts, opinions or their views related to the literature during the interviews. This type of reflective feedback aimed to include the voice of learning designers—the ultimate end-user—of the research. Lastly, the research culminated as a learning design tool which was shared with participants, to use or adapt as they saw fit and in order to develop the field of learning design (Morales, 2016:158-159).

2.4 Design-based research as research methodology

The goal of design-based research is to create design principles and contribute to theory in such a way that it is relevant and of practical use in collaboration with the intended community (Van den Akker *et al.*, 2006:6-7). Design-based research offers an approach that addresses challenges experienced in education and aims to

provide solutions to these challenges (Reeves & Oh, 2017:334-335). These solutions aim to create interventions that improve teaching and learning which include:

- design principles
- new theories
- artefacts
- practices (Reeves & Oh, 2017:334-335; Van den Akker et al., 2006:8-9).

Reeves and Oh (2017:334-340) conducted an analysis of educational technology research papers from 1989-2014. In their study, they found that many researchers focus on technology as a delivery mode, especially as it relates to the latest technology and not only focuses on the underlying instructional principles. Most of the research conducted, was based on the mode of delivery and indicates a "no-significance result;" a term coined by Russel (cited by Reeves & Oh, 2017:334). Reeves and Oh (2017:334-335) suggest that research aimed at improving educational practice should be a priority. With design-based research, it is possible to create solutions to educational problems while creating an opportunity to learn from the research process (Van den Akker *et al.*, 2006:117). The question that drove this study is indeed pragmatic in nature: What are the considerations which learning designers should take into account during the planning, designing and development of a multimodal learning event, taking into consideration the Cronjé (2006:412) four-quadrant model? A single loop design-based research underpinned the study during the constructing of an intervention in the form of a learning design tool based on the Cronjé matrix (2006:396). The process aimed to create design principles and contribute to theory in a way that was relevant and of practical use in collaboration with the community it intended to serve (Van den Akker et al., 2006:6-7). Figure 2.1 graphically illustrates the two phases followed during this study. They were the (i) *Participatory Action Research phase*, (ii) *Tool Compilation phase.*

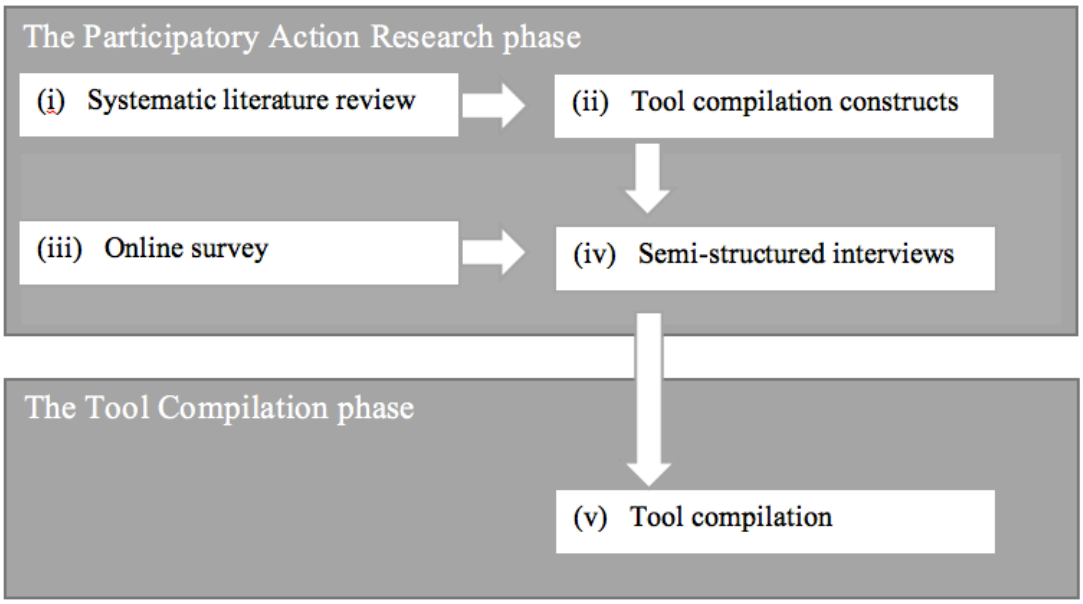


Figure 2.1: Depiction of the two phases of this research

The Participatory Action Research phase aimed to ensure a systematic inclusion of the relevant aspects relating to the research question. It included (i) a systematic literature review in order to ascertain relevant aspects from the literature on the topic; (ii) constructs from the literature to be used in the learning design tool; (iii) 39 modules which were matched to one of the Cronjé (2006:412) four quadrants; (iv) a selection of three participants based on the three quadrants relevant to the study who participated in the semi-structured interviews.

The tool compilation phase included the composing of a learning design tool, in accordance with the participants' input during phase one. Participants will receive the learning tool, with an open educational licence, to use in their professional practice, once permission has been obtained.

2.5 Mixed method research methodology

Mixed method research is a popular research methodology in education, especially in Design-Based Research. This study followed a mixed-method methodology. Various types of designs exist within a mixed-method methodology. Figure 2.2 indicates the Leech and Onwuegbuzie (2009:269) typology used to describe the kind of mixed-method methodology followed. Figure 2.2 is used with permission (§ Addendum 2.1).

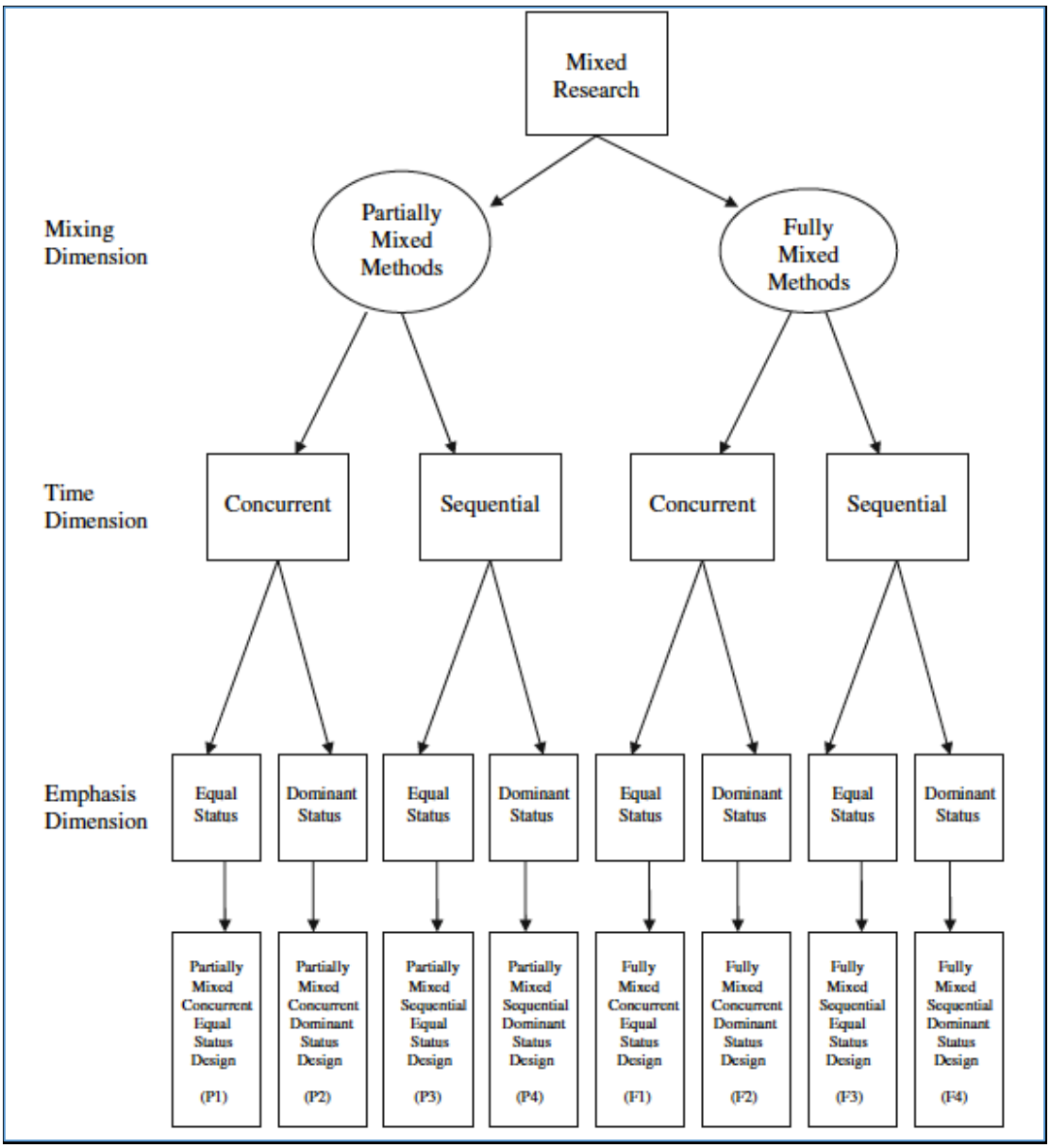


Figure 2.2: Typology of mixed research Leech and Onwuegbuzie (2009:269)

The Mixing Dimension refers to whether a study is fully mixed or partially mixed. A partially mixed-method methodology contains components from both quantitative and qualitative methods, but the emphasis focuses on one phase. In this study, the focus was more on the qualitative stage. The study was thus partially mixed.

The Time Dimension refers to whether the qualitative part of the study and the quantitative part happened simultaneously or in succession. The two phases of my research occurred in sequence. During the first phase, I made use of a quantitative process to plot modules in higher education and subsequently selected the appropriate candidates. In the second qualitative phase, I conducted semi-structured interviews with the three chosen participants.

The Emphasis Dimension refers to the extent that the results from one phase contribute more to answer the research question than the other. In this study, the dominant aspect was the qualitative phase.

In conclusion, the study related to a partially mixed sequential dominant status design (P4).

2.6 Research strategies followed during this study

Research strategies, on their own, could relate to any research paradigm or methodology. By selecting appropriate research paradigms and methodologies, research strategies are formatted according to these choices and assist in collecting adequate data that would assist in addressing the research question. I selected the following research strategies:

- conducting the systematic literature review (§ 2.6.1)
- conducting the quantitative component as an online survey (§ 2.6.2)
- conducting the qualitative component-semi-structured interviews (§ 2.6.3).

2.6.1 Conducting the systematic literature review

The literature review (§ Chapter 1.4 and Chapter 3) established the gap in the literature for this study to address. Firstly, this gap in our understanding relates to how learning designers translate theory into practice (Ertmer & Newby, 2013; Yanchar *et al.*, 2007:335). Secondly, learning designers should know which aspects to consider while deciding on the use of the Cronjé (2006:412) four-quadrant model during the design of learning events in higher education. A systematic literature review ensured that the process was strategic and robust. I consequently compiled a table of concepts to be used during subsequent steps (Table 3.1). A systematic literature review ensured a planned process of sifting through and selecting documents. The procedure followed was based on the Kitchenham (2004:3) Systematic Literature Review (SLR) process:

- planning the review by identifying concepts to be used (§ 2.6.1.1)
- creating a search protocol (§ 2.6.1.2)
- searching for articles (§ 2.6.1.3)
- applying criteria to selected articles (§ 2.6.1.4)
- analysing identified literature with Atlas.ti™ (§ 2.6.1.5)
- compiling an inventory of concepts to be used for the construction of an open-ended interview schedule (§ 2.6.1.6).

2.6.1.1 Planning the review by identifying concepts to be used

The first step of the review was to identify relevant concepts. These concepts would address the research gap. The concepts I selected were the following:

- Learning design to ensure that proper research of the field is selected

- Instructional strategies to include instructional design articles that do not necessarily include the term instructional design in its abstract, and can give some indication of why a particular strategy was selected
- Decision-making to include articles that deal with the planning phase of a learning event
- Learning event to include articles that focus on aspects related to a learning event
- Learning theory and specifically objectivist, behaviourism, constructivism

2.6.1.2 Creating a search protocol

Search strategy

The search strategy included the terms to be used and the number of abstracts I would read before moving on to the next search. I identified specific search terms to use during a dedicated search which would address the relevant research gap. The search terms were used by including an appropriate synonym and by combining two search terms for every search as indicated in Table 2.1. I limited the number of abstracts to be read, per search combination, to the first two hundred. I decided on this number after conducting a test search and realising that relevance started dropping after two hundred.

Table 2.1: Search strategy protocol

Data source	Documentation
Keywords used: synonyms used for concepts	“Learning design” OR “instructional design" “Instructional strategies” OR “instructional method" “Decision making”, “planning” OR “design approach”, “analysis” “Learning experience" OR "learning event" “Learning theory” OR “objectivist”, “behaviourism”, “constructivism”
Keywords used: the combination of search concepts	"Instructional design" OR "Learning Design" AND "Instructional strategy" OR "Instructional method"

Database selection

Subsequently I selected the databases to identify relevant literature, and chose the appropriate databases for the education field available to the North-West University Information Services (Anon, 2017). The recommended databases for the field of education were:

- EBSCOhost
- JSTOR
- SAePublications
- ScienceDirect
- Web of Science
- Scopus

I narrowed the search to only five databases, to enable me to view more abstracts per database, rather than having too much data and not being able to view as many abstracts per database. The selected databases were:

- EBSCOhost (journals included: Academic search premier, Applied science and technology source, Eric, PsycARTICLES, PsycINFO, Teacher reference centre)
- JSTOR
- SAePublications
- ScienceDirect
- Web of Science

Inclusion and exclusion criteria

I decided on the inclusion and exclusion criteria. The selected criteria would focus my search and get the most relevant articles. The study selection criteria relating to my study were articles:

- published in English
- relevant to my research questions by making use of the combination of at least two search terms in the abstracts of articles
- relevant to the higher education context
- published recently, i.e., published from 2007 to 2018
- original research articles.

The exclusion criteria which adhered to this study were:

- article abstracts that contained at least two of the keywords to be deemed relevant to the study
- articles without abstracts
- I excluded non-informative articles.

2.6.1.3 Searching for articles

The following section provides an example of a dedicated search of the literature in my study. I started by selecting the most generally used database, EBSCOhost, and followed a combination of at least two or more search terms with their relevant synonyms (Kitchenham, 2004).

Table 2.2: Example of one search conducted

Data source	Documentation
Electronic database	Ebscohost
Journal searched	Academic search premier, Applied science and technology source, Eric, PsycARTICLES, PsycINFO, Teacher reference centre
Keywords used	Advanced search: “learning design” Field: Abstract; OR “instructional design" Field: Abstract AND “instructional strategy" Field: Abstract; OR "instructional method" Field: Abstract
Limitation:	Published date: January 2007 to December 2017
Database specific limiters	Academic search premier: All, English, Abstract Applied science and technology source: Academic journal, Abstract Eric: Journal article, abstract, English PsycARTICLES: the year 2007-2017, all journals PsycINFO: years 2007-2017 Teacher reference center: years 2007-2017.

I conducted thirteen search combinations in five databases and viewed 13000 abstracts. Many articles that do not have abstracts, especially in the database JSTOR, were excluded. I kept track of the searches I conducted in an excel spreadsheet (§ Addendum 2.2).

2.6.1.4 Applying criteria to selected articles

I made use of the inclusion criteria while searching and only saved articles that were deemed relevant. I kept the relevant articles on my computer in PDF format. I concluded the search, and then I removed all duplicate items. This left a list of 77 articles in an Excel™ spreadsheet (§ Addendum 2.3). I read all these remaining articles to check their relevance to the study. Twenty eight (28) articles were excluded from use as they were not:

- relevant to the indicated period
- relevant to the study
- applicable to higher education.

2.6.2 Analysing of identified literature with Atlas.ti™

The 49 relevant articles were coded using Atlas.ti™ according to the Boeije (2002:391-409) strategy of constant comparative analysis. A code is a word or catchphrase that indicates the essence of a sentence or paragraph. Various types of coding exist, but for this study, I selected descriptive coding. Descriptive coding makes use of a topic to describe a paragraph (Saldaña, 2009:70). I made use of Atlas.ti™, a computer-assisted qualitative data analysis software (CAQDAS), to keep track of my codes and help me draw comparisons. When coding sections of text from

articles, I highlighted quotations to draw comparisons between various themes within single articles and across different articles. The goal was not to re-arrange the data into new themes but rather to show what was learned from the articles, draw comparisons between various pieces of text, discover patterns and then create new insight regarding the subject. I did not compare every single text against each other, but the aim was to do a systematic comparison of data in a systematic manner (Boeije, 2002:391-409).

2.6.3 Compiling an inventory of concepts

After writing the systematic literature report in Chapter 3 (§ Table 3.1), I compiled a list of concepts. I created a table to use in the semi-structured interviews.

2.7 Conducting the quantitative component

The first component in the mixed-method approach was the quantitative phase. The Cronjé (2006:412) four-quadrant model underpinned the theoretical framework of this study. To address the research questions, I first had to place modules within the relevant quadrants. The quadrants are the integration quadrant, construction quadrant, and the injection quadrant. The quantitative component comprised the following aspects:

- research instrument
- sampling of participants
- submitting of surveys to research participants
- survey analysis and interpretation of data.

2.7.1 Research instrument

I selected the research instrument in conjunction with the theoretical framework, the Cronjé (2006:412) four-quadrant model. Kelly Elander created the Objectivist and Constructivist Integration Assessment (OCIA) survey as part of his dissertation for the Degree Doctor of Philosophy (Elander, 2012). The instrument was tested in his study and shown as valid and reliable. Elander (2012:91-94) Reliability was ensured by conducting ‘test-retest’ and ‘alternative form reliability’. The survey was indicated as reliable using ‘Pearson correlation calculations’ (Elander, 2012:91-94). The instrument was designed to be able to map objectivist and constructivist elements of modules to the Cronjé (2006:412) four-quadrant model. In his study, the goal was to determine whether constructivist and objectivist elements co-existed in modules (Elander, 2012). Elander gave me permission (§ Addendum 2.4) to use the Copyrighted OCIA survey tool and provided me with the interpretation sheet. In my study, it was necessary to use the OCIA survey to map modules to specific quadrants. This enabled me to find

participants whose modules would fall in one of the three quadrants: integration, injection, and construction. I set up the selected OCIA survey in Google Forms with easy to select radio buttons Figure 2.3.

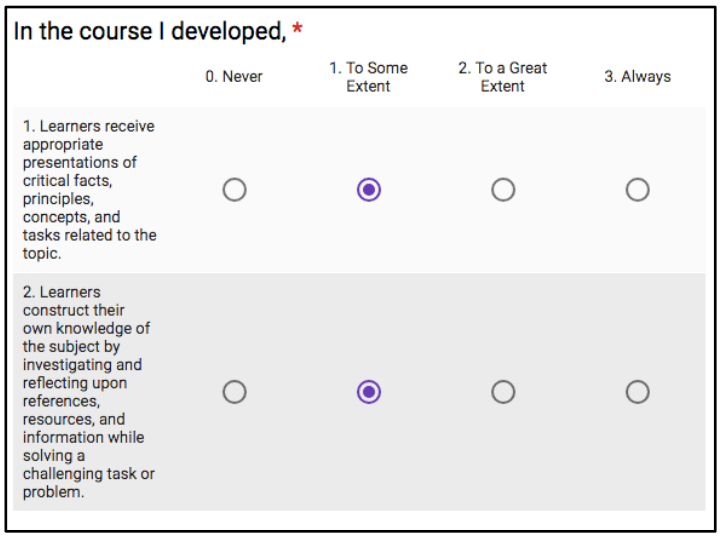


Figure 2.3: An example of the OCIA survey set up in Google Forms

Based on the OCIA survey created by Elander (2012:223-240)

I added a couple of questions beforehand that provided me with specific information related to the participants. For the quantitative phase, I wanted to determine how many years' experience each learning designer had in order to select participants for the quantitative period. I also ensured that the modules were part of a current degree in higher education and not only short courses or professional development opportunities.

2.7.2 Sampling of research participants

Purposeful sampling was used to select the subjects to take part in the study. The study is designed to include participants working in Higher education as Learning Designers. The two groups that I considered were (i) the annual eLearning update conference that is attended by learning designers working in South Africa; and (ii) the annual UP2U community of practice meetings. The learning designers from the UP2U group were selected because they are a community of practice explicitly aimed at the Higher education sector while the e-learning update covers the entire education spectrum from school level to corporate training. The UP2U aimed to foster meaningful relationships among learning designers from South African universities. While the Community of practice was established in 2007 by several

universities, it grew to a forum where all South African Higher education learning designers are welcomed. With a focus on “designing great learning experiences,” the UP2U group provided me with group of learning designers working in Higher education who relate impeccably to my study (UP2U, UP2U). The co-ordinator of the UP2U group permitted me to send out the surveys to the UP2U group and provided me with a mailing list of email addresses.

2.7.3 Submitting the surveys

Each of the group of UP2U learning designers was requested to complete the Objectivist and Constructivist Integration Assessment (OCIA) survey of Elander (2012:223-240) in its online survey format. A request to participate was forwarded to the learning designers on the mailing list of the UP2U group. Most of the emails that I sent out were undelivered, and I assumed university security firewalls blocked them. I decided to send out the survey from my North-West University work email address one by one in order to ensure delivery. Some of the email addresses were no longer current. After two weeks, only nine participants had completed the survey. As a result, I telephoned the participants according to a snowball sampling method. I contacted the learning designers on the UP2U list who work at centres for teaching and learning in Higher education and requested them to ask their colleagues to also complete the OCIA survey. I kindly requested learning designers to participate; I also made it clear that I would understand if they did not want to participate for whatever reason. I did not want to put pressure on learning designers to participate since it is proper ethical conduct (Plowright, 2011:155). Eventually 39 learning designers completed the survey.

2.7.4 Survey analysis and interpretation of data

The survey consisted of statement pairs. An example of these statement pairs can be seen in Figure 2.1. In each pair, one statement indicates a behaviourist element and the other statement indicates a constructivist element. Each of the statements was allocated a score based on the selection of the subject; for example, when a subject selected always, the corresponding score would be three. I made use of the North-West University Statistical Consultation Services to assist in the data analysis. Analysis revealed where each of the 39 modules would lie on the Cronjé (2006:412) four-quadrant model (§ Addendum 2.5).

2.8 Conducting the qualitative component

- Sampling of participants

- Conducting the semi-structured interviews, analysis and interpretation of data

2.8.1 Sampling of participants

Based on the data from the OCIA survey, I selected three modules and corresponding participants. A learning designer involved with the creation of a module from each of Cronjé's relevant three quadrants was selected based on the following criteria:

- At least five years' experience in the field as learning designer
- Designed a module in Higher education
- Learning designer had to be willing to participate in interviews.

I changed the module names to codes to preserve the anonymity of the participants. The modules selected for the qualitative interviews were:

- Construction quadrant: Module ee
- Integration quadrant: Module ll
- Injection quadrant: Module m

Two of the three learning designers were contacted and agreed to participate. I was unable to get hold of the third candidate: Integration quadrant: Module ll. I subsequently selected another module from the Integration quadrant: Module h.

Injection quadrant: Module h

The visual mapping of the modules is available as Figure 2.4.

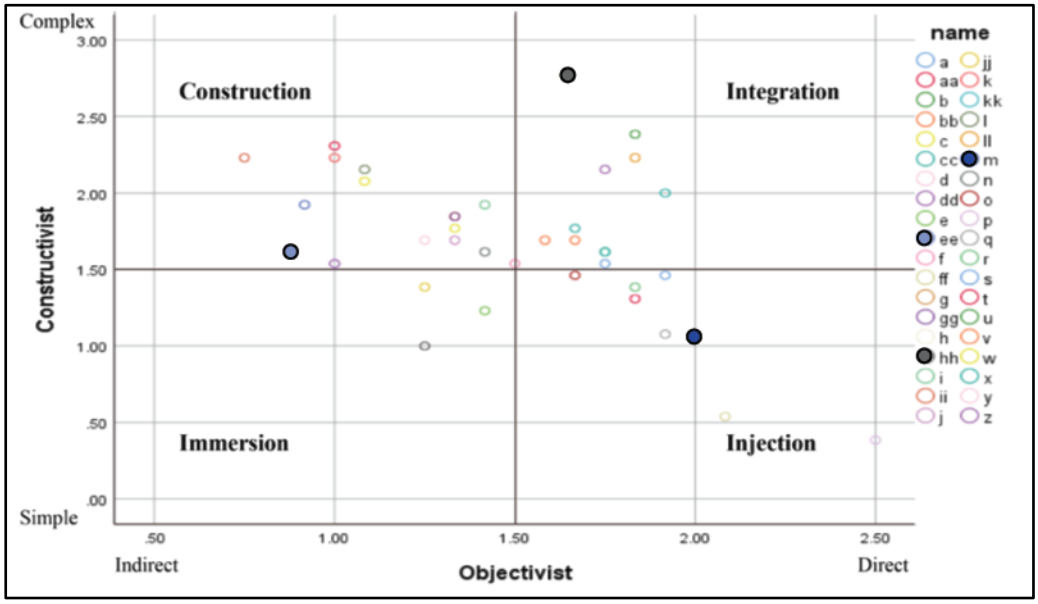


Figure 2.4: Modules visually indicated in quadrants using the OCIA survey, with the three selected modules highlighted.

2.8.2 Conducting the semi-structured interviews, analysis and interpretation of data

I conducted face-to-face semi-structured individual interviews according to guidelines set out by Merriam (2009:170-173). The participants received the tool compilation construct and background to the study several days before the interviews. After the participants had been informed of the process, I received permission from the participants to record their interviews and subsequently use the data in my study (§ Addendum 2.6). Qualitative data were collected using audio recordings to ensure that accurate data were retained. I did not take notes during the interviews to allow me to listen actively to the conversation, direct the conversation to remain focused, and issue prompts when necessary. After the interviews had been concluded I reflected on the sessions and noted any observations and thoughts related to the interview. The meetings were scheduled in succession so that each interview could be transcribed and analysed before moving on to the next interview. The discussions took place in a neutral environment (Merriam, 2009:231). I briefly explained the Cronjé (2006:412) four-quadrant model to each of the participants at the beginning of the meetings by summarising the document that they had received by e-mail earlier the week. The tone of the conversations was friendly and open. The interview protocol can be viewed in the addendum (§ Addendum 2.7).

The interviews were semi-structured and divided into two sections. Section one was related to the decision-making process and aimed to answer the sub-questions:

- In which situation would objectivist elements contribute towards optimal learning?
- In which situation would constructivist elements contribute towards optimal learning?

I asked the participants to keep their specific module in mind and take me through their decision-making process. Making use of a module-specific question enabled me to keep the conversation focused and specific to one of the three relevant quadrants. It also ensured that discussion was based on a first-hand account by participants. Halfway through the discussion, I shared the OCIA results related to the participants' module.

Section two related to integrating elements from both constructivism and objectivism and aimed to answer the sub-question:

- When learning events contain elements from both constructivist and objectivist elements, how would you move from one learning element to the other?

The interviews were transcribed verbatim using Otter.ai software to aid the process. I subsequently analysed these in Atlas.ti™, according to the Boeije (2002:391-409) strategy of constant comparative analysis. Atlas.ti™ enabled me to stay organised and access quotations with similar codes from my literature review. This was done to be able to compare the codes from each literature review with those of the first interview to allow me to interpret the patterns. I then completed the analysis, and this informed the next session. I did not change my interview protocol, but I made changes to my follow-up questions and prompts, depending on the context of the interview. Once the second interview was transcribed, I repeated the process and compared the codes of the two interviews and the literature. The third interview was then conducted and the analysis compared against the first two interviews and the systematic review (Merriam, 2009:170-173). The participant selection process as well as the systematic literature review ensured research rigour. By keeping 'an audit trial' of the data collection, interpretation and analysis ensured that the research findings are trustworthy (Merriam, 2009:223).

2.9 Assumptions and limitations

The systematic literature review was limited to the selected five relevant databases that I had chosen. I worked with the assumption that the OCIA survey that I made use of plotted the learning events correctly. The quantitative phase comprised a tiny sample; only 39 participants completed the OCIA survey.

2.10 Chapter summary

This chapter described the research process followed during the study. As a result of the pragmatic nature of the research question I selected the Burrell and Morgan (1979) functionalist worldview. The functionalist worldview afforded me the choice to address the question in both a quantitative and a qualitative way. From this all the other research decisions could be made. Participatory Action Research was selected as a way to approach the study, with the goal to address the problems experienced by learning designers by researching the link between theory and practice and creating change by improving the issue under research. Next, I selected Design-based Research as research methodology. Design-based Research offers a suitable methodology in the field of learning design because it aims to improve teaching by creating a new artefact or a new design principle, or contribute a new theory. This resonated with the goal of this study. In order to address my sub-research questions, I had to select three research participants who designed modules in the three relevant Cronjé (2006:412) four-quadrant modules. This led me to make use of a Partially Mixed Sequential

Dominant Status Design (Leech & Onwuegbuzie, 2009). The strategies I utilised included a Systematic Literature Review, a quantitative component consisting of a survey and a qualitative component consisting of three interviews. A systematic literature review ensured that the process was strategic and robust. I consequently compiled a table of concepts to be used during subsequent steps. For the next step, the quantitative component, the OCIA survey (Elander, 2012) was used in order to allocate modules to the relevant quadrants of the Cronjé (2006:412) four-quadrant module. For the last step, the qualitative component, I conducted three face-to-face semi-structured individual interviews according to guidelines set out by Merriam (2009:170-173). The interviews were transcribed verbatim and subsequently analysed in Atlas.ti™, according to the Boeije (2002:391-409) strategy of constant comparative analysis.

CHAPTER THREE
STRUCTURED MINING OF THE CURRENT LITERATURE

3.1 Introduction

This chapter aims to describe the mining of the current literature in order to portray the gap in the literature relating to the research question of this study. The main research question which underpins this study was: *What are the considerations which learning designers should take into account during the planning, designing and development of a multimodal learning event, taking into consideration the Cronjé (2006:412) four-quadrant model?* The SLR identified 52 research articles as primary documents. After analysis with Atlas.ti™, 49 codes—eminent concepts—emerged which I grouped according to four themes: (i) epistemological positions, (ii) teaching-and-learning approach, (iii) decision-making and (iv) moving from objectivist to constructivist approach in one learning event. Figure 3.1 depicts the structure of the Atlas.ti™ hermeneutic unit, encompassing the four themes and forty-nine codes.

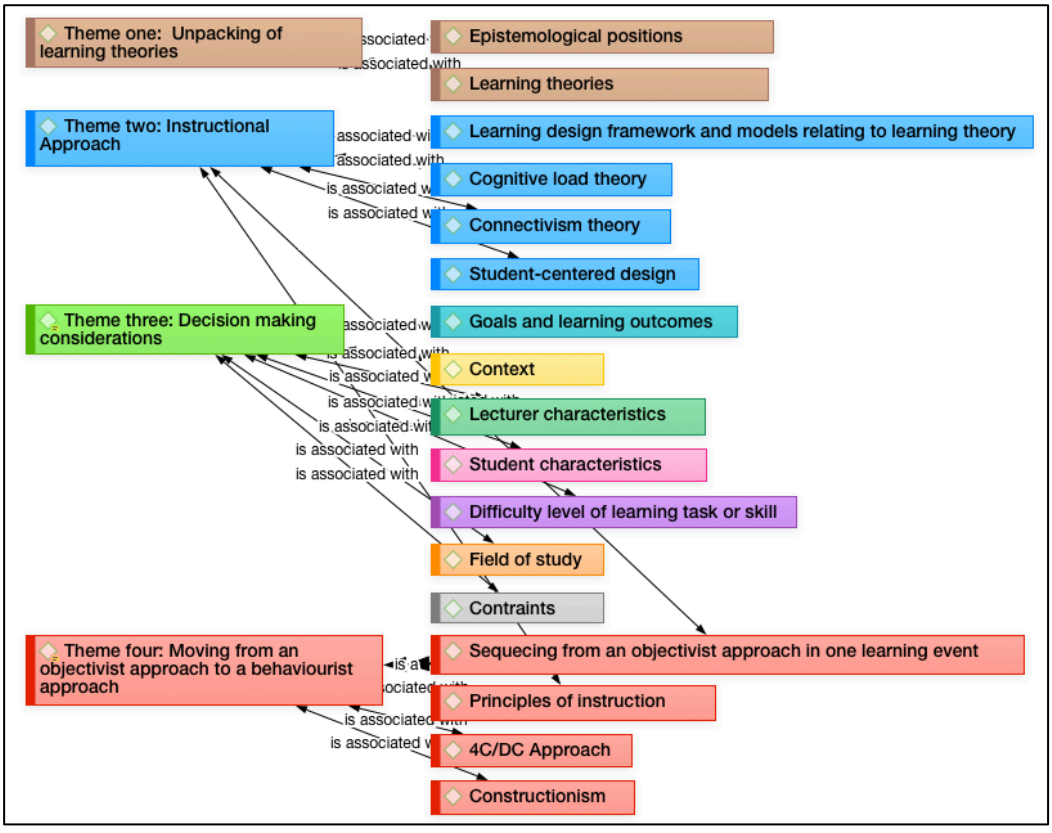


Figure 3.1: Depiction of the Atlas.ti™ hermeneutic network of the selected concepts elucidated from the SLR

3.2 Theme 1: Unpacking of learning theories

The first theme, unpacking of learning theories, explores the epistemological position, learning theory and other closely related elements to learning design. Considering that the Cronjé (2006:412) four-quadrant model is based on a combination of objectivist and constructivist epistemological positions, a logical point of departure was to unpack them, as well as their associated learning theories. In which situation would behaviourist and cognitivist (objectivist) elements contribute towards optimal learning? In which situation would constructivist elements contribute towards optimal learning? As discussed in Chapter One, the elements relevant to each quadrant, Elander (2012) established a list of elements (§ Chapter 1: Table 1.1) relating to each quadrant. The current analysis aimed to uncover a learning design perspective on the strengths of the learning theories in order to make optimal learning possible. Optimal learning is also viewed differently by these various learning perspectives.

Various authors define learning design, and I hereby present a few definitions in order to obtain clarity. Clinton and Hokanson (2012) and Sahin (2009) describe learning design as both an art and a science, as the learning design process contains rational as well as creative aspects. Falconer and Reiser (cited by Brill, 2016:681) define the field of learning design as ‘‘the analysis of learning and performance problems, and the design, development, implementation, evaluation and management of instructional and non-instructional processes and resources intended to improve learning and performance.’’ Massyn and Wilkinson (2014:98) describe learning design as the creation of a learning story. Bannon-Ritland (cited by Brill, 2016:682) argues that similar to other professionals, seeking solutions to complex human challenges, learning design requires collaborative and creative problem stating, framing, and solving. Clinton and Hokanson (2012) and Jonassen (2012:342) describe learning design as an iterative process; it entails interpretation and measurement, imagination and communication, problem solving and finally design judgement. Jonassen (2012:342) contends that decision-making is the most used method of problem solving. From these definitions it becomes clear that learning design covers a broad range of aspects. This study focuses on the problem solving, decision-making and design judgement aspects of learning design.

I address the theme of epistemological positioning through the elucidation of two concepts: (i) epistemological positions and (ii) learning theories.

3.2.1 Epistemological positions

Learning designers should base their design decisions on a theory of learning for them to be effective. The designer should establish a reflective awareness of the various theories that form the foundation of learning design (Bednar et al cited by Aqda *et al.*, 2011:262). Objectivism and constructivism are two epistemological positions that influenced the three main learning theories (Tamim & Grant, 2017:128). Crotty (cited by Clinton & Rieber, 2010:764) clarifies an epistemological position as the socio-cultural nature of knowledge. Objectivism is the belief that the reality we perceive is outside of us, independent of our own interpretation, and in the world (Clinton & Rieber, 2010:764). On the contrary, constructivists suggest that what a person perceives is subject to his own interpretation. Constructivist content, that we construct our own reality in our minds, is therefore how we perceive the world differently (Clinton & Hokanson, 2012).

3.2.2 Learning theories

Learning theory aims to describe the change that occurs in a person as a result of learning. This change in the student, whether it is a change in motor, cognitive or psychodynamic behaviour, is a view of learning shared by all learning theories (Lowyck cited by Tamim & Grant, 2017:128). I will discuss the three main learning theories:

- Behaviourism (§ 3.2.3)
- Cognitivism (§ 3.2.4)
- Constructivism (§ 3.2.5) (Tamim & Grant, 2017:128).

3.2.3 Behaviourism

Learning-design theory came about in the fifties when Skinnerian psychology and behaviourism were the predominant influences on learning theory. Many of the instructional assumptions and characteristics dating from that time period were consequently behaviourist in nature, e.g. computer-based instruction. Behaviourist learning design focuses on pre-selected content, coupled with an instructor, who selected a learning path that would lead to students' acquisition of knowledge (Clinton & Hokanson, 2012:117; Ertmer & Newby, 2013:48-50; Massyn & Wilkinson, 2014:98). Driscoll and Skinner (cited by Tamim & Grant, 2017:128-129) describe behaviourism in learning as a behavioural change following the succession of stimulus, response and reinforcement. Optimal learning from the behaviourist perspective is based on the ability to provide an appropriate answer to behaviour, pre-determined by the learning outcomes. The alignment between stimulus, response and reinforcement is viewed as important since it results in behaviour change (Ertmer & Newby, 2013:48).

Ertmer and Newby (2013:49-50) compiled the following list of elements associated with behaviourism:

> Possible current ID applications are listed in brackets [ ] following the listed principle: An emphasis on producing observable and measurable outcomes in students [behavioural objectives, task analysis, criterion-referenced assessment]. Pre-assessment of students to determine where instruction should begin [learner analysis]. Emphasis on mastering early steps before progressing to more complex levels of performance [sequencing of instructional presentation, mastery learning]. Use of reinforcement to impact performance [tangible rewards, informative feedback.]

The strength of behaviourist learning theory is the ability to explicitly measure performance because it is observable and measurable. From a decision-making perspective, the behaviourist pre-assesses the student in order to establish their skills levels to establish the departure point of learning. The learning path is viewed as an explicit, pre-determined sequence of learning events, which build sequence in a logical order from easy to complex. Sequencing is also an important consideration in the decision-making process. The stimulus-response-reinforcement cycle comprises an important consideration for design decision-making.

3.2.4 Cognitivism

Cognitivists view learning as a mental process that depends on how information is received, organised, stored and accessed from memory. According to Jonassen (cited by Ertmer & Newby, 2013), the focus of learning is on what students know and the way (how) they acquire it. Learning is seen as changes in the state of knowledge. Sweller, (cited by Tamim & Grant, 2017:128-129), contends that because of limited memory abilities, the ability to retain and process information is vital (Ertmer & Newby, 2013). The dominant theory in cognitive psychology is the information processing model. The theory focuses on the type of memory, and the way it processes and encodes information. Ertmer and Newby (2013:52-53) compiled a list of elements associated with cognitivism:

> Possible current ID applications are listed in brackets [ ] following the listed principle: Emphasis on the active involvement of the student in the learning process [student control, metacognitive training (e.g., self-planning, monitoring, and revising techniques)]. Use of hierarchical analyses to identify and illustrate prerequisite relationships [cognitive task analysis procedures]. Emphasis on structuring, organizing, and sequencing information to facilitate optimal processing [use of cognitive strategies such

> as outlining, summaries, synthesizers, advance organizers, etc.]. Creation of learning environments that allow and encourage students to make connections with previously learned material [recall of prerequisite skills; use of relevant examples, analogies].

The strength of Cognitivism is that it focuses on ways to organise information and facilitate the learning process in order to improve encoding, encourage understanding and enhance retention (Khalil & Elkhider, 2016). The learning path is viewed in a manner similar to behaviourism in the sense that sequencing is important, although more emphasis is placed on the student's input during the learning process. When making design decisions, cognitivist task analysis is important.

3.2.5 Constructivism

Bednar et al. (cited by Ertmer & Newby, 2013:55) describe constructivism in learning as creating meaning from experience. Duffy and Cunningham (cited by Tamim & Grant, 2017:128-129) place the focus of learning on "the construction of knowledge with multiple perspectives and with multiple representations, within a social activity." Brown et al. (cited by Tamim & Grant, 2017:128-129) state that for learning to be effective, it should include the following constructs: activity, concept and culture. Clinton and Rieber (2010:764) explain that:

> …constructivism draws heavily on the work of Piaget and Vygotsky and includes the key concepts of social learning, the zone of proximal development, cognitive apprenticeship, and mediated learning (scaffolding).

Ertmer and Newby (2013:57-58) compiled the following list of elements associated with constructivism:

> Possible current ID applications are listed in brackets [ ] following the listed principle. An emphasis on the identification of the context in which the skills will be learned and subsequently applied [anchoring learning in meaningful contexts]. An emphasis on student control and the capability of the student to manipulate information [actively using what is learned]. The need for information to be presented in a variety of different ways [revisiting content at different times, in rearranged contexts, for different purposes, and from different conceptual perspectives]. Supporting the use of problem-solving skills that allow students to go "beyond the information given" [developing pattern-recognition skills, presenting alternative ways of representing problems]. Assessment focused on transfer of knowledge and skills [presenting new problems and situations that differ from the conditions of the initial instruction].

The strength of this learning theory is to focus on transfer of knowledge to a variety of contexts and the development of problem-solving skills. The learning path is viewed as flexible, depending on the context and student. When making design decisions,

constructivist elements should be included, e.g. co-operative learning, discovery learning, self-directed learning, teaching of problem-solving strategies (Clinton & Rieber, 2010:764). These concepts are explained in the following sections:

- Co-operative learning (§3.2.5.1)
- Discovery learning (§3.2.5.2)
- Self-directed learning (§3.2.5.3)
- Problem solving strategies (§3.2.5.4).

3.2.5.1 Co-operative learning

The primary goal of co-operative learning is for groups of students to interact with one another in order to maximize learning. Learning could include aspects like reaching shared learning goals and improving of students' social skills (Guey *et al.*, 2010:111).

3.2.5.2 Discovery learning

Discovery learning is an inquiry-based approach mostly used in a problem-solving strategy. This type of learning is personal and internal. Discovery learning does not imply that no instruction takes place (Kirschner et el and Mayer 2004 cited by Clinton & Rieber, 2010:778). Students organise the learning content to make connections and to discover regularities (Bruner cited by Guey *et al.*, 2010:111).

3.2.5.3 Self-directed learning

Students are expected to make learning decisions by monitoring and regulating their learning. Self-regulated learning applies to all levels of formal learning experiences including Higher education (De Bruin & Van Merriënboer, 2017:2). In contrast to self-regulated learning, which refers to clear behavioural strategies for reaching short-term learning outcomes, self-directed learning is a broad constructivist perspective that refers to students deciding what and how to learn, which end-product will suffice as evidence of the learning, and when the goal has been reached (cited by Clinton & Rieber, 2010). There are two main elements, the goal and the method, that relate to self-directed learning (Candy cited by Clinton & Rieber, 2010). The first element, the goal, addresses the students' ability to self-manage or self-regulate. The second element, the method used, speaks to students' ability to make decisions regarding the learning, without or with assistance of a lecturer (Candy 1991 cited by Clinton & Rieber, 2010). At graduation, students should be able manage their learning and also perceive themselves as responsible life-long students (Blumberg cited by Sze-yeng & Hussain, 2010b:1913). Strategies associated with developing self-directed learning skills in students include assisting with planning and using resources, as well as providing feedback (Brockett and Hiemstra 1991 cited by Clinton & Rieber, 2010:15).

3.2.5.4 Problem solving strategies

Problem-based learning requires students to employ the research process, as it reflects on the process and applies new knowledge to find solutions to problems (Savery cited by Tamim & Grant, 2017). Problem solving encompasses a spectrum ranging from ill-structured to well-structured. Jonassen developed a typology of problems:

> …algorithms, story problems, rule-using, induction problems, decision-making problems, troubleshooting, diagnosis-solution problems, strategic performance problems, policy analysis problems, design problems, and dilemmas, more ill-structured problems, such as diagnosis problems, strategic performance problems, policy problems, and design problems (Jonassen, 2012:342).

Of these problem types, decision-making is viewed as being the type of problem that is encountered most frequently in students' career and is a vital component in other types of problem solving (Means et al. cited by Jonassen, 2012:342).

3.3 Theme 2: Instructional approach

Theme two focuses on a learning-design framework, various learning-design related theories, principles and approaches that could guide learning designers during decision-making. It is important to understand which decision-making tools/guidelines designers should use when the main research question concerns decision-making in the context of planning, designing and developing of learning events.

3.3.1 Learning design framework and models relating to learning theory

Learning design models aim to provide guidelines for the successful design of learning (Reigeluth, 1999b; Reigeluth & Carr-Chellman, 2009 as cited by Tamim & Grant, 2017:129). The ADDIE framework is based on a systems approach. ADDIE is an acronym for the phases Analysis, Design, Development, Implementation and Evaluation. Dick et al and Smith and Ragan are regarded as the creators of the ADDIE-related models (Gustafson and Branch as cited by Clinton & Hokanson, 2012:117). The systematic design of instruction came about in a time when behaviourism was predominant. Behaviourist instructional models typically focus on the instructor as the kingpin of the learning, stimulus-response of practice and assessment, and objective nature of learning. Precision teaching is an example of this type of thinking where students' success is measured through charting the rate of the occurrence of behaviours (Burton, Moore, & Magliaro cited by Tamim & Grant, 2017:129). Cognitivist instructional models assist students during learning through the efficient organising and sequencing of learning (Reigeluth & Moore, 1999; Wilson & Cole, 1991 cited by Tamim

& Grant, 2017:129). An example is Gagné's nine events of instruction which structure the events of instruction in a logical sequence (Tamim & Grant, 2017:129). Constructivist models support learning through creating learning events that focus on collaboration among students in order to find solutions to authentic problems (Jonassen cited by Tamim & Grant, 2017:129). Constructivist models include those of Willis and Wright and Shambaugh and of Magliaro (Clinton & Hokanson, 2012:117). Learning designers opting for constructivist learning design, could use the constructivist model of Jonassen, i.e. the Constructivist Learning Environment Model (Sue, 2010:463).

3.3.1.1 Towards an analysis framework

The role of a learning designer relates to conducting an iterative process of learning decisions (Jonassen, 2012:342). The analysis phase of the ADDIE framework is useful to learning designers to determine the considerations on the table during the planning of learning. During this phase, a design problem is defined and information is collected regarding the context, goals, tasks, the students and constraints (Clinton & Hokanson, 2012:112). The Dick and Carey model analysis comprises:

- performing a needs analysis to identify goals
- analysing the students and the context by establishing the characteristics of the target population and contextualising the characteristics of instructional settings
- conducting an instructional analysis by means of identifying sub-ordinate skills and identifying entry behaviours
- writing performance objectives (Khalil & Elkhider, 2016:150).

The ADDIE framework could be used for both a behaviourist and a constructivist approach. During constructivist learning design, the ADDIE framework is deployed differently (Clinton & Hokanson, 2012:117). Learning designers continuously perform analysis, design, development and evaluation steps with students, reflecting on the process and incorporating feedback. The R2D2 model of Willis and Wright illustrates main differences where learning objectives are not stated at an early stage. Learning designers should stay open-minded and be willing to change their design decisions (Clinton & Hokanson, 2012:117). Clinton and Hokanson (2012) add the design creativity loop to the ADDIE process in their Design/Creativity Loops. They contend that creativity is vital to solving design problems. The analysis phase of the design/creativity loop aims to provide guidelines to overcome design through:

- problem identification
- preparation
- incubation
- illumination
- elaboration and verification (Clinton & Hokanson, 2012:121).

The idea of the concept of creativity is to apply iterative cycles of problem solving to the design problem. The various phases (analysis, design, develop, implement and evaluation) overlap with a creativity envelope, encompassing the entire process. The emphasis on creative problem-solving during learning design is highlighted by this version of the ADDIE model. The Design and Creativity Loops Model of Clinton and Hokanson (2012:121) could be useful when learning designers design learning for any of the quadrants in the Cronjé (2006:412) model, which is not exclusive to either objectivist or constructivist positions.

3.3.2 Cognitive load theory

Cognitive load theory strives to develop instructional design guidelines, aimed at the efficient delivery of information in order to optimise working memory (Sweller cited by De Bruin & Van Merriënboer, 2017:2). This is based on the notion that students' cognitive systems have limited working memory (Cowan cited by De Bruin & Van Merriënboer, 2017:2). New research is available on working memory which is not relevant to information stored in long term memory. In the higher education context cognitive load theory could aid learning designers during their decision-making since it is especially relevant to teaching complex tasks aimed at loading students' cognitive systems (De Bruin & Van Merriënboer, 2017:2):

> Long-term memory holds cognitive schemas that vary in their degree of complexity and automation. Human expertise comes from knowledge organized by these schemas, not from an ability to engage in reasoning with many elements that have not been organized in long-term memory—human working memory simply is not able to process many elements (De Bruin & Van Merriënboer, 2017:2).

In order to develop students into experts, three cognitive-load processes of working memory should be taken into consideration. These processes include intrinsic, extraneous and germane load. The goal for the learning designer is to reduce extraneous cognitive load, manage intrinsic cognitive load, and promote germane load (Khalil & Elkhider, 2016:149). Based on the cognitive-load theory, learning designers should, during the planning of learning, keep in mind the sequencing of tasks, taking into consideration students' pre-knowledge, students' previous experience, as well as the difficulty level of the learning.

3.3.2.1 Connectivism theory

Siemens (cited by Kilfoil, 2008:1019-1021) describes learning as a series of connections between information sources where inquiry skills are more important than memorising facts. The skill is ultimately the ability to identity connections between

fields, ideas and concepts. He argues that learning take place in humans and non-humans. Knowledge rests in the diversity of opinions. Massyn and Wilkinson (2014:97) contend that connectivism could assist with student-content interaction during learning. In certain fields, like industrial design, knowledge updates take place at a rapid pace. By engaging with these various ways of thinking about information, and embedding the thinking in learning design, better understanding of the field of study could be attained (Renda & Kuys, 2015a:16). The principles of connectivism could be useful for learning designers to make decisions pertaining to student-content interaction during learning.

3.3.2.2 Student-centred design

Keeping in mind that we are in the 21st century, learning is not different from any other century since humans still require processing of information and practising of skill in order to learn. However, the amount of information produced and available to students is different. It is therefore important to acknowledge that the learning landscape has changed (De Bruin & Van Merriënboer, 2017:1). This change in the learning landscape results in the need to focus less on the transmission of knowledge and more on development of domain-general skills, e.g. literacy skills and self-directed learning skills (De Bruin & Van Merriënboer, 2017:1). Gauthier (2016:10) states that students should be given an opportunity to give input in the design of learning events for optimal learning against the backdrop of a variety of activities to promote interaction amongst students, between students and lecturers, and between students and the content. Oliver and Trigwell cited by Starr-Glass (2013:1464) suggest that during the design of blended learning environments, the differences between modes of delivery add to student satisfaction due to the variation. A practical application for an instructional strategy based on variation theory would be to provide alternative perspectives from inviting guest speakers, as well as to encourage different views of the subject matter (Gauthier, 2016:7; Starr-Glass, 2013:1467). Student characteristics should be considered during the planning of a learning event (Neumann & Koper, 2010:80). An activity based approach is not new and Vygotsky, Leont'ev, Luria and Engeström have already described it (Mays, 2016:138). In group-learning activities, additional constructivist elements are combined with the activity, for instance cooperative learning and problem-based learning. Group-learning activities are vital in the design of learning events in higher education. These group-learning activities are designed as small-groups work towards a mutual goal (De Hei *et al.*, 2016:34-35). Benefits of group learning activities could include promoting higher-order skills and shared-knowledge construction (De Hei *et al.*, 2016:34-35). The variation theory could be used for decision-making during interaction amongst peers, between students and lecturer(s) and students and content.

3.4 Theme 3: Decision-making considerations

The third theme, decision-making considerations, focuses on considerations for learning designers' decision-making while selecting strategies for learning events. This theme explores the issues which should be considered during decision-making. This theme contributes towards sub-questions one to three: *In which situation would constructivist elements contribute towards optimal learning? In which situation would objectivist elements contribute towards optimal learning?* Furthermore, sub-question three is also explored in theme three. These decision-making considerations include:

- Goals and learning outcomes (§ 3.4.1.1)
- Context (§ 3.4.1.2)
- Lecturer characteristics (§ 3.4.1.3)
- Student characteristics (§ 3.4.1.4)
- Difficulty of learning task or skill (§ 3.4.1.5)
- Field of study (§ 3.4.1.6)
- Constraints (§ 3.4.1.7).

3.4.1.1 Goals and Learning outcomes

When performing an analysis, formulating a learning goal is a major consideration. This is due to facts should not be facilitated the same way as domain-general skills. This will directly impact on selecting corresponding learning (Ertmer & Newby, 2013:60). Objectivists aim to structure outcomes. In order for learning to be effective, specific outcomes cannot be negotiated. Content is pre-specified and sequenced, and the goal of learning is to transfer specific knowledge (De Bruin & Van Merriënboer, 2017:1; Ertmer & Newby, 2013:56-60; MacPhail *et al.*, 2013). By pre-defining the appropriate behaviour of students after completion of the learning content, pre-determined outcomes are vital to behaviourists (Ertmer & Newby, 2013:48). Constructivists, on the other hand, view outcomes as negotiations between lecturers and students in order to establish relevant outcomes. These outcomes are linked to the learning goals, but they are compiled as a joint venture between lecturers and students. Content is also not strictly pre-specified; as a variety of resources relate to the specific learning context. Constructivist goals are therefore to teach advanced processes and domain-general skills (De Bruin & Van Merriënboer, 2017:1; Ertmer & Newby, 2013:56-60).

3.4.1.2 Context

The optimal learning environment where knowledge will be acquired and the skills learned would have to be considered. The context in which learning and assessment will occur and where it will be applied is one of the major considerations in the decision-making process (Ertmer & Newby, 2013:58; MacPhail *et al.*, 2013:102). Constructivism

focuses on placing students in contexts that will likely elicit skills and appropriate processes (Biggs cited by MacPhail *et al.*, 2013:102).

3.4.1.3 Lecturer style

Guidance from experts on subject matter influences learning designer decision-making (Stephen *et al.*, 2010:47). Since lecturers also contribute towards the design of a module, the lecturer and the designer of a learning event is often not the same person. Subsequently, the characteristics of the lecturer should also be taken into account. These may include experience in the domain, as well as knowledge of the domain (De Hei *et al.*, 2016:4). Clinton and Rieber (2010:761) state that in their constructionist course design, they make provision for the different instructional styles of lecturers.

3.4.1.4 Student characteristics

Student characteristics should be considered during the planning of a learning event. Including the student voice in the instructional design process contributes towards the transparency and also empowers the students (Starr-Glass, 2013). MacPhail *et al.* (2013); Sze-yeng and Hussain (2010a:1914) highlight student experiences, needs of the students, students' profiles, demographic information, experiences with the content, technology and students' perception on the roles and responsibilities in an instructional setting:

- student capabilities profile and age
- student needs
- demographic information, culture and language
- experience with content
- participants' perception on roles and responsibilities in an instructional setting.

Student experiences, profile and age

Objectivist elements could contribute towards optimal learning when students' experiences are not at a level where they are able to function in a constructivist environment. For example, when students' self-directed learning is low, objectivist elements could contribute to optimal learning (Massyn & Wilkinson, 2015:63). Likewise constructivist elements could contribute to optimal learning when students' experiences to function in a constructivist environment are at the appropriate level (Massyn & Wilkinson, 2015:63).

Students needs

Students have different learning needs which are linked to where they find themselves in their learning journey. When they have a need for the explanation of objectivist

elements, this need should be met (Massyn & Wilkinson, 2015:63). On the contrary, when students do not need explanation of the subject matter, constructivist elements are better suited for them to build knowledge on their prior experiences through interaction, collaboration, support, or linking of tasks and presentations to real-life experiences (Massyn & Wilkinson, 2015:63).

Demographic information, culture and language

The social context could include language and culture. Taking culture into consideration is important for learning designers as it determines the way people think and regard their themselves (Sahin, 2009:1467). Constructivist elements could contribute to optimal learning where various student viewpoints should be accommodated, keeping the student demographic and related macro environment in mind (Massyn & Wilkinson, 2015:66).

Experience with content

Khalil and Elkhider (2016) emphasize the importance of identifying subordinate skills and entry behaviours of the targeted students. Students' expertise will affect the way they manage their cognitive load. Effective learning design should therefore include information about the students' learning experience with content and prior knowledge. Instruction for beginners will differ from instruction for experienced students due to the "expertise reversal effect" (De Bruin & Van Merriënboer, 2017:3). Objectivist elements could contribute towards optimal learning where students' experience with content is at a novice level. Similarly constructivist elements would contribute towards optimal learning where students experience with content is at an experienced level (De Bruin & Van Merriënboer, 2017:3).

Students' perception on roles and responsibilities in an instructional setting

Students' perception of a learning event is an important consideration. Where students do not value situated cognition, it could be better to start with objectivist elements. When the students do value situated cognition, constructivist elements could be introduced earlier (Massyn & Wilkinson, 2015:63).

3.4.1.5 Difficulty level of a learning task or skill

The difficulty level of the learning or skill is important. Sue (2010:473) argues that in a case-based approach study, students' ability to perform is influenced by considerations such as the prior exposure and knowledge relating to the task. When dealing with basic skills, a behaviourist approach could be a good fit. Basic skills include memorising

facts, discussing or conveying concepts, providing explanations and performing repetitive procedures (Ertmer & Newby, 2013:49-57). Schunk (cited by Ertmer & Newby, 2013:49-52) contends that a cognitivist approach is suitable for learning that involves higher-level skills, e.g. reasoning, problem-solving and information processing—skills not compatible with a behaviourist approach (Ertmer & Newby, 2013:49-60).

3.4.1.6 Field of study

Jonassen (cited by Ertmer & Newby, 2013:57) contends that knowledge acquisition happens in three phases, starting with introductory, then advanced, and finally expert. A consideration conducive to a behaviourist approach includes the knowledge field. Furthermore, structured knowledge domains are linked with a behaviourist approach (Ertmer & Newby, 2013:49-57). Jonassen (cited by Ertmer & Newby, 2013:57) states that introductory knowledge can be best taught from the objectivist approach. The Studio Curriculum was based on the constructivist approach (Clinton & Rieber, 2010:778). These authors view constructionism as a good fit for the creation of artefacts. Decision-making is directly linked to constructivist learning theory, taking into consideration the student and the field of study.

3.4.1.7 Constraints

Constraints are limitations to be considered (Clinton & Hokanson, 2012:112). These could include aspects like budget, environmental or student-need constraints. The macro environment refers to the political and social situation and could constrain learning events. Student-need constraints (technological abilities) and budget constraints could also affect learning. Alternatives should be considered (Massyn & Wilkinson, 2015:66). Constraints related to situated cognition (apprenticeship) could include suitable facilities, adequate resources available, and the selection of an authentic context. In some cases, objectivist elements could be a better solution (Ertmer & Newby, 2013; Massyn & Wilkinson, 2014).

3.5 Theme 4: Moving from objectivist approach to a constructivist approach in one learning event

From the literature, I address sub-question three: *When a learning event contains elements from both constructivist and objectivist elements, how would you move from one learning element to the other?* The fourth theme, moving from objectivist to constructivist approach in one learning event, comprises the following concepts: (i)

Sequencing from objectivist approach to a behaviourist approach, (ii) Principles of instruction, (iii) 4C/DC approach and (iv) Constructionism.

3.5.1 Sequencing from an objectivist approach to a behaviourist approach

Massyn and Wilkinson (2015:97) argue that behaviourist principles should teach "the *what*," cognitivist principles should teach "the *how"* and constructivist principles should teach "the *why*." "The what" refers to facts, "the how" refers to processes and "the why" refers to higher-order thinking. They suggest a transition should be made to a constructivist approach "where initial misconceptions and biases acquired during the introductory stage can be discovered, negotiated, and if necessary, modified and/or removed." So, first teach facts and processes in an objectivist manner; then move to a constructivist approach for higher-order thinking.

3.5.2 Principles of instruction

Merrill (2007:5) describes the principles of instruction as a "cycle of instructional phases consisting of activation, demonstration, application, and integration. All in the context of real-world problems or tasks." Merrill's five levels of application are based on the principles of instruction. He suggests to commence with the facts; then facts combined with demonstration; and then move to application, but still keep information and demonstration, and complete the learning when all the steps have been integrated (Jabar & Albion, 2016:52).

3.5.3 4C/DC approach

A useful model to assist in addressing the research question is the 4C/DC approach. It is based on a system-approach model. In the system-approach model, two aspects are important: (i) Automated processing are those actions that you perform without consciously thinking about it, and strategies relating to these skills (drill and practice). It has close links to objectivist strategies as it requires repetitive strategies like practice and direct feedback. (ii) Controlled processing are those actions that are consciously controlled and which relate to skills which are non-repetitive and are in line with constructivist strategies (elaboration, reflection and scaffolding) (De Bruin & Van Merriënboer, 2017:2).

3.5.4 Constructionism

Constructionism can be viewed as the application of the principles of constructivism. Clinton and Rieber (2010:764) state that in the constructivist environment, students are tasked with creating an artefact which they can share with their peers and then reflect

on the learning. Bers et al. (cited by Clinton & Rieber, 2010:764) propose four basic principles of constructionism:

> Learning by designing meaningful projects to share in the community, using concrete objects to build and explore the world, the identification of powerful ideas that are both personally and epistemologically significant, and the importance of self-reflection as part of the learning process.

In order for students to create artefacts which are personally and epistemologically significant, negotiation regarding the outcomes should take place between the lecturers and students. These outcomes could greatly depend on the lecturers' style and the students' perceptions of the learning goal. Higher education is regulated through external bodies and this often complicates matters. External bodies expect pre-determined structured content and outcomes which are in conflict with constructionist principles (Karagiorgi & Symeou cited by Schultz, 2015:4). Learning designers and lecturers involved in the creation of outcomes in the constructionist quadrant should go about it in such a way that it does not prohibit constructionist learning events (Alkeaid cited by Schultz, 2015:4). Clinton and Rieber (2010:761) are of the opinion that constructionist course design should make provision for the varied instructional styles of the lecturers. They should also make provision for students' foundational skills and knowledge by letting them first acquire team-working experience; ensuring a sound theoretical pre-knowledge, as well as practical skills to create artefacts.

3.6 Chapter summary

The chapter provided an in-depth account of the literature identified, directly related to the research questions, according to the systematic literature of this study. Table 3.1 provides a summary of the themes captured in the systematic literature review.

Table 3.1: Summary of themes captured in the systematic literature review

Decision-making considerations	In which situation would objectivist elements contribute towards optimal learning?	In which situation would constructivist elements contribute towards optimal learning?	How would you move from behaviourist to constructionist elements in one learning event?
Goals or learning outcomes			
Goals/learning outcomes	When learning outcomes are pre-determined When content is pre-specified When the goal is to teach fact Transmission of knowledge (De Bruin & Van Merriënboer, 2017:1; Ertmer & Newby, 2013:56-60)	When learning outcomes can be negotiated and students' goals incorporated When content is not pre-specified When the goal is to teach advanced processes and domain-general skills, such as literacy skills and self-directed learning skills (De Bruin & Van Merriënboer, 2017:1; Ertmer & Newby, 2013:56-60; Massyn & Wilkinson, 2015:65)	
Context			
Context of the learning environment		Emphasis on the identification of the context in which the skills will be learned and subsequently applied (Ertmer & Newby, 2013:58)	
Lecturer characteristics			
Lecturers abilities to facilitate learning	Lecturers have suitable pedagogical and content knowledge (MacPhail et al., 2013:101)	Lecturers have suitable content knowledge and the ability to facilitate students in their knowledge construction, interactive collaboration activities and self-directed learning tasks (MacPhail et al., 2013:101)	
Student characteristic			
Student capabilities profile and age	Students' experiences are not at a level where they are able to function in a constructivist environment, for example when their self-directed abilities are low (Massyn & Wilkinson, 2015:63)	Students' capabilities to function in a constructivist environment are well developed, for example when their self-directed skills (Massyn & Wilkinson, 2015:63)	
Student needs	Students need explanation (Massyn & Wilkinson, 2015:63)	Students build on prior knowledge and experiences by way of interaction, collaboration, support, linking of tasks and presentations to real life experiences (Massyn & Wilkinson, 2015:63)	
Demographic information, culture and language		Students' viewpoints should be accommodated; keeping in mind the student demographic group and related macro environment (Massyn & Wilkinson, 2015:66)	
Experience with content	Students' experience with content is at a novice level (De Bruin & Van Merriënboer, 2017:3)	Students experience content at an experienced level (De Bruin & Van Merriënboer, 2017:3)	

Decision-making considerations	In which situation would objectivist elements contribute towards optimal learning?	In which situation would constructivist elements contribute towards optimal learning?	How would you move from behaviourist to constructionist elements in one learning event?
Participants' perception on roles and responsibilities in an instructional setting	Students do not value situated cognition (Massyn & Wilkinson, 2015:63)	Students value situated cognition (Massyn & Wilkinson, 2015:63)	Students move from newcomer to full participant in a situated learning context (Clinton & Rieber, 2010:766)
Difficulty level of learning task or skill			
Content	Introductory knowledge Jonassen (cited by Ertmer & Newby, 2013:57) Novelty of the task and limited prior knowledge (Sue, 2010:473) Discriminations, generalisations, associations, and chaining (Ertmer & Newby, 2013:49-57)	Advanced knowledge Learning that involves higher level skills for example reasoning, problem-solving and information processing (Ertmer & Newby, 2013:49-57) Constructivist principles should teach higher order thinking (Massyn & Wilkinson, 2015:97)	First teach facts and processes in an objectivist manner; then move to a constructivist approach (Massyn & Wilkinson, 2015:97) The Merrill five levels of application suggest that one commences with the facts; then facts combined with demonstration; and then move into the application side but still keep information and demonstration and finally complete a task where all the proceeding steps are integrated (Jabar & Albion, 2016) Another approach is seen in the 4C/DC model where a series of real-life whole tasks are presented, but the learning event starts with a series of tasks and is supported with information. The tasks become progressively more complex and then move to part task, part practice events. This process is supported by just in time information (Van Merriënboer, 2013)
Field of study			
	When the field of study is highly structured (Kilfoil, 2008:1022)	Fields where students can learn by creating artefacts Field where an authentic ill-structured problem could be solved or through investigation in a project (Clinton & Rieber, 2010:778; Tamim & Grant, 2017)	
Constraints			
Macro environment (political and social situations)	Where macro environment factors constrain the learning event (Massyn & Wilkinson, 2015:66)	Where macro environment factors constrain the learning event (Massyn & Wilkinson, 2015:66)	
Student-need constraints			

Decision-making considerations	In which situation would objectivist elements contribute towards optimal learning?	In which situation would constructivist elements contribute towards optimal learning?	How would you move from behaviourist to constructionist elements in one learning event?
(technological abilities)			
Budget constraints		Where situated cognition (apprenticeship) is possible, taking into account considering the physical facilities Where adequate resources are available and therefore knowledge creation be possible in an authentic context? Where collaboration spaces are available where peers, advanced students and lecturers could interact (Ertmer & Newby, 2013:59; Massyn & Wilkinson, 2014)	

CHAPTER FOUR
STRUCTURED SELECTION OF RESEARCH PARTICIPANTS

4.1 Introduction

This chapter communicates the results of the small-scale quantitative survey phase of the study. The Elander (2012) Objectivist and Constructivist Integration Assessment (OCIA) Survey results indicated 39 modules in one of the Cronjé (2006:412) quadrants. From these results, I selected three modules based on the three relevant quadrants and the participants' years of experience.

4.2 The Objectivist and Constructivist Integration Assessment Survey Results

Elander (2012) developed the Objectivist and Constructivist Integration Assessment (OCIA) Survey© as part of his PhD thesis. The goal of his survey was to allocate modules to the relevant quadrants of the Cronjé (2006:412) four-quadrant model. I submitted the OCIA survey in Google Forms and emailed it to the UP2U group. The goal of the OCIA survey was to map the modules which the participants were responsible for to one of the Cronjé (2006:412) quadrants. I organised the results accordingly as:

- Background of the survey (§ 4.2.1)
- Statistical analysis of the data (§ 4.2.2)
- Objectivist results (§ 4.2.2.1)
- Constructivist results (§ 4.2.2.2)
- Objectivist and constructivist result summary (§ 4.2.2.3)
- Participants correlation to the quadrants (§ 4.2.3)
- Modules plotted to the quadrants (§ 4.2.7)
- Module selection for participation in the qualitative studies (§ 4.2.8).

4.2.1 Background of the survey

The goal of the OCIA survey was to indicate participants' modules in one of the four-quadrants. The OCIA survey comprised 26 questions. Each statement indicated either an objectivist element or and constructivist element. Table 4.1 indicates an example of a statement pair, consisting of an objectivist statement and a behaviourist statement. In order to select participants for the qualitative section of the study, I added questions to the OCIA survey relating to the subjects' experience and the type of institutions where they work.

Table 4.1 OCIA survey example indicating statement pairs

Statement	Never 1	To Some Extent 2	To a Great Extent 3	Always 4
Question one: In the module I developed, students receive appropriate presentations of critical facts, principles, concepts, and tasks related to the topic.			x	
Question two: In the module I developed, students construct their own knowledge of the subject by investigating and reflecting upon references, resources, and information while solving a challenging task or problem.		x		

4.2.2 Statistical analysis of the data

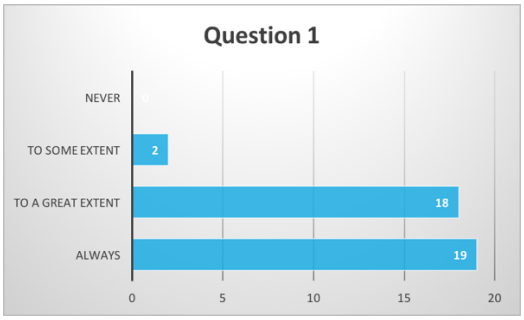
The data were extracted in the form of an Excel™ document, with the assistance of the Statistical Consultation Services with SPSS (IBM). I did not convey results in percentages as this was a small-scale study. Thirty-nine participants completed the survey. I first present the statements indicating the objectivist statement results followed by the constructivist statement results.

4.2.2.1 Objectivist statement results

The objectivist results were obtained from the OCIA survey statements that indicated the objectivist statements. The objectivist statements comprised thirteen questions. The objectivist statement questions, followed by the participant's selected options indicated in words and graphs are presented. With question one, almost everybody agreed, resulting in a mean of 2.44. Question 1 therefore did not contribute towards discriminatory results.

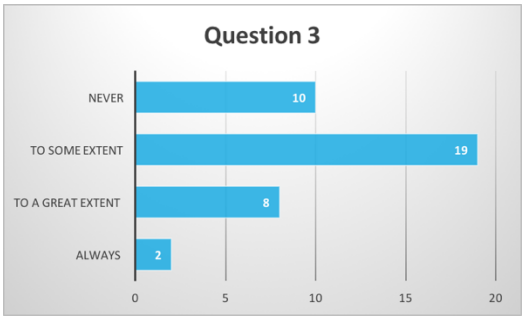
Question 1
In the module I developed, Students receive appropriate presentations of critical facts, principles, concepts, and tasks related to the topic.

- 0 participants agreed
- 2 participants selected the to some extent option
- 18 participants selected the to a great extent option
- 19 participants selected the always option



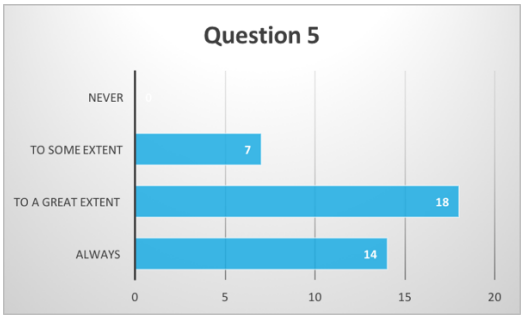
Question 3
In the module I developed, learning does not require the students to have prior knowledge of the subject.

- 10 participants selected the never option
- 19 participants selected the to some extent option
- 8 participants selected the to a great extent option
- 1 participant selected the always option



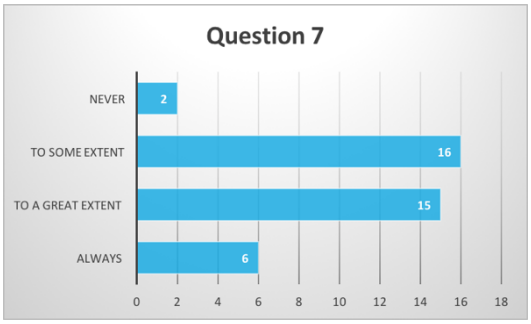
Question 5
In the module I developed, learning tasks, activities, sequences, case problems, and deadlines, are predetermined.

- 0 participants selected the never option
- 7 participants selected the to some extent option
- 18 participants selected the to a great extent option
- 14 participants selected the always option



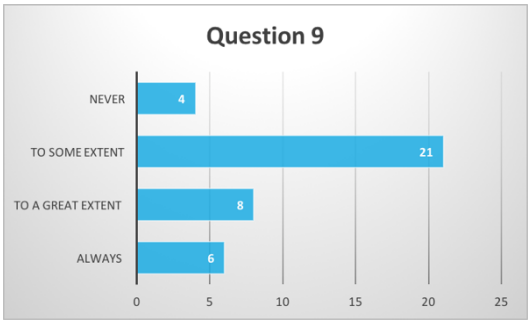
Question 7
In the module I developed, the instructor is responsible for directing and delivering critical subject information.

- 2 participants selected the never option
- 16 participants selected the to some extent option
- 15 participants selected the to a great extent option
- 6 participants selected the always option



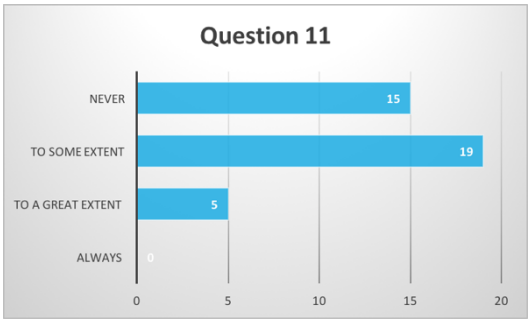
Question 9
In the module I developed, students are extrinsically motivated with recognition, rewards (grades), and/or punishment.

- 4 participants selected the never option
- 21 participants selected the to some extent option
- 8 participants selected the to a great extent option
- 6 participants selected the always option



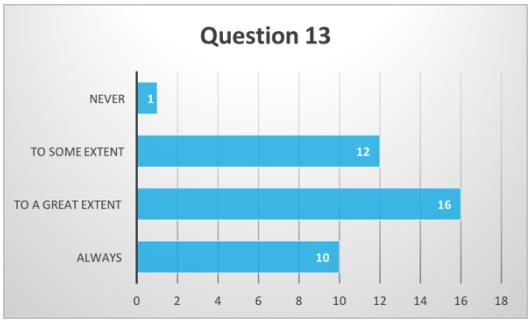
Question 11
In the module I developed, the student is primarily a passive recipient of course information and facts.

- 15 participants selected the never option
- 19 participants selected the to some extent option
- 5 participants selected the to a great extent option
- 0 participants selected the always option



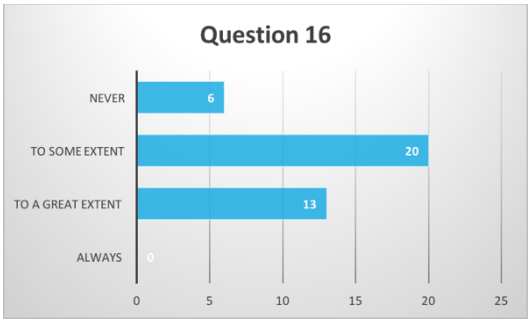
Question 13
In the module I developed, subject information is received through lectures, presentations, media, or demonstrations provided by the instructor.

- 1 participant selected the never option
- 12 participants selected the to some extent option
- 16 participants selected the to a great extent option
- 10 participants selected the always option



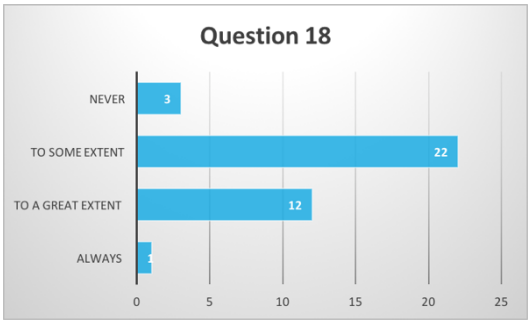
Question 16
In the module I developed, learning focuses on receiving facts, concepts, or principles in academic settings.

- 6 participants selected the never option
- 20 participants selected the to some extent option
- 13 participants selected the to a great extent option
- 0 participants selected the always option



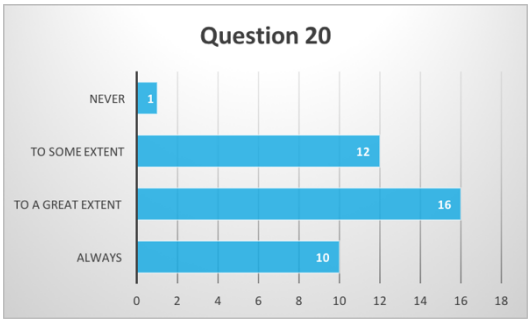
Question 18
In the module I developed, students solve complex problem scenarios where there are specific answers; prescribed solutions; and/or recommended approaches.

- 1 participant selected the never option
- 22 participants selected the to some extent option
- 12 participants selected the to a great extent option
- 1 participant selected the always option



Question 20
In the module I developed, the instructor provides instructions, direction, comments, answers to questions, and feedback throughout the course.

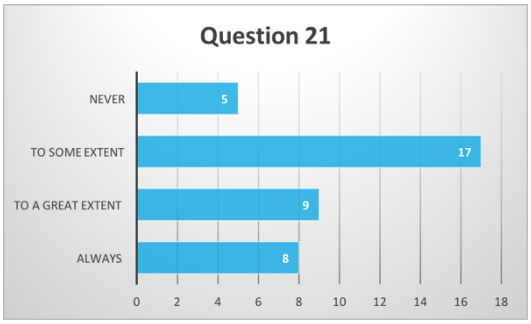
- 1 participant selected the never option
- 12 participants selected the to some extent option
- 16 participants selected the to a great extent option
- 10 participants selected the always option



Question 21

In the module I developed, students receive a comprehensive explanation of the course information in a logical sequence that they are expected to understand and commit to memory.

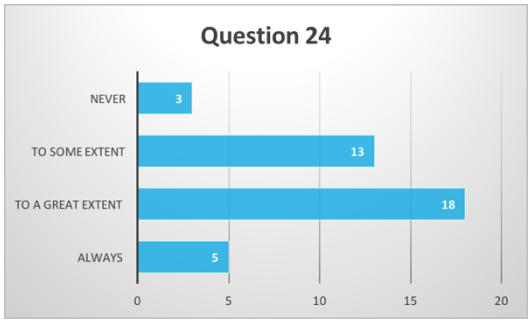
- 5 participants selected the never option
- 17 participants selected the to some extent option
- 9 participants selected the to a great extent option
- 8 participants selected the always option



Question 24

In the module I developed, students—individually or in groups—ask questions of the instructor, who provides clarification or correction to their understanding of the topic

- 3 participants selected the never option
- 13 participants selected the to some extent option
- 18 participants selected the to a great extent
- 5 participants selected the always

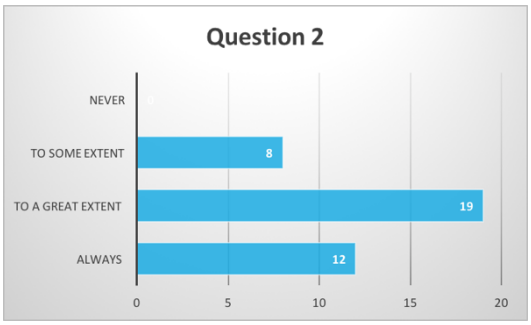


4.2.2.2 Constructivist statement results

The constructivist statements comprised thirteen questions. The constructivist statement questions are indicated below, followed by the participants' selected options indicated in words and graphs.

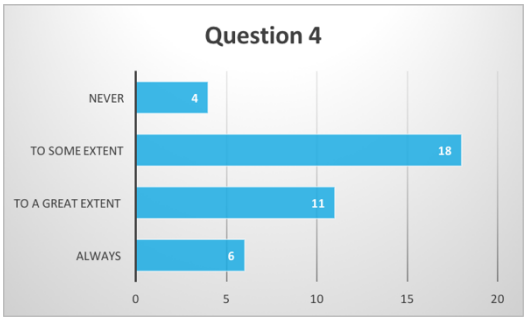
Question 2
In the module I developed, students construct their own knowledge of the subject by investigating and reflecting upon references, resources, and information while solving a challenging task or problem.

- 0 participants selected the never option
- 8 participants selected the to some extent option
- 19 participants selected the to a great extent option
- 12 participants selected the always option



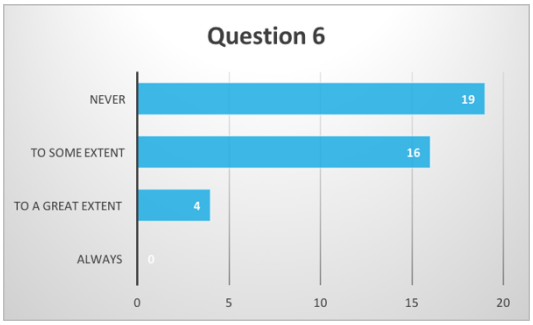
Question 4
In the module I developed, learning relies on using the students' prior knowledge or experience with the subject.

- 4 participants selected the never option
- 18 participants selected the to some extent option
- 11 participants selected the to a great extent option
- 6 participants selected the always option



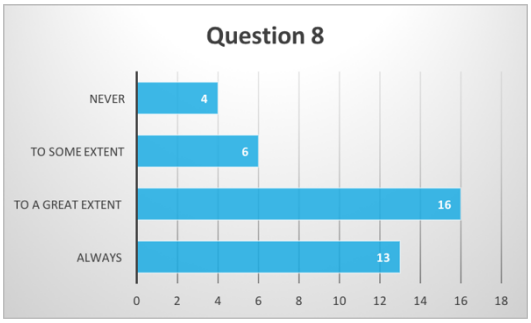
Question 6
In the module I developed, learning strategies, tasks, activities, sequences, and timelines, are chosen by the students.

- 19 participants selected the never option
- 16 participants selected the to some extent option
- 4 participants selected the to a great extent option
- 0 participants selected the always option



Question 8
In the module I developed, the instructor offers support, serving as a resource, for students as students explore the subject.

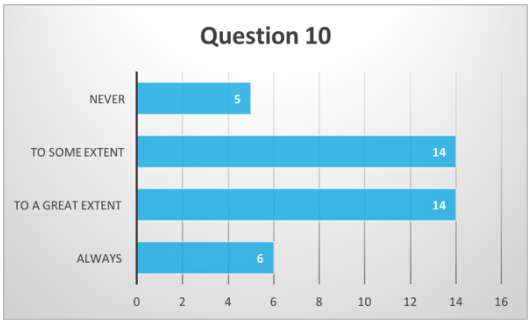
- 4 participants selected the never option
- 6 participants selected the to some extent option
- 16 participants selected the to a great extent option
- 13 participants selected the always option



Question 10

In the module I developed, students motivate themselves intrinsically with their own goals, aspirations, and/or concerns.

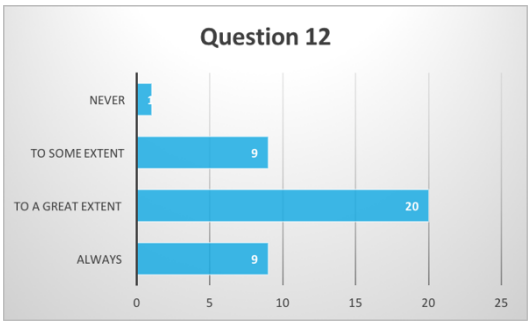
- 5 participants selected the never option
- 14 participants selected the to some extent option
- 14 participants selected the to a great extent option
- 6 participants selected the always option



Question 12

In the module I developed, the students are active builders of their own knowledge of the subject.

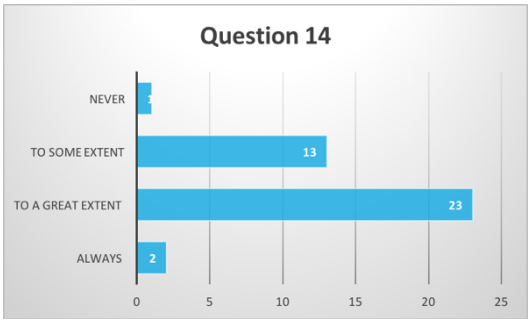
- 1 participant selected the never option
- 9 participants selected the to some extent option
- 20 participants selected the to a great extent option
- 9 participants selected the always option



Question 14

In the module I developed, subject information is uncovered by students as they explore, discover, or experience resources by themselves or in groups.

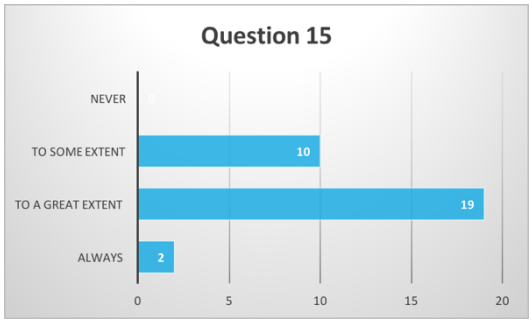
- 1 participant selected the never option
- 13 participants selected the to some extent option
- 23 participants selected the to a great extent option
- 2 participants selected the always option



Question 15

In the module I developed, learning focuses on performing tasks in settings that are, or simulate, 'real world' situations.

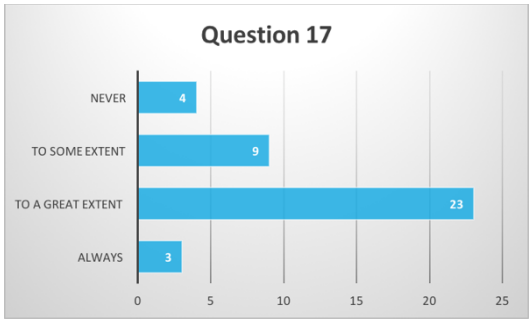
- 0 participants selected the never option
- 10 participants selected the to some extent option
- 19 participants selected the to a great extent option
- 2 participants selected the always option



Question 17

In the module I developed, students are challenged to solve complex problem scenarios that do not have exact correct answers, prescribed solutions, or recommended approaches.

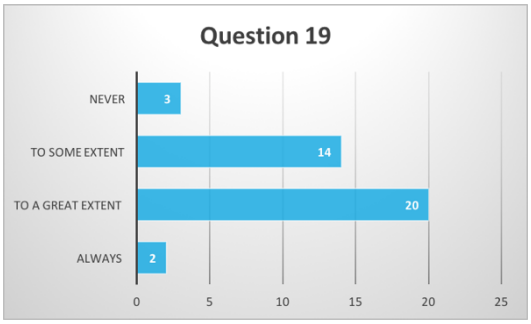
- 4 participants selected the never option
- 9 participants selected the to some extent option
- 23 participants selected the to a great extent option
- 3 participants selected the always option



Question 19

In the module I developed, the instructor provides some initial direction or instructions, then, allows students to determine their own learning approaches.

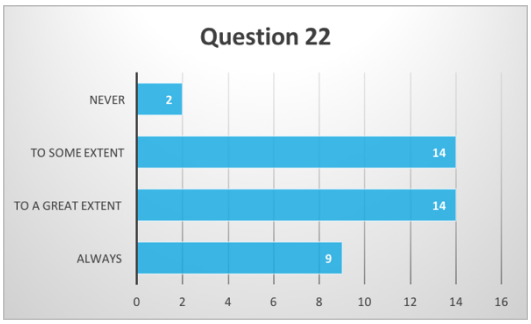
- 3 participants selected the never option
- 14 participants selected the to some extent option
- 20 participants selected the to a great extent option
- 2 participants selected the always option



Question 22

In the module I developed, students are exposed to multiple representations of course information, after which they formulate some useful observations and/or conclusions from their activities and experiences.

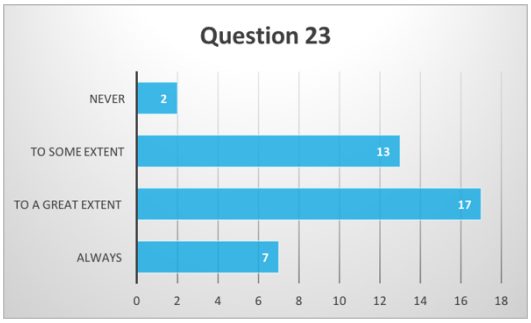
- 2 participants selected the never option
- 14 participants selected the to some extent option
- 14 participants selected the to a great extent option
- 9 participants selected the always option



Question 23

In the module I developed, students express their observations and ideas about the topic to other students, and together they form a collaborative understanding of the topic.

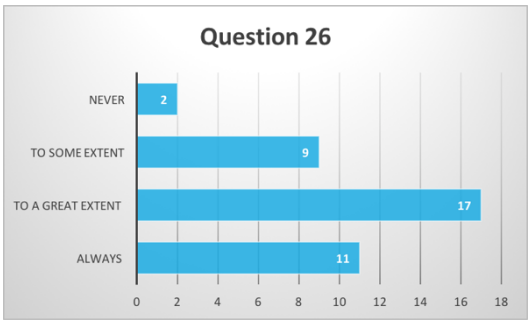
- 2 participants selected the never option
- 13 participants selected the to some extent option
- 17 participants selected the to a great extent option
- 7 participants selected the always option



Question 26

In the module I developed, students show what they have learned by using the processes and experiences from class or outside activities to complete a project, do a presentation, or develop a reasonable solution to a problem.

- 2 participants selected the never option
- 9 participants selected the to some extent option
- 17 participants selected the to a great extent option
- 11 participants selected the always option



4.2.2.3 Objectivist and constructivist result summary

The survey comprised 26 questions. The results relating to Question 1 were not taken into account, because it correlated negatively with objectivism. Therefore, it was not statistically meaningful. The closer the mean is to three, the more the participants agree with the statement. On average the tendency showed that the modules were more constructivist than objectivist with a mean of 1.52 at the objectivist side and a mean of 1.68 at the constructivist side. Table 4.2 indicates Objectivist and constructivist OCIA survey results summary with the mean indicated by M, the Standard deviation indicated by SD and the questions indicated by Q.

Table 4.2: Objectivist and constructivist OCIA survey results summary

Objectivist results							Constructivist results						
	0 N	1	2	3 A	M	SD		0 N	1	2	3 A	M	SD
Q 1*	-	2	18	19	2.44	0.6	Q 2		8	19	12	2,1	0,72
Q 3	10	19	8	2	1.05	0.83	Q 4	4	18	11	6	1.49	0.88
Q 5	-	7	18	14	2.18	0.72	Q 6	19	16	4	-	0.62	0.67
Q 7	2	16	15	6	1.64	0.81	Q 8	4	6	16	13	1.97	0.96
Q 9	4	21	8	6	1.41	0.88	Q 10	5	14	14	6	1.54	0.91
Q 11	15	19	5	-	0.74	0.68	Q 12	1	9	20	9	1.95	0.76
Q 13	1	12	16	10	1.90	0.82	Q 14	1	13	23	2	1.67	0.62
Q 16	6	20	13	-	1.18	0.68	Q 15	-	10	19	10	2.00	0.73
Q 18	3	22	12	1	1.29	0.65	Q 17	4	9	23	3	1.64	0.78
Q 20	1	12	16	10	1.90	0.82	Q 19	3	14	20	2	1.54	0.72
Q 21	5	17	9	8	1.51	0.97	Q 22	2	14	14	9	1.77	0.87
Q 24	3	13	18	5	1.64	0.81	Q 23	2	13	17	7	1.74	0.82
Q 25	3	12	14	10	1.79	0.92	Q 26	2	9	17	11	1.95	0.86
Reliability Objectivist							Reliability Constructivist						
Cronbach's Alpha				0.68*			Cronbach's Alpha				0.86		
Mean				1.52			Mean				1.69		
Standard deviation				0.37			Standard deviation				0.48		

* Question one (Q1) correlated negatively with objectivism and were removed

4.2.3 Participants correlation to the quadrants

The participants were mainly learning designers, although a few academic advisors and one lecturer also participated. The statistician rounded off the subject's year of experience to the closest number (Table 4.3). On average participants had nine years of experience. There was a negative correlation between objectivism and constructivism that is statistically meaningful (r = -0.41*). This correlationindicates that the more constructivist elements a module contained, the less objectivist it was, and the more objectivist it was, the less constructivist it was (r = -413.00**). The more years of experienced participants had, the less objectivist they were. The opposite, however, could not be indicated (r = -0.04*).

Table 4.3: Objectivist and constructivist OCIA survey correlations

Correlations					
			Years of experience	**Objectivist**	**Constructivist**
Spearman's rho	Years of experience	Correlation Coefficient	1.00	-0.41*	0.14
		Sig (2-tailed)		0,03	0.49
		N	28.00	28.00	28.00
	Objectivist	Correlation Coefficient	-0.41*	1.00	-413.00**
		Sig (2-tailed)	0.03		0,01
		N	28.00	39.00	39.00
	Constructivist	Correlation Coefficient	0.14	-413.00**	1.00
		Sig (2-tailed)	0.49	0.01	
		N	28.00	39.00	39.00

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

4.2.4 Modules indicated on the quadrants

The module names were changed to codes to preserve participants' anonymity. Figure 4.1 indicates where the OCIA survey results had placed the modules in the relevant quadrants of the Cronjé (2006:412) four-quadrant model.

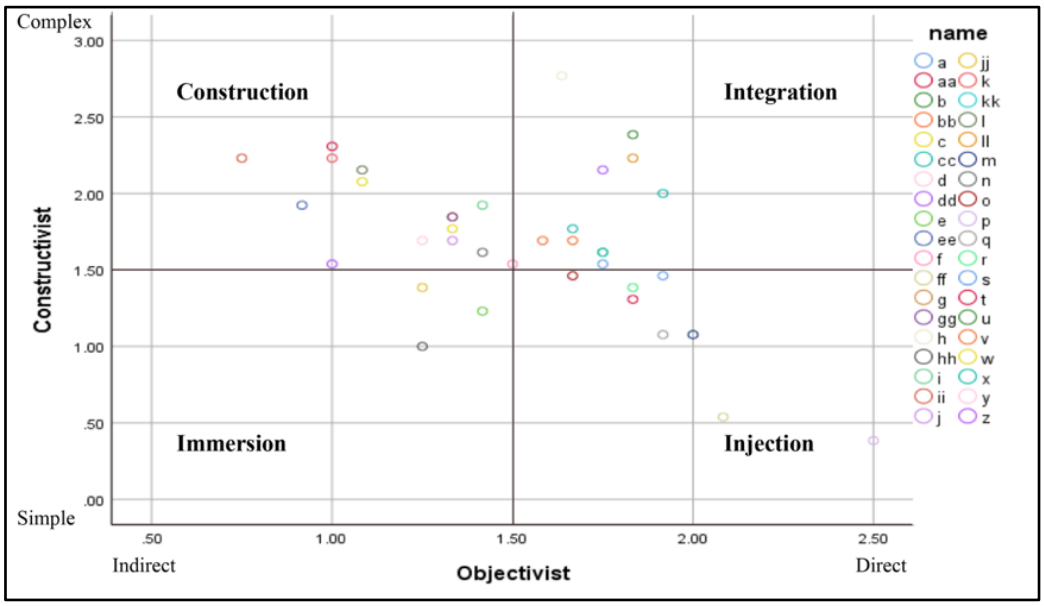


Figure 4.1: Thirty-nine modules indicated on the Cronjé (2006:412) four-quadrant model

4.2.5 Module selection for participation in the qualitative studies

I selected one participant from each of the three relevant quadrants. The characteristics of the selected participants related to:

- indicate five years' experience as learning designer
- employed in the Higher education sector

- be willing to participate in qualitative interviews.

The modules selected for the qualitative interviews are indicated in Figure 4.2. Module ee was selected in the Construction quadrant**.** Module m was selected in the Injection quadrant. Initially Module ll was selected in the Integration quadrant, but after numerous attempts to reach the participant, another module had to be selected. Module h was selected instead, as the relevant mode for the Integration quadrant.

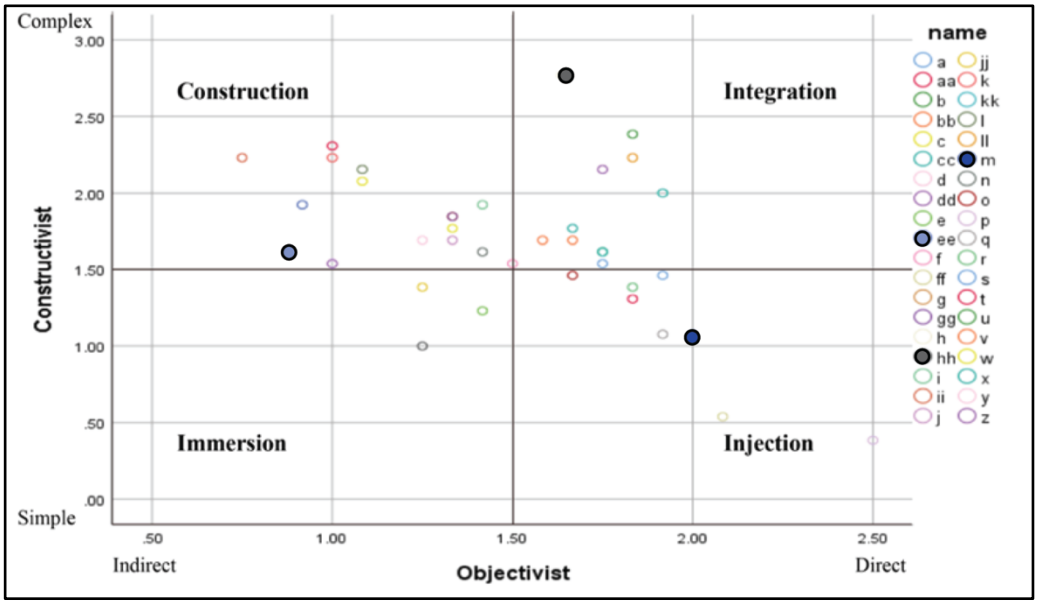


Figure 4.2: The three selected modules indicated on the Cronjé (2006:412) four-quadrant model

4.3 Chapter summary

The goal of the quantitative component of the study was to provide a structured strategy for the selection of participants. The three participants I selected for the quantitative component of the study all had at least five years of experience as learning designers at various institutions of higher education. Interesting correlations: (i) the more constructivist elements a module contained, the less objectivist it seemed; and (ii) the more objectivist elements a module contained, the less constructivist it seemed (r = -0.41*); (iii) the experienced the participants were, the less objectivist they seemed (r = -0.41*).

CHAPTER FIVE
TALKING TO RESEARCH PARTICIPANTS

5.1 Introduction

Using the Cronjé (2006:412) four-quadrant model as theoretical framework, this chapter provides an account of the considerations that guide the decision-making process of learning designers in higher education context. For this research from a qualitative approach, I interviewed three learning designers by means of semi-structured individual interviews as participants. I conducted a content analysis of an integrated data set (Addendum 5.1). Figure 5.1 indicates section one of the qualitative component and Figure 5.2 indicates section two of the study.

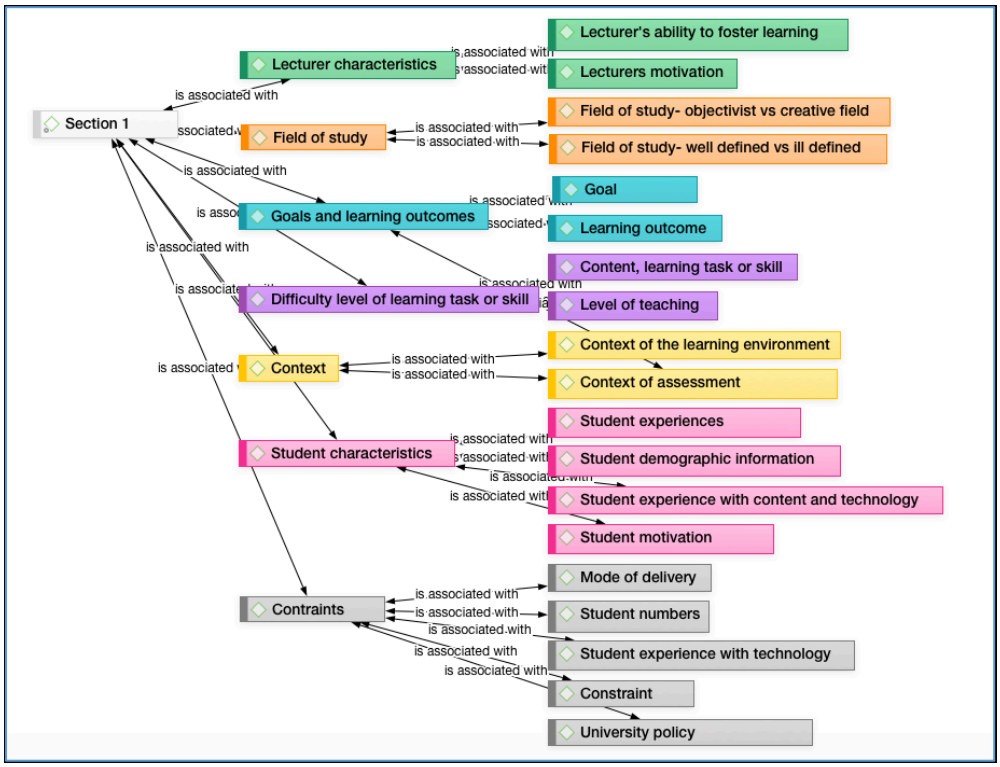


Figure 5.1: Depiction of section one's selected concepts of the Atlas.ti™ hermeneutic network

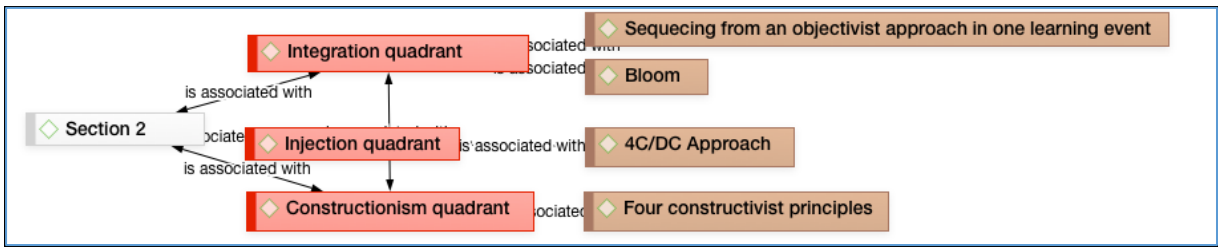


Figure 5.2: Depiction of section two's selected concepts of the Atlas.ti™ hermeneutic network

5.2 Section 1: The decision-making process

Section One dealt with the decision-making process and the considerations associated with a specific quadrant of the (Cronjé, 2006:412) four-quadrant model (Figure 5.3). The three learning designers were: (i) Participant one (relating to the constructivist quadrant), (ii) participant two (relating to the injection quadrant) and (iii) participant three (relating to the integration quadrant). The aim of section one was to address the sub-questions:

- In which situation would constructivist elements contribute towards optimal learning?
- In which situation would objectivist elements contribute towards optimal learning?

Constructionism quadrant Participant one module information	**Integration quadrant** Participant three module information
Field of study: Journalism Year: Honours level	Field of study: Accounting Year: Master's level
	Injection quadrant Participant two module information
	Field of study: Accounting Year: First-year level

Figure 5.3: Cronjé (2006:412) four-quadrant model indicating the three selected participants

Seven considerations emerged from the systematic literature review (§ Chapter Three). The participants received the listed considerations several days before the interviews. I organised the findings of Section One according to the following considerations:

- Lecturer characteristics (§ 5.2.1)
- Field of study (§ 5.2.2)
- Goals and learning outcomes (§ 5.2.3)
- The difficulty level of the learning task or skill (§ 5.2.4)
- Context (§ 5.2.5)

- Student characteristics (§ 5.2.6)
- Constraints (§ 5.2.7).

5.2.1 Lecturer characteristics

This analysis indicated that the following aspects are considerations to consider regarding lecturer characteristics:

- Lecturer's abilities to facilitate learning
- Lecturer's motivation.

5.2.1.1 Lecturers' abilities to facilitate learning

The first consideration which emerged from the literature was lecturers' ability to apply theory-informed pedagogy and their experience-level with the facilitation of learning. Lever-Duffy and Mizell (as cited by Jabar & Albion, 2016:53) advocate the view that despite the context of the 21st century in which we live, lecturers design and develop learning events that facilitate knowledge building for students through well informed pedagogical principles. The participants emphasised the role of lecturers during the design process:

> *We work in support of lecturers [PD53:2].*
>
> *I was pretty much reliant on the lecturers [PD55:28].*
>
> *It was very much dictated by the buy-in from the lecturers [PD55:19].*

A participant argued that learning designers should be flexible in the sense that they should be able to work across various theoretical frameworks:

> *In our environment you need to be flexible, you cannot bring your own theoretical framework to your client's context, you must go into their theoretical framework [PD53:2].*

Another participant indicated that lecturers theoretical influence is a major consideration. He/she indicated that the lecturers are often not aware that they are using objectivist or constructivist elements, but rather that the focus is on applying engaging learning strategies. This is where the working relationship with an instructional designer could guide the selection of an appropriate theoretical framework for a module:

> *The one lecturer was very good, and she drove a lot of it. She was not even thinking behaviourist or constructive. It was just that she had a more creative approach and more engaging approach to the subject matter. I did suggest, especially that that initial text based without sometimes even any assignments, or activities, and activities, that was one thing I found was the lack of understanding that you're not just giving them information. Initially, I mean, this is early days, that it needs to be tested. And that needs to be*

contextualised, and how to apply this knowledge that I think we might have had a bit of influence in from our side [PD54:18].

When establishing the role that suitable pedagogical facilitation principles play in the context of this study, a participant described two obviously different lecturers who interacted on the module with him/her:

There were actually two lectures on the course. The one was, she's a very good teacher, you can see she is very good teacher, the other lecturer is more, I would say, he's more kind of task-focused. If I put it that way. And he is not so much of a teacher really, as a subject matter expert. And I found her development of the course was much more creative than his. It was just facts, facts, facts, facts, and that was the you know, but she, you know, found unique ways of engaging with the students or getting them to do the exercises [PD54:16].

This participant mentioned that the lecturer who was content-driven, introduced behaviourist elements to the course while the lecturer who was "an excellent teacher," introduced additional constructivist elements, like scaffolding, into the module:

Not only think about the one lecture was very much there, the one who's good, a good teacher to say she was more towards the constructivist side, if that makes any sense, in this context. He was more as I say, facts, figures just, you know, give it back to me where she was a bit more, more creative. She actually also helped the students; she scaffolded the students quite a bit in that she would help them to answer theory, questions, say, this is how you do it, analyse this question should analyse the question and demo it and like a whiteboard scenario, things like that. So, they could actually see how to do it. But the scaffolding sort of element [PD54:25].

Another participant advocated the view that as lecturers' experience with facilitating learning increased, further constructivist elements became evident in the module. This was evident from the following quote:

Every year it is different students. It is the lecturer who learns how to do it. And now the lecturer doesn't, she very seldom contacts me for anything because she knows how everything works. And she does the instructional design. She's got the plan, and she knows what works and what doesn't work. And then she goes, now she's independent. But it was high input, in the beginning, holding her hand and encouraging her on, on how to communicate with the student [PD55:55].

The literature review (§ Chapter Three) presented arguments which indicated that lecturers should employ suitable pedagogical and content knowledge in order to impart objectivist elements (MacPhail *et al.*, 2013:101). From these interviews, it could

become evident that lecturers who are content-driven, typically preferred to include objectivist elements which focussed on transfer of factual content. Further, they indicated that lecturers should demonstrate the ability to facilitate students in their knowledge construction, foster interactive collaboration activities and guide their self-directed learning tasks while they interacted with constructivist elements (MacPhail et al., 2013:101). The interviews also indicated that in practise, lecturers were more comfortable to include constructivist elements in their modules as they became experienced facilitators. A specific element of facilitation which emerged, was the ability to provide support by means of scaffolding and communication with students.

5.2.1.2 Lecturer's motivation

The second consideration which emerged from the interviews was lecturer's motivation. Schultz (2015:9) notes that "pedagogy determines what tools instructors will use–technology is just a tool that supports learning." Lecturers' own motivation, and their ability to use technology effectively could prohibit them from engaging with students, especially in distance education modules. This became clear in the opinion of a participant who was tasked with the design of a distance education module:

> *Other lecturers on the program were not as into technology and this young and eager as she was. And they were practically as I will, you know, more interested in their research than spending extra time on this module because they've done it all [PD55:55].*

Lecturers who were not comfortable with certain aspects of module design, would, instead of introducing new elements, keep the modules the way they were. The participant explained how both students and lecturers rejected the use of peer-review as an assessment strategy:

> *It was very much dictated by the buy-in from the lecturers [PD55:19].*
>
> *So halve of the peer review was the lecturer who wasn't happy with or wasn't comfortable with it [PD55:27].*

Similarly, another participant reflected on an incident where the lecturer was hesitant to re-design a module until the internal review process forced him/her to do so:

> *You know, I mean, some of them do plan it out very well. But I think sometimes they need a bit more advice. You know, and also, sometimes lecturers are a bit resistant. I haven't had that experience in any great way, but some of my colleagues have, they will say to them, no I think this way is better, they will resist it, then they will go for internal review, and they will come back [PD54:28].*

Lecturers who were inspired to assist students to become successful after completion of their university studies, strove to include more constructivist elements in their courses. This could be seen in the comment made by a participant:

> *The lecturer must be really open minded and come with fresh ideas. This lecturer is always the when it comes with the ideas, you know. And she says she doesn't want the students to learn the theory that is in the published text books about entrepreneurship, she wants them to come out of there, able to identify an opportunity and go and create the business and do a proper job of it. That's what she wants to do. So it depends on what your outcome is that you personally envisage. If you just want the students to all pass the written exam at the end of the year, you're not going to do all the trouble she's doing [PD55:46].*

I did not include lecturer motivation as a decision-making consideration in my systematic literature review. Several participants pointed out that lecturer motivation influences the design of a module. Subsequently I included it as a decision-making consideration under the heading of lecturer characteristics (Table 4.1).

5.2.1.3 Summary of lecturer characteristics related to the design of a learning event

Lecturers inclined to shy away from constructivist approaches when they displayed insufficient facilitation skills. They rather opted for their tried and tested behaviourist approaches, coupled with a clear focus on a content-driven approach. Lecturers who combined sound pedagogical and content knowledge, opted for more constructivist elements in their modules. Confident lecturers, who had well developed communication and scaffolding skills, leaned towards the constructivist approaches. The association between motivation and knowledge concerned with pedagogy and the sound use of technology became evident. Table 5.1 provides a summary of considerations that relate to lecturer characteristics.

Table 5.1: Constructs relating to lecturer characteristics

Decision-making considerations	In which situation would objectivist elements contribute towards optimal learning?	In which situation would constructivist elements contribute towards optimal learning?
Lecturer's abilities to foster learning	Lecturers have suitable pedagogical and content knowledge (MacPhail *et al.*, 2013:101) Content-driven lecturers are more comfortable with behaviourist elements in a module*	Lecturers have suitable content knowledge and the ability to facilitate students in their own knowledge construction, interactive collaboration activities and self-directed learning tasks (MacPhail *et al.*, 2013:101)

Decision-making considerations	In which situation would objectivist elements contribute towards optimal learning?	In which situation would constructivist elements contribute towards optimal learning?
		Lecturers who seek ways to engage students on a higher level are more willing to add constructivist elements in their modules* As lecturers' confidence level with facilitation increases, especially communication and scaffolding skills, they are willing to include more constructivist elements in their module*
Lecturer's motivation	When lecturers are not comfortable with constructivist elements, they will not include it in the module* When lecturers are pressed for time, they often resort to more objectivist modules* Lecturers' ability to facilitate learning with the aid of technology affects their ability to engage students in distance modes of delivery*	When lecturer's motivation to help students succeed after university increases, they will include more constructivist elements in their module*

* Participant views

5.2.2 Field of study

The field of study (domain) emerged as a significant decision-making factor as it pertained to the Cronjé (2006:412) four-quadrant model. A participant indicated that the field of study employed a major impact on the chosen approach:

> *It depends on the subject [PD54:26].*

From the constructionism quadrant, the certain module's field of study was journalism. Journalism is, by nature, a field where participants should be able to write a story. The year level was in the fourth year. Literature indicates that, in a field of study where students could learn by creating artefacts, a constructionist approach would be best suited (Clinton & Rieber, 2010:778; Tamim & Grant, 2017). Furthermore, literature suggests a constructivist approach when dealing with a field of study where problem solving is important. (Clinton & Rieber, 2010:778; Tamim & Grant, 2017). A participant was of the opinion that even in first-year modules in a creative field, a constructivist approach could be suitable, especially where problems were ill-defined:

> *There are first-year classes in other subjects. Where they do constructivist right from the word go, they do not do behaviourist at all, two of my children did architecture. They walk in there, and they get an ill-defined problem to solve [PD55:32].*

From the Injection quadrant, the selected participant for this study, indicated that an accounting on first year level, included high levels of behaviourist elements. This participant indicated that, this field of study comprised rigid facts and hard concepts. Designers were hence compelled to introduce behaviourist elements:

It's an accounting program. So, it is what it is, that more objectivist type of approach, behaviourist type of approach [PD54:12].

This approach links to the opinion of Kilfoil (2008:1022), who indicated that, in highly structured fields, some behaviourist elements should be included.

Another participant's module related to the integration quadrant. The field of study of this participant related to Accounting on master's level. It was significant to note that both the Accounting modules (injection and integration) contained considerable amounts of behaviourist elements. However, in the postgraduate module comprised both constructivist and behaviourist elements. It seemed that constructivist elements increased as year of learning progressed.

5.2.2.1 Summary relating to field of study

The field of study emerged as a significant consideration for the decision-making relating theoretical frameworks. The interplay between the year of study and field of study became evident. Behaviourist elements seemed to contribute to optimal learning when the field of study was objectivist, highly structured and well defined. Constructivist elements could contribute to optimal learning when the field of study is creative, especially when learning could be promoted by creating. Where problems were ill-defined, learning events should contain more constructivist elements. Table 5.2 provides a summary of considerations that relates to lecturer characteristics.

Table 5.2: Constructs relating to the field of study

Decision-making considerations	In which situation would objectivist elements contribute towards optimal learning?	In which situation would constructivist elements contribute towards optimal learning?
Field of study-objectivist vs creative field	When the field of study is objectivist* or highly structured that makes the field of study more behaviourist (Kilfoil, 2008:1022)	When field of study is creative* especially where students can learn by creating an artefact, introduce more constructivist elements (Clinton & Rieber, 2010:778; Tamim & Grant, 2017)
Field of study- well defined vs ill-defined field	When the field of study is well defined*	When problems are ill-defined; the learning event would contain more constructivist elements*

* Participant views

5.2.3 Goals and learning outcomes

The Dick and Carey model (cited by Khalil & Elkhider, 2016:150) provides a clear indication of what should be considered during an analysis phase while considering

goals and learning outcomes of learning modules. They suggest the identifying of goals, conducting instructional analysis, analysing the characteristics of the students, and getting to know learning context during the compiling of learning outcomes (Khalil & Elkhider, 2016:150). My findings relate to:

- Goals
- Learning outcomes.

5.2.3.1 Goals

Overall goals of degrees and of subsequent modules are essential for consideration by learning designers. In HEI especially in the South African context where poverty is a high concern, the goal of graduate studies should enable students to find work after completion of their studies:

> *You write a really valuable applied competency-based outcome that will equip the student for immediate workplace readiness upon graduation [PD53:3].*

The needs of the market should be determined by determining the type of jobs which are available to graduates by engaging with external stakeholders:

> *If you take a job advertisement and there is a list of kind of requirements for that job, that is pretty much where you need to start your outcomes from, you have to curriculate towards achieving those outcomes because that is what the market is looking for. So you should probably achieve that by engaging with your stakeholders and finding out from different employers what it is that this qualification need, so that you can curriculate towards what the market needs [PD53:1].*

Mays (2016:142) indicates that it is crucial to include other affected stakeholders when deciding on the learning goal. He posits that when the aim of the module is to nurture self-directed students, some implicit goals should be identified. For degree programmes, goals are grouped according to particular module goals, e.g. how goals relate to the teaching of specific facts or competencies. A participant was of the opinion that the teaching of facts is most efficiently achieved through objectivist elements, while learning through constructivist elements would take longer:

> *If it is simply about acquiring facts instructionism is more efficient, it gets you there quicker with no waste of time. You get to the outcome, you are to the point, you are prepared for the exam and everything what the constructivism does is it focuses on the process and not on product so instructionism focus on the product and not on the process. We look at the facts, we learn the facts and we get it done [PD53:10].*

The participant continued by stating that the teaching of advanced processes, i.e. curating information, was most effectively achieved through constructivist elements. Despite the general perception that a constructivist learning environment seemed disorganised, constructivist learning prepared students for lifelong learning:

> *With constructivism you look at the process of acquiring knowledge to be able to find knowledge and we integrate it and we make it our own and it is not efficient and it is messy and you get confused understandings and you negotiate it but that prepares us for continued learning where there is no instructor available so the constructivist learning is really important even more on the factual basis, the ability to curate knowledge and to understand fact from fiction and that kind of thing is really important [PD53:10].*

5.2.3.2 Learning outcomes

Learning designers often encounter modules which have already had learning outcomes formulated. Pre-set outcomes limit the extent to which learning designers could influence the learning approach of the module:

> *These are accredited courses, you know, they've got to stick to what the outcomes are, you know, they're given that there's no real, I won't say there's, there's no leeway to play around a little bit with the outcomes, but they have to follow obviously, that that particular structure [PD54:7].*

In some cases, pre-set learning outcomes prohibits lecturers to negotiate local learning outcomes with their students:

> *There are certain fixed things. So it's going to be more behaviourist in some ways [PD54:3].*

In some cases, it was possible to adapt learning outcomes:

> *I had wonderful ideas. I wanted to start to with proper alignment between outcomes, and learning material, teaching and assessments. So that is more or less very much what my ideal for redesigning was. So, we started with trying to formulate the outcomes properly [PD55:1].*

Learning designers often used taxonomies, e.g. Bloom's taxonomy, to assist them while writing learning outcomes (Neuman & Koper, 2010). Bloom's taxonomy could be useful to determine when a learning event related to a constructivist or an objectivist approach. When learning outcomes on the lower levels of Bloom's taxonomy related to remembering, understanding and applying, then objectivist elements could be more evident:

> *If you use Bloom's taxonomy as an illustration of knowledge being accumulative, it is exactly that, so the instructionism works well when you get to the initial introduction to the learning areas [PD53:20].*

This is especially true in rapidly changing fields, e.g. the field of information technology. Some facts could be outdated by the time students graduate. Graduates should become well developed self-directed students, or they wouldn't keep up with the fast changing market-place:

> *The life of knowledge is like a year and a half in a certain area. That means you start in you first year and by the time you reach your third year, you graduate and 60 percent of everything you have learned has become outdated. Now you can go away and the lecturer is gone and everything you know is outdated so if you haven't learned how to learn you are lost. So for that reason, that is important even on the lower order cognitive levels, to engage with factual knowledge to get people through that process of sourcing information and validating information and that is why I am a constructivist fan because it adds agency to the student and prepares the student for lifelong learning. I don't think instructionist does it that well [PD53:10].*

Renda and Kuys (2015b:17) made a connection between the importance of the learning outcome and the "half-life" of knowledge. Learning outcomes should be updated in order for the module to stay relevant. They propose that learning outcomes should be in line with market needs. While this is not always possible, it is vital to teach students to become self-sufficient by becoming self-directed students. According to a participant, the this could be accomplished by also including constructivist elements in fact-based modules:

> *Constructivist learning is really important even more on the factual basis, the ability to curate knowledge and to understand fact from fiction [PD53:10].*

> *It is important even on the lower order cognitive levels, to engage with factual knowledge to get people through that process of sourcing information and validating information and that is why I am a constructivist fan because it adds agency to the student and prepares the student for lifelong learning. I don't think instructionist does it that well [PD53:10].*

> *It adds agency to the student and prepares the student for lifelong learning [PD53:14].*

Referring to the Cronjé (2006:412) four-quadrant model, there should be fusion of behaviourist and constructivist elements. In the case of working with learning outcomes where the emphasis was on the lower levels of Bloom, more behaviourist elements should be used, although constructivist elements should also be important. Conversely, when a learning event related to the higher levels of Bloom, constructivist elements would contribute to optimal learning. A participant points out that there is a natural progression from Bloom's lower to the higher levels. He further explains that the only

way students could develop higher-order skills (analysis, evaluation and creation), was by incorporating constructivist elements:

> *If you move into the higher-order cognitive level, it is no longer appropriate, it simply doesn't work, then you need to flip over to constructivist learning, not flip over, it is the only way you can actually operate on that level, so there is actually a very natural progression from fact based direct instruction to knowledge construction, either individually or negotiated understanding type of thing, through social constructivist learning [PD55:10].*

Constructivist elements contribute to optimal learning when content was not pre-specified, when learning outcomes were negotiated, and when students' goals were incorporated. Several participants mentioned that Bloom was not useful for compiling a constructivist approach. Learning outcomes should be negotiated with the students according to their learning needs:

> *Let's talk about the skills that they need, because they're smart, they're master students, they have to go and work out there in industry, work related skills that go with knowledge about financial management, what must they produce in their job must they write? Must they talk, must they present? Must they have computer skills, Excel, all these things. Let's bring it put it all on the table [PD55:3].*

A participant mentioned the South African Qualifications Authority's (SAQA) Level Descriptors for the National Qualifications Framework (NQF) as an alternative to Bloom's levels when creating learning outcomes:

> *I started working towards using level descriptors in framing applied competency based outcomes, in our environment there is a bit of resistance, because we still want to Bloom, but I am trying to get them off Bloom and into level descriptors, and then you write a really valuable applied competency based outcome that will equip the student for immediate workplace readiness upon graduation [PD53:18].*

This participant also indicated that the level descriptors are better suited when creating competency-based outcomes:

> *On the higher order cognitivist levels, direct instruction is not always possible and having said that I am not a fan of Blooms taxonomy. It is a knowledge domain taxonomy and it forces you into some really bad practices, assessment practices. It is the reason why we have written exams because we use Blooms Taxonomy, because that is what Blooms taxonomy almost forces us into and that is why I want to move away from Blooms Taxonomy into the Level Descriptors and using Level Descriptors as a basis [PD53:10].*

It is beyond the scope of this study to analyse the various taxonomies appropriate to creating learning outcomes. It is important to keep in mind that the learning outcomes would influence the way behaviourist and constructivist elements will be used in a learning event.

5.2.3.3 Summary of decision-making consideration related to goals and learning outcomes

The goal of a module should have links to the demands of the marketplace. When a module intended to teach student specific pre-selected facts, behaviourist elements would contribute best to learning. However, when the pre-selected facts are likely to change rapidly, constructivist elements should be considered. Also, when the objective of a module was to develop students advanced processes and domain-specific skills, constructivist elements would best contribute to learning. Learning outcomes were, in some cases, pre-determined or not pre-determined. When learning outcomes were pre-determined and indicated lower-order thinking outcomes, objectivist elements were best suited. Furthermore, when the content was fixed, objectivist elements should be considered (Table 5.3).

Table 5.3: Integrated constructs relating to goals and learning outcomes

Decision-making considerations	In which situation would objectivist elements contribute towards optimal learning?	In which situation would constructivist elements contribute towards optimal learning?
Goals	When your goal is to teach fact and convey knowledge (De Bruin & Van Merriënboer, 2017:1; Ertmer & Newby, 2013:56-60)	When facts in the specific learning domain change rapidly* When your goal is to develop advanced processes and domain-general skills, such as literacy skills and self-directed learning skills*
Learning outcomes	When learning outcomes are pre-determined and lower-order thinking needs to be developed (remember, understand, apply)* When content is pre-specified*	When learning outcomes can be negotiated and students' goals incorporated* When content is not pre-specified (De Bruin & Van Merriënboer, 2017:1; Ertmer & Newby, 2013:56-60; Massyn & Wilkinson, 2015:65) When higher-order thinking should be cultivated (analyse, evaluate and create)*

* Participant views

5.2.4 The difficulty level of the content, learning task or skill

This analysis indicated that the following aspects were considered:

- Content, learning task or skill
- Level of teaching

5.2.4.1 Content, learning task or skill

The aspect of behaviourist learning, as opposed to constructivist learning, differed related to content, learning task or skill. Behaviourist approaches focused on delivering content-driven facts and subsequently the application of facts, while constructivist approaches focused on developing of higher-order problem-solving and reasoning skills through the process of creating artefacts. Ertmer and Newby (2013:57) indicate that behaviourist elements were best suited to introductory knowledge in contexts where tasks were unfamiliar to the students. In such instances, the students had limited prior experience related to the content or task. A participant added that, for the cognitive domain, one had to commence with introductory facts, foster knowledge for a basic understanding of the content before one could advance to higher-order skills, e.g., critical thinking:

> *You cannot start with NQF level seven learning interactions and content on the higher-order without covering the introductory facts of the discipline type of thing as well, so you need to be aware of the nature of learning, of the accumulative nature of learning. You don't start with the critical thinking of stuff, you start with the basic understanding, basic knowledge and it builds up into the ability to think critically about something [PD53:30].*

A behaviourist approach is suited to students who have inadequate pre-knowledge relating to specific content. Van Merriënboer (2013:157) states that novice students should not be introduced to complex learning since the cognitive load on students would be too high. You focus more on key concepts rather than specific facts and allow the students to create artefacts or to solve problems in an authentic environment. One participant presented arguments that solving a problem linked to a real-world scenario would increase the students' comprehension of facts:

> *Instead of simply giving them you know, facts and figures, give them an actual scenario of real world scenario, and get them to actually figure it out themselves, you just give a certain amount of information [PD54:7].*

In an authentic environment, the goal should be to simulate the real world as closely as possible (Ertmer & Newby, 2013:57). However, a participant rightly pointed out, this was not always viable:

> *It is not always a practical thing so we need to moderate that theoretical ideal to what is workable in our context. Given there are always two considerations in terms of access, so there is the physical access, we want everybody to be able to come to university but you want everybody to have a very real rich authentic learning experience. Those two things are a little bit conflicting, so we need to find out how authentic we can make the learning experience and*

assessment and while still giving as many people access to it. The more you move in the direction of authenticity the more expensive it becomes and the more contrived you are and the further you get away of authenticity the cheaper it becomes [PD53:16].

The financial and practical implications of an authentic learning environments are elaborated on under constraints (§ 5.2.7).

5.2.4.2 Level of teaching

In South Africa, NQF levels indicate the year level of teaching. Mays (2016:137) points out that the NQF levels are progressive to the cultivating of learning goals to encourage self-directed students. The participants referred to the level of teaching as an essential decision-making consideration. A participant expressed the pragmatic view relating to student numbers and the year level:

The problem with a first year BCOM, where these students begin, they are 1700 students in each of the subjects.

You can do that in a Masters class of I think there's 17 to 20 [PD55:31].

Another focused on the content aspect of the year-level, indicating that on first-year level, behaviourist elements were necessary:

You cannot start with NQF level seven learning interactions and content on the higher-order without covering the introductory facts of the discipline type as well [PD53:30].

Correspondingly, another participant indicated that on PhD level, the learning would contain only constructivist elements. He/she mentioned that there were exceptions to this rule, for example, in Natural Sciences students work on pre-determined projects:

I think many PhD studies are more in the constructionist quadrant, in other words constructivist. The exception is Natural Sciences where laboratory work is in progress and the project is already in place, students get pre-determined projects [PD56:1][2]

It is evident that many considerations played a role in the decision-making process of learning designers and that some of these influence one another. In this particular case the year level and field of study are linked.

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[2] *Ek dink baie PhD studies kwalifiseer ook vir hierdie kwadrant, en is dus suiwer Constructivist. Die uitsondering is Natuurwetenskappe met baie laboratoriumwerk waar die projek klaar aan die gang is en hulle net vooraf-afgebakende ondersoeke bylas.*

5.2.4.3 Summary relating to the difficulty level of the learning task or skill

As noted, it was important to establish the difficulty level of the learning outcome, learning task or relating skill to be attained. When the students had no previous knowledge of the content or experience relating to the learning task or skill, behaviourist elements would contribute towards optimal learning. In addition, a behaviourist approach was also suitable when the focus of the module was on discriminations, generalisations, associations, and chaining. Similarly, the year of study played an important role when the students had no pre-knowledge of the task or content, behaviourist elements to be introduced.

Contradictory, when the students did have previous knowledge related to the content, or experience related to the learning task or skill, constructivist elements would contribute towards optimal learning. For instance, when teaching advanced knowledge, one would want to develop higher level skills. Accordingly, the higher the year of study, the more constructivist elements should be present. Student numbers were mentioned in relation to the year-level. However, I considered this to be a constraint, and thus included it in the constraint section (§ 4.2.7).

Table 4.5: Constructs relating to the difficulty level of the learning skill or task

Decision-making considerations	In which situation would objectivist elements contribute towards optimal learning?	In which situation would constructivist elements contribute towards optimal learning?
Content, learning task or skill	Introductory knowledge Jonassen (Ertmer & Newby, 2013:57) Novelty of the task and limited prior knowledge (Sue, 2010:473) Discriminations, generalisations, associations, and chaining (Ertmer & Newby, 2013:57)	Advanced knowledge (Ertmer & Newby, 2013:57) Learning that involves higher-level skills, for example reasoning, problem-solving and information processing (Ertmer & Newby, 2013:57)
Level of teaching	Consider the year of study, when the students had no pre-knowledge of the task or content, then include behaviourist elements*	Consider the year of study; the higher the level of teaching, the more constructivist elements should be present*

* Participant views

5.2.5 The consideration related to the learning event context

The context where learning will take place relates to a pragmatic consideration. This is especially important when deciding how many behaviourists or constructivist elements to include. This analysis indicated the following contextual aspects:

- Context of the learning environment
- Context of assessment.

5.2.5.1 Context of the learning environment

The learning environment becomes significant when considering constructivist elements. In a constructivist learning event, it is important to simulate a real-world situation closely. Ertmer and Newby (2013:57) posit that it is important that the context in which skills would be obtained, is identified and analysed. They further emphasise identifying the needs of the work context. A participant indicated that the closer the learning experience mimics real life, the more effective the learning experience:

> *Given there are always two considerations in terms of access, so there is the physical access, we want everybody to be able to come to university but you want everybody to have a very real rich authentic learning experience. Those two things are a little bit conflicting, so we need to find out how authentic we can make the learning experience and assessment and while still giving as many people access to it. The more you move in the direction of authenticity the more expensive it becomes and the more contrived you are and the further you get away of authenticity the cheaper it becomes. So, the model that we have where someone stands up, lectures and then you have a written exam, it is a really cheap way so you have great physical access but you have very small epistemological access and so that is the kind of tension between those two extremes. So, we need to get as close as possible to authenticity, whilst still making an economically viable proposition [PD53:28].*

As a consequence of mimicking real-life situations, authentic learning environments could be feasible. However, authentic learning becomes expensive. It is therefore important to analyse the context and adopt a realistic vision of pragmatic and financial constraints. The closer the learning content mimics authenticity, more constructivist elements are required.

5.2.5.2 Context of assessment

As with the context of the learning environment, the context of the assessment emerged as an important pragmatic consideration. The participants indicated a process of constructive alignment between the outcomes, the learning environment and the assessment:

> *I had wonderful ideas I wanted to start to with proper alignment between outcomes, and learning material, teaching and assessments. So, that is a more or less very much what my, my ideal for designing, redesigning was. So, we started with trying to formulate the outcomes properly [PD55:1].*

Depending on the context of the learning outcomes, its assessment could comprise either behaviourist or constructivist elements. While authentic assessment is ideal in

modules high in constructivist elements, it may not always possible. A participant explained the problem of authentic assessment by using an example from engineering at his/her institution:

> *So, that is tricky in our context because authentic assessment is not always economically viable. So, if I am going to tell you, you are studying engineering right, so you have to be able to build a bridge. So, your assessment's about building a bridge, so it is not always a practical thing so we need to moderate that theoretical ideal to what is workable in our context. Given there are always two considerations in terms of access, so there is the physical access, we want everybody to be able to come to university but you want everybody to have a very real rich authentic learning experience. Those two things are a little bit conflicting, so we need to find out how authentic we can make the learning experience and assessment and while still giving as many people access to it. The more you move in the direction of authenticity the more expensive it becomes and the more contrived you are and the further you get away of authenticity the cheaper it becomes [PD53:16].*

Assessment plays an important part in HEI learning. Behaviourist assessment is quick and effective and this provides the reason why it was evident in so many modules. However, in addition to testing the cognitive abilities of a student, authentic assessment has additional benefits as it also assesses other competencies. Clinton and Rieber (2010) explain how they implemented assessment in the *Studio Experience* module as part of a constructionist learning project. In the Studio Experience module, the focus was on assessing constructivist elements, where students had to create artefacts. Students wrote their own learning goals and these were used as an assessment tool for the artefact. Behaviourist elements were also assessed during an oral exam which assessed according to competent or not yet competent. The knowledge part of the assessment could be repeated until a pass mark was obtained. Unfortunately, many assessment practices at different institutions prohibited this type of assessment. A participant described an example of such a limiting assessment practice in the module he/she designed in the online marking system as a dictated behaviourist approach:

> *The constraints of you know, the marking systems, the schemes and such as well, there are certain requirements that the students have to meet, obviously [PD54:20].*

Some summative exams dictate, in most cases, that behaviourist elements are used. It is, however, it remains important to include some constructivist elements:

> *There's a little cartoon I use when I do the lectures, it is the kids sitting in front of somebody interviewing them, he says what experience do you have?*

Tests, I can do tests, and I mean, I've had the experience myself at university many, many years ago [PD54:35].

This participant also indicated the importance of the context in which the skills were evident. Even in a theory-based module, the students should understand how theory is linked to practise.

5.2.5.3 Summary of the decision-making considerations related to the context

The literature review and the participants indicated the significant role the context plays in decision-making processes. This is not only true for the context of the learning environment, but it is also important to consider the context where the knowledge or skills will be applied. It is important to match the learning experience as closely as possible to the needs of the work environment. The closer the learning matches the authentic learning experience, the more expensive education delivery becomes. When deciding on the inclusion of constructivist elements, consider whether the work context could be translated to the learning environment. Assessment strategies should also be considered during the analysis phase of a module. On the one hand, while the assessment of behaviourist elements is affordable and underpinned by most electronic marking systems, assessing constructivist elements could be costly and difficult to implement. However, including constructivist elements into modules could lead to the assessment of performance-based competencies that could prepare students to feel ready for the place of work (Table 5.5).

Table 5.5: Constructs relating to the learning event context

Decision-making considerations	In which situation would objectivist elements contribute towards optimal learning?	In which situation would constructivist elements contribute towards optimal learning?
Context of the learning environment	Authentic learning experience is not always possible–cost/practical The more authentic, the more expensive it becomes*	When the context in which the knowledge would be applied could be translated to the learning environment (Ertmer & Newby, 2013:58)
Context of assessment	When the main focus is on knowledge or when a behaviourist approach is dictated by assessment practices, some online marking system makes the assessment more behaviourist *	When the main focus is on assessing performance and not knowledge. Keep in mind the cost, and practicality should also be considered*

* Participant views

5.2.6 Student's characteristics

This analysis indicated that the following aspects are considerations to consider regarding lecturer characteristics:

- Student experiences
- Student needs
- Demographic information
- Student experience with content and technology
- Student motivation.

5.2.6.1 Student experiences

The systematic literature review indicated that student experiences should be considered. One of these experiences were self-directed learning skills. When students have insufficient self-directed learning skills, they will not perform well in a largely constructivist environment. On the contrary, when students' self-directed learning skills are well developed, constructivist elements could be introduced (Massyn & Wilkinson, 2015:63). A participant suggested that a single student could display varying levels of self-directed learning skills and modules should therefore be designed accordingly. He suggests that, for a self-directed student, minimalist design could be possible, and that a highly structured learning is required to enhance the learning experience for students who are low in self-directed learning skills:

> *I do acknowledge that not everybody is equally fluent in self-directed learning so some people need more support and some people need really strong scaffolding some people can just carry on their own and we need to acknowledge that. So, my thinking is that you do design for two extremes. So, you design for the person who is entirely capable of self-directed learning and that is a very minimalist design. So, you tell the person what is the outcome what the assessment criteria is and what the rubric is and how it is going to be used and you leave them alone. Nothing more than that, nothing more is necessary, they will figure it out. But then there is that student that is going to get lost when you do that. So, for them, you have a very rigid, I don't want to say rigid, but a very rigid learning interacting where you've plotted out using a lesson plan template that goes step by step-by-step type of thing, and as people get used to that process of knowledge acquisition you can withdraw the strong scaffolding. So, you can support the process of acquisition, you can withdraw the strong scaffolding [PD53:11].*

From this scenario, students' self-directed skills are developed as they move from a predominantly behaviourist to a predominantly constructivist approach.

5.2.6.2 The learning needs of the students

Massyn and Wilkinson (2015:63) present arguments that emphasise that the needs of students an important consideration during the decision-making. When students require much explanation, additional behaviourist elements in a module would lead to optimal learning. One participant explicitly stated that age did not play a role in this decision, but that levels of student experience should be considered:

> *I don't think we've really ever thought about that we are picturing I think when we think first year, I mean, we did consider that there would be professional students who didn't necessarily have a qualification, people with a lot of experience, we did consider that, but I don't think we consciously thought age wise; we were thinking more in terms of experience, I think that was more what we were thinking off [PD54:15].*

When students had adequate prior experience in the field, their needs would be different, and constructivist elements could lead to optimal learning.

5.2.6.3 Demographic information of the students

Demographic information emerged as a decision-making consideration. When using a fact-based approach, ensure that the context of the examples used in the module, matches the student context. Therefore, knowing the context of students is important during a behaviourist approach to ensure that the examples used in the modules resonates with the specific students:

> *It couldn't be South African, text, which is what they would normally teach in the module. For example, so you had to have that more generic approach and, you know, make sure that you weren't being too South African. It had to be it. That's why it's called BCom international accounting, because there has to be that that global approach [PD54:14].*

Massyn and Wilkinson (2015:66) argue that including constructivist elements would contribute to optimal learning, keeping in mind the student demographic and related macro environment. A participant indicated that in a constructivist learning environment, the demographic information is of less importance because every student could contribute his/her viewpoint to the discussion:

> *All we have to do is to tell people what it is that people have to learn and how we are going to know that they have learned it and then you can leave them alone. And when they do need help we can support the process that is actually all you need to design and when you do that you pass agency to the student; when you do that you open up curricula to different knowledge systems being brought into the learning conversation so that the decolonisation conversation to that extent goes away, because anybody can*

come and bring their own knowledge into the conversation, you know it is not pre-determined by me and what you need to know, you can come and prove to me that you have met the outcome so it requires an assessment flip [PD53:31].

Constructivist elements would contribute to optimal learning where various student viewpoints should be accommodated.

5.2.6.4 Students' experience with content and technology

Gauthier (2016:1) argues that even students with pre-knowledge of the specific content, may struggle to build new knowledge. Therefore, it is of vital importance to know which content the students have attained. Clinton and Rieber (2010) explain that they recently made changes to the curriculum in order to avoid students entering into a constructivist environment without the necessary pre-knowledge. They add that in the past, these students could voluntarily choose to enrol for a behaviourist-based module that would prepare them for the subsequent constructionist module. After the change, the behaviourist module was no longer optional, but compulsory. The reason behind this change is to ensure that students were better prepared for the constructionist Studio Experience module. This example proves that students, without previous experience with content and technology, should rather enrol for a module that contains predominantly behaviourist elements, before entering into a constructionist environment. It is interesting to note that one participant mentioned that students could have ample experience, even though they are first years. Some of the students enrolled for a first-year level should be working with experienced professionals:

I think when we think first year, I mean, we did consider that there would be professional students who didn't necessarily have a qualification, people with a lot of experience, we did consider that [PD:54:15].

Another consideration emerged related to students' experience with technology. Czerkawski and Lyman (2016:535) indicate that students' technological abilities will influence the mode of delivery they choose, e.g. when students perception towards technology is positive, they are likely to enrol for online studies. Learning designers should consider students' access to technology and their experience level with technology:

I sent out a questionnaire to the students about what do they have access to in terms of computers and internet? And where do they use the internet for studies, at office or at home, or equally here and there. And that was a very interesting thing to see. Some of them practically halve the class said, they work on the Internet at the office after hours, which means very early in the morning, or late in the afternoon so they miss the traffic [PD55:5].

When students have limited technological abilities, it is advisable to include behaviourist elements, in order for them to grow their confidence for constructivist elements:

> *You use the computer for that, let they drill, if it's mathematics and grammar they have to drill these things to get it in you don't want to drill them in a classroom you get the computer program and let them drill themselves. And you monitor their progress and see how they're making progress. And if they need more time for that, you tell them okay you have to spend more time on this and you cannot continue until you reach that level because you are going to get stuck [PD55:35].*

When students are at a level where they can use technology to create artefacts, it is an indicator that they are ready for a constructionist environment. Keep in mind that technology, in this sense, is not limited to the digital environment:

> *And then the computer at the at the higher levels it's dependent on what the student does with it, you know, you can build a model on a computer or a middle model from cardboard and wire and what have you. And I've seen all of them in my children's studies and around here and, what medium you use to express your, your unique view of this application now it works it doesn't matter. And I think the students will gravitate towards using technology and they like making videos and presentations with colour and movement and things rather than a paper portfolio. But I think one shouldn't be prescriptive, they can use where they feel they can express themselves what they want to express So it's you telling the computer what to do in behaviourist and the student telling the computer what to do in constructivist [PD55:35].*

The student level of experience is also discussed under Constraints (§ 5.2.7).

5.2.6.5 Student motivation and perceived value of the learning event

Massyn and Wilkinson (2015:63) indicate the extent to which students value situated cognition as a valuable learning experience. When students do not value situated-cognition or other constructivist elements, it could be conducive to include behaviourist elements:

> *Very soon it came these students don't want to do peer review, they are just not going to do it, finished. I said okay, skip the peer review, you just give them individual feedback [PD55:6].*

Another motivational issue is students' perception of learning versus simply getting the grade in order to get the degree. A participant indicated that students are often driven by grades instead of a desire to learn:

Rather that it's driven by a willingness to learn wanting to learn desire to live, curiosity, one would like that. But unfortunately, it doesn't always work [PD54:46].

However, Gauthier (2016:4) indicates that when students understand the connection between the content and the application in the place of work, an increase in motivation to perform better and improve their skills could be expected.

5.2.6.6 Summary of student's characteristics as it relates to the decision-making process

A number of important decision-making considerations emerged from this analysis. All things considered, it is important to remember that the considerations, especially those pertaining to student characteristics, should not be viewed in isolation. In the first place when students' experiences are not yet at a level where they could function in a constructivist environment, additional behaviourist elements would contribute to optimal learning (Massyn & Wilkinson, 2015:63). Likewise, when students' experiences to perform in a constructivist environment are well developed, constructivist elements could contribute to optimal learning (Massyn & Wilkinson, 2015:63). In the second place, the needs of the student proved an important consideration. When students require extensive explanations, then include behaviourist elements. Contrary to this, when students build knowledge on prior experiences by way of interaction, collaboration, support, linking of tasks and presentations to real life experiences, constructivist elements would contribute to optimal learning (Massyn & Wilkinson, 2015:63). Thirdly, demographic information was shown as a consideration during decision-making. This relates to the student context and is important to establish the context of students when including behaviourist elements. It is important to include the viewpoints of multiple students when considering constructivist elements (Massyn & Wilkinson, 2015:66). Fourthly, students' experience with content and technology will influence the use of behaviourist versus objectivist elements. Where students' experience with content and technology is low, behaviourist elements could be included (De Bruin & Van Merriënboer, 2017:3). It is important to consider the level of experience of students. Some students could have relevant experience, even though they do not have a degree. When students' experience with content and technology is at an advanced level, constructivist elements are suited (De Bruin & Van Merriënboer, 2017:3). And in the fifth place, student motivation would influence their ultimate participation in a learning event. When students are driven by assessment and not curiosity, they could refuse to participate in certain activities, e.g. peer-assessment. When students do not value situated cognition, behaviourist elements could contribute

to optimal learning. When students value situated cognition, constructivist elements could contribute to optimal learning (Massyn & Wilkinson, 2015:63).

Table 5.6: Constructs relating to student characteristics

Decision-making considerations	In which situation would objectivist elements contribute towards optimal learning?	In which situation would constructivist elements contribute towards optimal learning?
Student experiences	Students' experiences are not yet at a level where they can function in a constructivist environment, for example when their self-directed abilities are low (Massyn & Wilkinson, 2015:63)	Students' experiences to perform in a constructivist environment are well developed, for example their self-directed skills (Massyn & Wilkinson, 2015:63)
Student needs	Students require explanation (Massyn & Wilkinson, 2015:63)	Students need to build knowledge on prior experiences by way of interaction, collaboration, support, linking of tasks and presentations to real life experiences (Massyn & Wilkinson, 2015:63)
Demographic information	When using a fact-based approach make sure the context of the examples correlates with the student context*	Where various student viewpoints should be accommodated; keeping in mind the student demographic group and related macro environment (Massyn & Wilkinson, 2015:66)
Students' experience with content and technology	Consider the experience level of students, some students might have content experience even though they do not have a degree* Where students' experience with content is at a novice level (De Bruin & Van Merriënboer, 2017:3)	Students are able to express themselves using a variety of technology* Where students experience content at an experienced level (De Bruin & Van Merriënboer, 2017:3)
Student motivation	Students driven by assessment and not curiosity, or might refuse to participate in certain activities for example peer-assessment* Students do not value situated cognition (Massyn & Wilkinson, 2015:63)	Students value situated cognition (Massyn & Wilkinson, 2015:63)

* Participant views

5.2.7 Constraints related to the effective design of a learning event

Constraints related to the design of a learning event are those aspects that would prevent the effective delivery of a learning event due to practical considerations. This analysis indicated that certain constraints influenced the effective design of a module:

- Mode of delivery
- Student cohort size
- Student experiences with technology
- University policy
- Time
- Budget constraints.

5.2.7.1 Mode of delivery

When the mode of delivery prevents students from attaining their learning goals, a behaviourist approach could be the only viable option. Certain multiple choice and other objectivist type of electronic assessment systems prevent a constructivist approach:

> *…the constraints of you know, the marking systems [PD54:20].*

Another participant did not think that the mode of delivery prohibits an approach, stating that students could collaborate in any way which they are comfortable with:

> *Not necessarily in Blackboard, they can use whatever platform they want some do it in WhatsApp, some do it in an email; it depends on their preferences, you are not descriptive, they do that, they get assessed on the on the product, and they must declare what everyone contributed to this thing [PD55:17].*

It is vital to consider the restrictions and affordances connected to different modes of delivery.

5.2.7.2 Student numbers

The student numbers are another important constraint to consider. All the participants indicated that behaviourist elements are plausible with large classes. When you work with a student cohort where the approach is constructivist, the number of students in a group should be limited:

> *You cannot do that. In, with 1700 students, you can do that in a Masters class of I think there's 17, 17 to 20. That's more or less the standard for our masters course with masters [PD55:37].*
>
> *Our classes are so large we cannot do apprenticeships [PD55:47].*
>
> *…that was a relatively small class, I think it was 30 to 40 students, it was not a 1000 [PD55:48].*

It would be challenging to give individual support to students when the student group are too large:

> *The problem with a first year BCOM, where these students begin, they are 1700 students in each of the subjects. There's no way that you can scaffold those students and support them one on one. So that is very much, there is the textbook, I'm giving you lectures, and I'm explaining as good as I can. And I'm making podcasts and putting into Blackboard. And you have tutor classes and about a 10th of the students either going to attend the tutor classes, if you have problems. And if you really seriously in trouble, you go into the lecture and you make an appointment and stand in the queue for two hours to see the lecturer. So You cannot do that. In, with 1700 students, you can do that in a Masters class of I think there's 17, 17 to 20 [PD55:30].*

While technology could assist with large classes in a behaviourist approach, individualised support is necessary in during a constructivist learning approach.

5.2.7.3 Student experiences and access to technology

Many universities make use of technology, and specifically computer-assisted education. Students' experiences and access to technology should be considered. One of the participants mentioned that at their university all first years are required to do basic computer literacy classes:

> *Yeah, well that's the first thing they must learn at the university are how to use a computer [PD55:36].*

Many universities use technology to increase access or to find alternative solutions where the student numbers are too large. One participant mentioned the use of technology as a solution when dealing with large student groups:

> *Our classes are so large we cannot do apprenticeships and that's where simulations come in [PD55:47].*

> *I send out a questionnaire to the students about what do they have access to in terms of computers and internet? And where do they use the internet for studies, at office or at home, or equally here and there [PD55:4].*

Consequently, it is important to ensure students have the necessary computer experience to use learning technology and obtain access to learning technology.

5.2.7.4 Institutional policy related to the learning event

Institutions often have policies in place that underpin certain types of learning design. Mays (2016:133) reports that universities often base their decision-making on cost. Once the real cost of certain types of learning design are calculated, they realise they not able to invest in it. A participant listed some constraints resulting from university policy:

> *His is one of the complaints they have as well, they are constrained by that behaviourist model as well, because you've got to produce throughput, you have got to produce certain marks, all sorts of stuff And that I found it where everywhere I Go, I mean, I have been to UK, ZN, is it in I've been to UJ I've been to where else have I been, to UFS. All of these places WSU every time I talk about behaviourism and cognitive theories. They say they're constantly revert to behaviourism. And because that is what the system dictates [PD54:38].*

This participant indicated that the system forces learning designers to make use of behaviourist elements, by forcing continuous assessment for all learning, resulting in

students becoming unwilling to participate in any learning activities which are not graded:

> *I'd say fundamentally, it was more behaviourist? Definitely. They need a certain number of marks over the course of the course to pass, you know, a lot of the activities were that count for marks. So that was basically the carrot to get the students to do this stuff. And I think my personal opinion is you need some of that, I'd love to do a course where it isn't just driven by marks, but rather that it's driven by a willingness to learn wanting to learn, desire to live, curiosity, one would like that. But unfortunately, it doesn't always work [PD54:7].*

5.2.7.5 Time as a consideration when planning a learning event

Time is an essential consideration on two levels. Firstly, the time that the actual learning activity would comprise once implemented. Iwan *et al.* (2015:299) caution that learning with constructivist elements would take additional time for students to engage with the learning content. This was echoed by a participant who noted that behaviourist elements are more time-efficient:

> *On the lower order cognitive levels is where instructionism work and constructivism also works there uhm but it uhm it works better in a different way to instruction, so if it is simply about acquiring facts instructionism is more efficient, it gets you there quicker with no waste of time [PD53:10].*

The participant also indicated that constructivist elements would take extra time and effort from the students:

> *With constructivism you look at the process of acquiring knowledge to be able to find knowledge and we integrate it and we make it our own and it is not efficient and it is messy and you get confused understandings and you negotiate it but that prepares us for continued learning where there is no instructor available so the constructivist learning is really important even more on the factual basis, the ability to curate knowledge and to understand fact from fiction and that kind of thing is really important [PD53:10].*

Therefore, time seems an important consideration during learning events. The second aspect related to time, is the time that the learning designer and lecturer has available to work together on a module. The participant notes that lecturers are often pressed for time:

> *We've had lecturers who are really pressurized, who can only give you the, the dates or the material or whatever it is, within a very short time period before it has to go for review [PD54:8].*

Time specifically in this particular project time was a factor, because, as I say, lecturers are pressured it is not it's not the only thing they're doing [PD54:27].

Since learning designers work in collaboration with lecturers, their time should also be considered. When time is limited, a behaviourist approach is often the result:

You really did not have time to become very creative, to integrate extension and create very engaging activities in terms of problem-based learning and stuff like that. Some of it is in there, but I noticed that the less time we had the more we went towards more behaviorist type of pattern of just, you know, activities for marks, and that the activities with a draw card. I mean, obviously, there's the information in the meat of it is, but that's the feeling I had [PD54:9].

Both time-related aspects indicated that a behaviourist approach would be a consequence when learning designer and lecturer time is limited. This statement, of course, lends itself to much speculation and does not speak to optimal learning.

5.2.7.6 Summary of constraints related to the design of a learning event

While none of the constraints could determine if a learning event should contain either constructivist or behaviorists elements, the constraints could prohibit the way a learning event could be designed. It is therefore important to keep these constraints in mind when designing a learning event. Once the mode of delivery was established, the affordances provided by the technology becomes an important consideration. For example, when an electronic objectivist marking system is the only viable assessment option, constructivist assessment would not be possible. Or, when the student numbers are too large, it would prohibit constructivist elements, since individual support would also be impossible. Also, students' experience with technology could prohibit optimal learning, whether it is of either behaviourist or constructivist in nature. When trying to overcome one constraint, e.g. facilitation of large student numbers with the aid of technology, care should be taken to ensure that students were prepared to use the specific learning technology. University policy is another consideration. University systems often dictate a behaviourist model by default, ruling in time as a crucial consideration. The participant was of the opinion that behaviourist elements take up less time. However, for complex learning to be successful, sufficient time should be assigned to the design and compilation of learning tasks. Lastly, budget and learning experience constraints should be considered. Authentic assessment and authentic learning experiences are not always viable due to the high costs associated with them, or simply because the intervention would not be practically executable in the learning environment (Table 5.7).

Table 5.7: Constructs relating to constraints

Decision-making considerations	In which situation would objectivist elements contribute towards optimal learning?	In which situation would constructivist elements contribute towards optimal learning?
Mode of delivery	When the mode of delivery will prevent you from attaining your goal, for example when an objectivist marking system is the only option*	When the mode of delivery is not restrictive*
Student numbers		When the student to lecturer ratio enables individual support*
Student experiences with technology	Student experience with technology What do students have access to in terms of computers and the internet?* When do they have this access?*	
University policy	Consider the University policy, the system often dictates a behaviourist model*	
Time	Behaviourist elements take up less time*	For complex learning to be successful enough time should be designated for tasks (Iwan *et al.*, 2015:299)
Budget and learning environment constraints		Authentic assessment and authentic learning experiences are not always viable*

* Participant views

5.3 Section 2: The strategies that could aid in moving from objectivist elements to constructivist elements in one learning event

This section reports on the way instructional design theory could be applied when moving from objectivist to constructivist elements as it relates to three quadrants. Each of the three quadrants comprises both behaviourist and constructivist elements in varying permutations. I did not require participants to elaborate on specific quadrants, but requested them to discuss the quadrants in general. I analysed the data according to the quadrants, based on the literature and participant responses:

- Injection quadrant (§ 5.3.1)
- Integration quadrant (§ 5.3.2)
- Constructionism quadrant (§ 5.3.3).

5.3.1 Injection quadrant

The injection quadrant relates to considerably more behaviourist elements than constructivist elements. From the above analysis, behaviourist elements are fact-based and relate to the knowledge-based cognitive domain. When dealing with content, Massyn and Wilkinson (2015:97) propose that it is best to teach students facts and processes in an objectivist manner, and thereafter move to a constructivist approach. Knowledge progression should start with the known and progress towards the

unknown. Therefore, content and tasks should be organised in such a manner that would allow students to process new learning:

> *Obviously, students cannot immediately be confronted with highly complex learning tasks. This would overwhelm their cognitive resources and might have other negative effects, such as jeopardizing their motivation. Therefore, learning tasks should be organized from simple to complex or from easy to difficult. In addition, support and guidance for task performance should be high in the beginning and gradually fade away in a process of scaffolding (Van Merriënboer & Sluijsmans, 2009:57)*

A Participant indicated that Bloom's taxonomy as a way to move from behaviourist elements to objectivist elements. Blooms taxonomy was designed with the purpose of exchanging assessment questions with the intent to classify learning outcomes (Neumann & Koper, 2010:78). In the revised Blooms taxonomy, the lower level categories include remember, understand and apply, while the higher levels include analyse, evaluate and create. Today it is one of the most popular taxonomies used in the cognitive domain (McIver *et al.*, 2016:58). The participant also indicated how the taxonomy would be useful to assist in progressing from behaviourist to constructivist elements. He/she noted that there is a natural progression from the lower levels of Bloom—which are behaviourist in nature—to the higher levels of Bloom, which are constructivist in nature:

> *How do you decide when you migrate from direct instruction to constructivist learning kind of thing, so a lot of it has to do with where you kind of switch away from the knowledge, the basic unknown, underlying principle towards the analytical thinking and the synthesising of knowledge and the variation and that type of stuff. So, there is a natural kind of progression that force you away from instructionism to constructivism. But I do think that you should deliberately add some constructivist learning into the lower order levels as well [PD53:10].*

5.3.2 Integration quadrant

In the integration quadrant, comprises of both behaviourist elements and constructivist elements. One participant mentioned that a strategy that could work would be to give students a real-life scenario—provide them a certain amount of information and let them figure out the rest for themselves:

> *Instead of simply giving them you know, facts and figures, give them an actual scenario of real-world scenario, and get them to actually figure it out themselves give a certain amount of information [PD54:24].*

In this example, the real-world scenario represents the constructivist element, while the supporting information represents the behaviourist element. This comment from a participant is in line with the 4C/DC model where the focus is on a series of real-life whole tasks, but the learning event starts with a series of tasks, and is supported with information. Tasks become progressively more complex and then progress to part-task, part-practice events. This process is supported by just in time information (Van Merriënboer, 2013). This is in contrast with the approach explained in the injection quadrant since the constructivist elements are introduced first, followed by the behaviourist elements.

5.3.3 Constructionist quadrant

In the constructionist quadrant, the focus is on creating. Constructionism is what the word implies, constructing something. Synonyms for constructing include fashioning, building, composing and creating. Referring to Bloom's taxonomy, the create category is relevant at the higher cognitive domain. However, a participant indicated that Bloom's taxonomy could be problematic since it is relevant to the cognitive domain and forces you into some inappropriate assessment practices:

> *I started working towards using level descriptors in framing applied competency based outcomes, a lot more so, in our environment there is a bit of resistance, because we still want to Bloom, but I am trying to get them off Bloom and into level descriptors, and then you write a really valuable applied competency-based outcome that will equip the student for immediate workplace readiness upon graduation [PD53:18].*

Bers et al (cited by Clinton & Rieber, 2010:764) suggest the application of four principles for the constructionist environment. First, students learn by creating something new. Secondly, students make use of concrete objects in order to create meaning. Thirdly, students find ideas that open up new meaning to them, and fourthly, students should self-reflect on their learning. An example of a constructionist learning event is the Studio Curriculum. In the Studio Curriculum, students' progress from newcomer to full participant in a situated-learning context (Clinton & Rieber, 2010:766).

5.3.4 Summary of strategies that could aid in moving from objectivist elements to constructivist elements in one learning event

Various strategies indicated the way to progress from objectivist elements to constructivist elements in a learning event. In the Injection Quadrant, Bloom's taxonomy was indicated as a useful to progress from objectivist elements to constructivist elements. In the Integration quadrant, the 4C/DC model indicated a way

to integrate both objectivist and constructivist elements. In the Constructionist quadrant, the focus was on competency-based outcomes, and the four principles of Bers et al (cited by Clinton & Rieber, 2010:764) could be useful to advance from objectivist to constructivist elements in a learning event.

5.4 Talking to participants summary

This Chapter conveyed the findings of the qualitative component. I presented the findings in the Chapter as an integrated data set with reference to relevant literature. The interviews focused on two distinct sub-sections related to this study. Section one focused on the learning design analysis phase. Conversations were guided by the seven considerations relating theoretical frameworks. The findings comprised the way learning designers use these considerations in the decision-making process. Section two focused on the strategies that could aid in moving from objectivist elements to constructivist elements in one learning event. The findings comprised the way instructional design theory could be applied when moving from objectivist elements to constructivist elements in a single learning event with relation to the Cronjé (2006:412) four-quadrant model

CHAPTER SIX
CULMINATION OF THE RESEARCH INTO AN ANALYSIS TOOL

6.1 Introduction

This final chapter, a gestalt of the research journey, indicates the research steps taken, elucidates the contribution to learning design theory and presents the learning design analysis tool. The reflective discussion ponders on the lessons learned during the research journey and indicates the relevance of the artefact to the learning design community. Finally, recommendations are made for further research. Iterations are suggested for the further development of the learning design tool. I organised the concluding chapter according to:

- Discussion of the research journey (§ 6.2)
- Contribution of the study (§ 6.3)
- Limitations of the study (§ 6.4)
- Recommendations for further research (§ 6.5).

6.2 Discussion of the research journey

6.2.1 Chapter One: Introduction to the study

My research journey commenced when I identified a problem at my place of work. The research problem related to the starting point and consequently became the drive for the research. Whenever I had to make research decisions, I referred to the original problem statement. Chapter One, therefore, presented statement of the research problem, the context of the research, relevant literature, and the proposed actions to address the research question. The identified problem was that learning designers have to agree on a theoretical framework before the design of learning ensues. However, it was unclear what the considerations were that learning designers would take into account during decision-making when planning and designing multi-modal learning. Many universities deliver their courses according to multiple modes where the modes of delivery include face-to-face, blended and distance mode. Despite these variations in the method of delivery and their subsequent effect on teaching, the section of underpinning learning theories remains ubiquitous (Ertmer & Newby, 2013:69). The role of the learning designer comprises that of understanding the strengths and weaknesses of learning theories in order to select and implement optimal strategies. Branch (1999:151) proposes that the best place to start is to identify a theoretical framework. In order to select a theoretical framework, we should understand what these theories entail and how learning designers view and use them. Behaviourism, cognitivism and constructivism are learning theories that have different philosophical underpinnings. Some learning designers feel forced to make use of only one learning theory, e.g. either behaviourism or constructivism. Many are of the opinion that these

two cannot be combined (Elander, 2012:42). Others, however, contest that using learning theories in combination is appropriate (Alessi & Trollip, 2001; Cronjé, 2006:412). Cronjé (2006:412) indicated that learning could indeed comprise both objectivist and constructivist elements. He proposed a model which could be useful when considering choices to be made when learning designers select elements of learning design during the planning of learning. This model, the Cronjé (2006:412) four-quadrant model, was selected as the theoretical framework since it could be useful when articulating the choices of learning designers. However, in the first place learning designers struggle to translate theory into practice, and secondly it was unclear which aspects would influence learning relating to one of the quadrants of the Cronjé (2006:412) model (Cronjé & Elander, 2016:14). Elander (2012:50) then identified frequently used instructional elements in the context of higher education. These elements directly relate to the Cronjé (2006:412) four-quadrant model. Instructional elements, as identified by Elander (2012:50), were used in combination with the Cronjé (2006:412) four-quadrant model as a framework to establish which aspects would determine when learning would relate to a specific quadrant. From the initial literature review, aspects learning designers considered when deciding on a theoretical approach included goals, students' proficiency or cognitive level, content, context and knowledge or skills. The main research question which underpinned this study was: *What are the considerations which learning designers should take into account during the planning, designing and development of a multimodal learning event, taking into consideration the Cronjé (2006:412) four-quadrant model?*

Three sub-questions related to collectively assisting in addressing the main research question:

- In which situation (type of content or context) would constructivist elements contribute towards optimal learning?
- In which situation (type of content or context) would objectivist elements contribute towards optimal learning?
- When a learning event contains elements from both constructivist and objectivist elements, how would you move from one learning element to the other?

The aim of this study was two-fold, firstly to determine the aspects considered in the learning design decision-making process and secondly to create a tool to choose elements and strategies suitable for learning events. In line with the aim of the study, the world view for this study related to the Burrell and Morgan (1979:25) functionalist paradigm. The functionalist paradigm is pragmatic and connected to a problematic approach, and similarly this research study aimed to find a solution to a practical problem. Participatory Action Research (PAR) highlighted the importance of bringing together action and reflection, theory and practice in collaboration with people in order

to find a practical solution to problems a specific community experienced (Morales, 2016:158). I selected Design-Based Research as methodology. The aim was to construct an intervention in the form of a learning design tool. Mixed-method methodology fitted into the functionalist paradigm.

The problem statement was contextualised within the relevant body of literature and the gaps in our current knowledge elucidated. In due course, the goal of the study was to create a tool that could guide the learning designers to decide on the most effective approach. Chapter One therefore conceptualised the study and posed as a map that guided my research journey.

6.2.2 Chapter Two: Research Design and Methodology

Chapter Two provided an in-depth explanation of the research decisions made and the strategies followed in order to address the research question. Firstly, I described the worldview that I adopted of the Burrell and Morgan (1979:25) functional paradigm since it suited the pragmatic nature of the research question. Selecting the appropriate worldview was vital since the subsequent research decisions related from this lens. Throughout the journey I reflected on the functional paradigm, as it guided me to ensure that the research choices remained coherent. Furthermore, the functionalist paradigm afforded me the opportunity to address issues in both a quantitative and qualitative way. Participatory Action Research is concerned with collaborative knowledge construction and use, thus affording me the opportunity to work with the learning-design community. During the research journey, I kept the learning-design community in mind, which reflected in the research design. I selected Design-based research because it offered a methodology that addressed problems experienced in education and aimed to provide solutions while learning from the process (Reeves & Oh, 2017:334-335; Van den Akker *et al.*, 2006:117). This goal resonated with the pragmatic goal of the research. I subsequently followed a partially mixed sequential dominant status design from Leech and Onwuegbuzie (2009:269). I selected three research strategies to collect data:

- A systematic literature review to scrutinise relevant review (Kitchenham, 2004)
- Quantitative component to select applicable participants for interviews
- Qualitative component: semi-structured individual interviews to attain in-depth views of research participants (Merriam, 2009).

Firstly, I used a systematic literature review as described by Kitchenham (2004). This enabled me to focus my search. I started by selecting the relevant concepts to be used. I created a search protocol which included the search strategy, the database selection

and the creation of inclusion and exclusion criteria. Once the search was conducted, I applied the relevant criteria to selected articles. Those articles which did not meet the criteria, were excluded according to certain exclusion criteria. Eventually 49 articles were selected. I coded in a descriptive manner, using Atlas.ti™, according to the Boeije (2002:391-409) strategy of constant comparative analysis. The result of the systematic literature review was tool-compilation constructs that would form the premise of the semi-structured interviews and finally for the Learning Design Tool presented in this chapter (Table 6.3).

Secondly, I conducted the quantitative component. The selected target population was learning designers from different HEI that subscribed to the UP2U community of practice. The UP2U group was ideal, as the group comprised a learning-design community employed in higher education. The UP2U group met the purpose to share knowledge and experience related to the relevant learning design discourse. Based on my conceptual framework, I selected the Elander (2012) OCIA Survey as instrument to place the participants' modules in one of the quadrants of the Cronjé (2006:412) four-quadrant model. The data were analysed, and each module was matched to one of the Cronjé (2006:412) four-quadrant. From the analysed data I was able to select three learning designers as research participants for the subsequent in-depth interviews. The three learning designers were: (i) participant one (relating to the constructivist quadrant), (ii) participant two (relating to the injection quadrant) and (iii) participant three (relating to the integration quadrant).

Lastly, I conducted the qualitative component according to the guidelines of Merriam (2009:170-173). The selected participants agreed to participate. Subsequently, I sent each of them a document which indicated a brief overview of a study and of the tool compilation constructs derived from the literature review. Interviews were scheduled with participants in succession. I transcribed the data with Atlas.ti™, according to the Boeije (2002) strategy of constant comparative analysis. The research outcomes resulted in learning design tool constructs (Chapter 5).

6.2.3 Chapter Three: Systematic literature review

Chapter Three described the mining of appropriate current literature. The goal of the systematic literature review was to identify a gap in the literature relating to the research questions and to create a tool compilation construct document for subsequent research steps. The SLR identified 52 research articles as primary documents. After analysis with Atlas.ti™, four themes emerged.

Theme One explored the epistemological positions and related learning theories. The Cronjé (2006:412) four-quadrant model is based on a combination of objectivist and constructivist epistemological positions and their associated learning theories. Theme One identified two epistemological positions: objectivism and constructivism. The three main learning theories, Behaviourism, Cognitivism and Constructivism and related elements were presented. The strengths and weaknesses of each learning theory were discussed.

Theme Two dealt with the Instructional approach in the context of decision-making. ADDIE comprised the framework suitable for both constructivist and objectivist elements (Clinton & Hokanson, 2012:117). It was important to use a decision-making framework that is suitable for both types of elements since the Cronjé (2006:412) four-quadrant model contains elements of both these epistemological positions. Furthermore, I presented relevant instructional-design models and theories which aided learning designers during their decision-making.

Theme Three focused on decision-making considerations during the analysis phase. Here I presented and discussed the seven decision-making considerations found in my SLR.

Theme Four indicated models I identified which could be used when moving from an objectivist approach to a constructivist approach in one learning event.

These constructs were compiled into a table (Table 3.1) and were presented to participants in the qualitative component of the study.

6.2.4 Chapter Four: Quantitative results

Chapter Four conveyed the data collected from the quantitative component of the study. The goal of the quantitative component was to provide a structured strategy for the selection of participants. The instrument chosen to select participants with was the Objectivist and Constructivist Integration Assessment (OCIA) Survey© developed as part of the Elander (2012) PhD thesis. The survey was selected as instrument to place modules in the relevant quadrants of the Cronjé (2006:412) model. I set up the OCIA survey in Google Forms and submitted the survey to the UP2U group. The goal of the OCIA survey was to map the participants' modules to one of the Cronjé (2006:412) quadrants. The data were extracted with the assistance of Statistical Consultation

Services of the North-West University. The results comprised 39 participants' modules indicated on the Cronjé (2006:412) quadrants. Subsequently I selected three of the participants for the qualitative component.

6.2.5 Chapter Five: Talking to participants

Chapter Five communicated the findings obtained from talking to participants. The participants received the tools compilation construct and background to the study several days before the interviews. These considerations are presented as an integrated inventory of concepts, comprising literature and participants' opinions. They include six considerations: (i) lecturer characteristics, (ii) field of study, (iii) type of learning task or skill, (iv) goals and learning outcomes, (v) context, and (vi) student characteristics.

6.2.5.1 Lecturer characteristics

Lecturers are inclined to shy away from constructivist approaches when they have insufficient facilitation skills. Lecturers who possess combined sound pedagogical and content knowledge opt for more constructivist elements in their modules. Confident lecturers with well-developed communication and scaffolding skills often lean towards constructivist engagements. The association between motivation and knowledge concerned with pedagogy and the optimal use of technology becomes clear.

6.2.5.2 Field of study

Behaviourist elements contribute to optimal learning when the field of study is objectivist, highly structured and well defined. Constructivist elements will contribute to optimal learning when the field of study is creative, especially when learning can be promoted by creating. Where learning is ill-defined, learning events tend to contain unnecessary constructivist elements.

6.2.5.3 The type of learning task or skill

It is important to establish the difficulty level of the content, learning task or skill to be learned. When the student group has no previous knowledge related to the content or experience related to the learning task or skill, behaviourist elements will contribute towards optimal learning. Similarly, the year of study plays an important role; when the student group has no pre-knowledge of the task or content, more behaviourist elements should be introduced. On the other hand, when the student group does have previous knowledge related to the content or experience related to the learning task or skill, constructivist elements will contribute towards optimal learning. For example, when you

want to teach advanced knowledge or you want to develop higher level skills. Accordingly, the higher the year of study, the more constructivist elements should be present.

6.2.5.4 Goals and learning outcomes

It is important to establish the difficulty level of the content, learning task or student skills. When the students have no previous knowledge relating to the content, or experience related to the learning task or skill, behaviourist elements contribute towards optimal learning. In addition, a behaviourist approach is also suitable when the focus of the module is on discriminations, generalisations, associations, and chaining. Similarly, the year of study is important. When the students have no pre-knowledge of the task or content, behaviourist elements should be introduced. However, when the students have previous knowledge, constructivist elements will contribute towards optimal learning, e.g. when you teach advanced knowledge or develop higher level skills. Accordingly, the higher the year of study, the more constructivist elements should be present.

6.2.5.5 Context

When deciding on the inclusion of constructivist learning elements, consider whether aspects of the real-world environment can be incorporated in the learning event. Behaviourist assessments are better supported by most online marking systems. Electronic assessment of constructivist elements is costly and impractical. Constructivist assessment could lead to assessing performance-based competencies that could prepare students to become profession ready.

6.2.5.6 Student characteristics

When students' experiences are not yet at a level where they can function in a constructivist environment, behaviourist elements could contribute to optimal learning. When students' experiences to perform in a constructivist environment are well developed and they have self-directed learning skills, constructivist elements could contribute to optimal learning (Massyn & Wilkinson, 2015). When students require extensive explanation, behaviourist elements are important (Massyn & Wilkinson, 2015). When students need to build knowledge on prior experiences by way of interaction, collaboration, support, linking of tasks and presentations to real life experiences, constructivist elements could contribute to optimal learning (Massyn & Wilkinson, 2015). This relates to the student context and it is important to establish the context of students when including behaviourist elements. However, when it is

important to include various student viewpoints, constructivist elements should be included (Massyn & Wilkinson, 2015). Where students' experience with content and technology is at a novice level, behaviourist elements should be included. Students could have relevant experiences even though they do not have formal qualifications. When students' experience with content and technology is at an advanced level, more constructivist elements are suitable (De Bruin & Van Merriënboer, 2017). When students are driven by assessment and not curiosity, they might refuse to participate in certain activities, for example peer-assessment. Students who do not value situated cognition behaviourist elements, could contribute to optimal learning. Students who value situated cognition constructivist elements, could contribute to optimal learning (Massyn & Wilkinson, 2015).

Next, the way instructional design theory could be applied, when moving from objectivist elements to constructivist elements, as they relate to the three quadrants. Each one of the three quadrants have both behaviourist and constructivist elements in varying combinations. Blooms taxonomy could be useful to move from behaviourist approach to a constructivist approach. The taxonomy was designed with the purpose of exchanging assessment questions with the intent to classify learning outcomes. In the revised Blooms taxonomy, the lower level categories include remember, understand and apply. The lower levels could be used for a behaviourist approach. The higher-level categories include analyse, evaluate and create. The 4C/DC model could be useful when working in the integration quadrant, where the focus is on a series of real-life whole tasks, but the learning event starts with a series of tasks and is supported with information. The tasks become progressively more complex and then move to part task, part practice events. This process is supported by just in time information. First, students learn by creating a new artefact. Secondly students make use of concrete objects in order to create meaning. Thirdly students find ideas that open up new meaning to them personally. Finally, students need to self-reflect on the process of learning.

6.2.6 Addressing the research question

The main research question which underpinned this study was: *What are the considerations which learning designers should take into account during the planning, designing and development of a multimodal learning event, taking into consideration the Cronjé (2006) four-quadrant model?* The learning design analysis tool would assists learning designers working in higher education to choose elements and strategies suitable to specific modules.

The LEAF tool is available as Figure 6.1 and Addendum 6.1. The tool is not to be interpreted as elements being exclusive to constructivism or behaviourist but rather decision-making considerations. Table 6.2 provides an interpretation sheet for the learning event analysis framework (LEAF).

Table 6.1: Learning event analysis framework (LEAF) tool

Step one: Consider the lecturer characteristics			
Guiding question	Decision-making considerations		
	Objectivist element	Constructivist element	Be on the look-out for
At what level is the lecturers' ability to facilitate learning?	Lecturers have suitable pedagogical and content knowledge[3] Content-driven lecturers are more comfortable with behaviourist elements in a module	Lecturers have suitable content knowledge and the ability to facilitate students in their own knowledge construction, interactive collaboration activities and self-directed learning tasks[4] Lecturers who seek ways to engage students on a higher level, are more willing to add constructivist elements in their modules. As lecturers' confidence level with facilitation increases, especially communication and scaffolding skills, they are willing to include more constructivist elements in their module	Student to lecturer ratio When a lecturer needs to provide individual support to students when facilitating learning, the student group should be small
At what level is the lecturers' motivation?	If lecturers are not comfortable with constructivist elements, they will not include them in the module	Lecturers' motivation to help students succeed after university increases; they will include more constructivist elements in their module	Lecturers' abilities to facilitate learning with the aid of technology affect their ability to engage students in distance modes of delivery

[3] (MacPhail *et al.*, 2013:101)
[4] (MacPhail *et al.*, 2013:101)

Step two: Consider the field of study			
Guiding question	Decision-making considerations		
	Objectivist element	Constructivist element	Be on the look-out for
Is the field of study more objectivist or creative in nature?	When the field of study is objectivist or highly structured that makes the field of study more behaviourist	Field of study is creative, especially where students can learn by creating an artefact, the learning designer should introduce more constructivist elements	
Is the field of study well defined or ill-defined?	When the field of study is well defined	Problems are ill-defined, the learning event would contain more constructivist elements When facts in the specific learning domain, change rapidly	

Step three: Consider the goals and learning outcomes			
Guiding question	Decision-making considerations		
	Objectivist element	Constructivist element	Be on the look-out for
What is the goal of the module?	When your goal is to teach facts and convey knowledge [5]	When your goal is to develop advanced processes and domain-general skills, such as literacy skills and self-directed learning skills	
What is the learning outcome of the module?	When learning outcomes are pre-determined and lower-order thinking needs to be developed (remember, understand, apply) When content is pre-specified	When learning outcomes can be negotiated and students' goals incorporated When content is not pre-specified 6 When higher-order thinking should be cultivated (analyse, evaluate and create)	Consider the university policy, universities often dictate a specific approach

[5] (De Bruin & Van Merriënboer, 2017:1; Ertmer & Newby, 2013:56-60)

[6] (De Bruin & Van Merriënboer, 2017:1; Ertmer & Newby, 2013:56-60; Massyn & Wilkinson, 2015:65)

Step four: Consider the level of teaching			
Guiding Question	Decision-making considerations		
	Objectivist element	Constructivist element	Be on the look-out for
What type of content, learning task or skill should be taught or developed	Introductory knowledge [7] Novelty of the task and limited prior knowledge [8] (discriminations, generalisations, associations, and chaining [9])	Advanced knowledge, for example when problems are ill-defined, the learning event would contain more constructivist elements Learning that involves higher-level skills (reasoning, problem-solving and information processing[10])	
At what year level is the module?	Consider the year of study, when the student group has no pre-knowledge of the task or content, more behaviourist elements should be introduced	Consider the year of study; when the student group has pre-knowledge more constructivist elements should be present	

Step five: Consider the context of the learning environment			
Guiding Question	Decision-making considerations		
	Objectivist element	Constructivist element	Be on the look-out for
What is the context of the learning environment	When the context in which the knowledge will be applied cannot be translated to the learning environment [11]	When the context in which the knowledge will be applied can be translated to the learning environment [12]	The mode of delivery and budget implications: Authentic learning experience is not always possible –cost / practically workable The more authentic, the more expensive it becomes

[7] (Jonassen cited by Ertmer & Newby, 2013:57)

[8] (Sue, 2010:473)

[9] (Ertmer & Newby, 2013:57)

[10] (Ertmer & Newby, 2013:57)

[11] (Ertmer & Newby, 2013:58)

[12] (Ertmer & Newby, 2013:58)

Step five: Consider the context of the learning environment			
Guiding Question	Decision-making considerations		
	Objectivist element	Constructivist element	Be on the look-out for
			Time allocation: For complex learning to be successful, enough time should be designated for tasks
What is the context of the assessment	When the main focus is on assessing fact-based knowledge	When the main focus is on assessing performance	The mode of delivery and budget implications: Keep in mind the cost and practicality of the assessment i.e. when a behaviourist approach is dictated by assessment practices, some online marking system makes the assessment more behaviourist

Step six: Consider the student characteristics			
Guiding Question	Decision-making considerations		
	Objectivist element	Constructivist element	Be on the look-out for
What are the needs of the students?	Students require explanation [13] Students' experiences are not yet at a level where they can function in a constructivist environment, for example when their self-directed abilities are low [14]	Students' experiences to perform in a constructivist environment are well developed, i.e. their self-directed skills [15]	
Do the students have experience with the content and technology?	Consider the experience level of students, some students might have content experience even though they don't have a degree.	Students are able to express themselves using a variety of technology. Where students experience content at an experienced level [17]	

[13] (Massyn & Wilkinson, 2015:63)

[14] (Massyn & Wilkinson, 2015:63)

[15] (Massyn & Wilkinson, 2015:63)

[17] (De Bruin & Van Merriënboer, 2017:3)

Step six: Consider the student characteristics			
Guiding Question	Decision-making considerations		
	Objectivist element	Constructivist element	Be on the look-out for
	Where students' experience with content is at a novice level [16]		
What is the student's context?	When using a fact-based approach, ensure the context of the examples correlates with the student context	Where various student viewpoints should be accommodated;[18]	Keep in mind the student demographic group and related macro environment
What motivates students?	Students driven by assessment and not curiosity, or might refuse to participate in certain activities for example peer-assessment. Students do not value-situated cognition [19]	Students value-situated cognition [20]	

[16] (De Bruin & Van Merriënboer, 2017:3)

[18] (Massyn & Wilkinson, 2015:66)

[19] (Massyn & Wilkinson, 2015:63)

[20] (Massyn & Wilkinson, 2015:63)

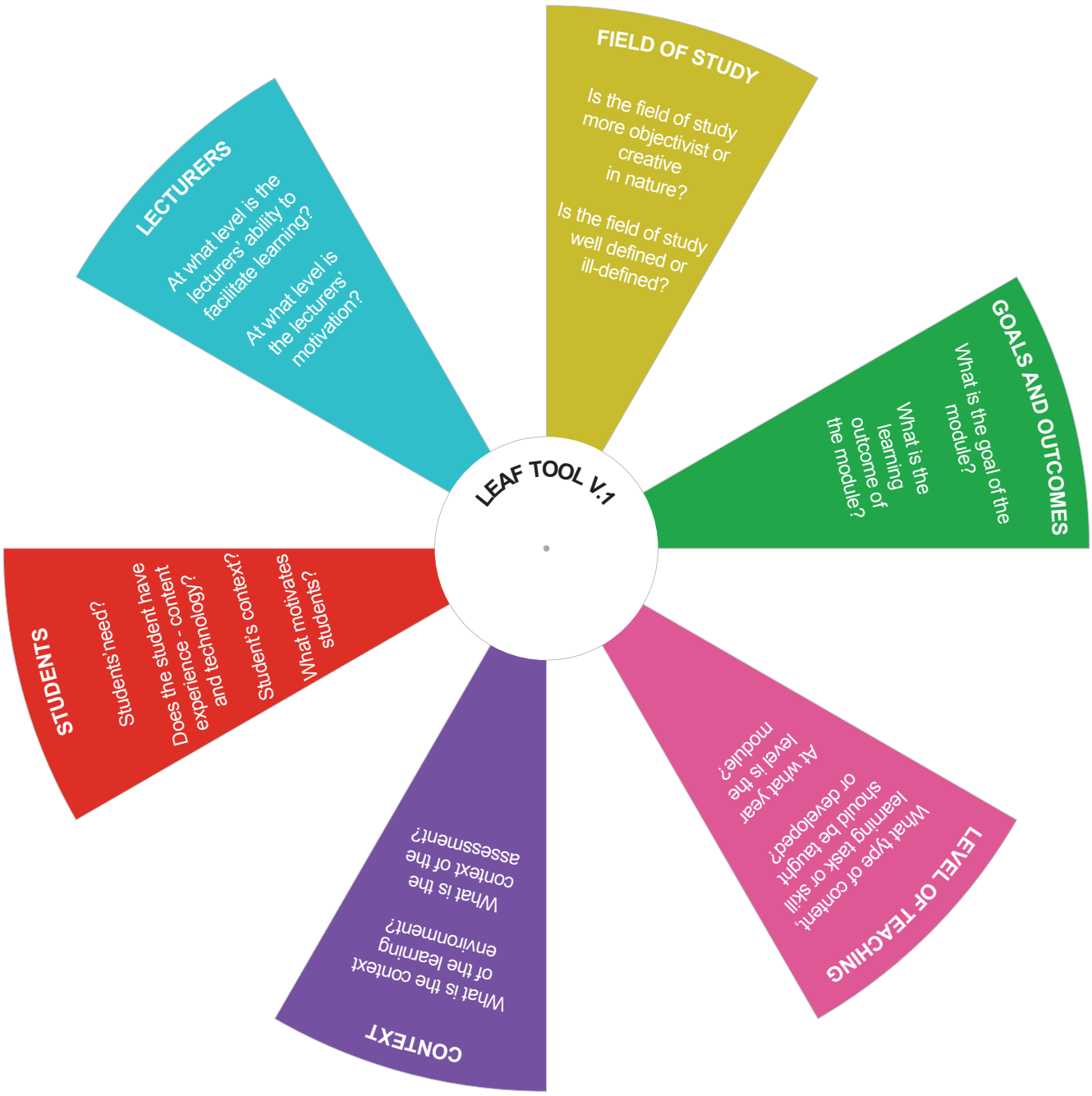
LEAF TOOL V.1
FIELD OF STUDY
Is the field of study more objectivist or creative in nature?
Is the field of study well defined or ill-defined?
GOALS AND OUTCOMES
What is the goal of the module?
What is the learning outcome of the module?
LEVEL OF TEACHING
What type of content, learning task or skill should be taught or developed?
At what year level is the module?
CONTEXT
What is the context of the learning environment?
What is the context of the assessment?
STUDENTS
Students' need?
Does the student have experience - content and technology?
Student's context?
What motivates students?
LECTURERS
At what level is the lecturers' ability to facilitate learning?
At what level is the lecturers' motivation?

Figure 6.1: Learning Event Analysis Framework tool

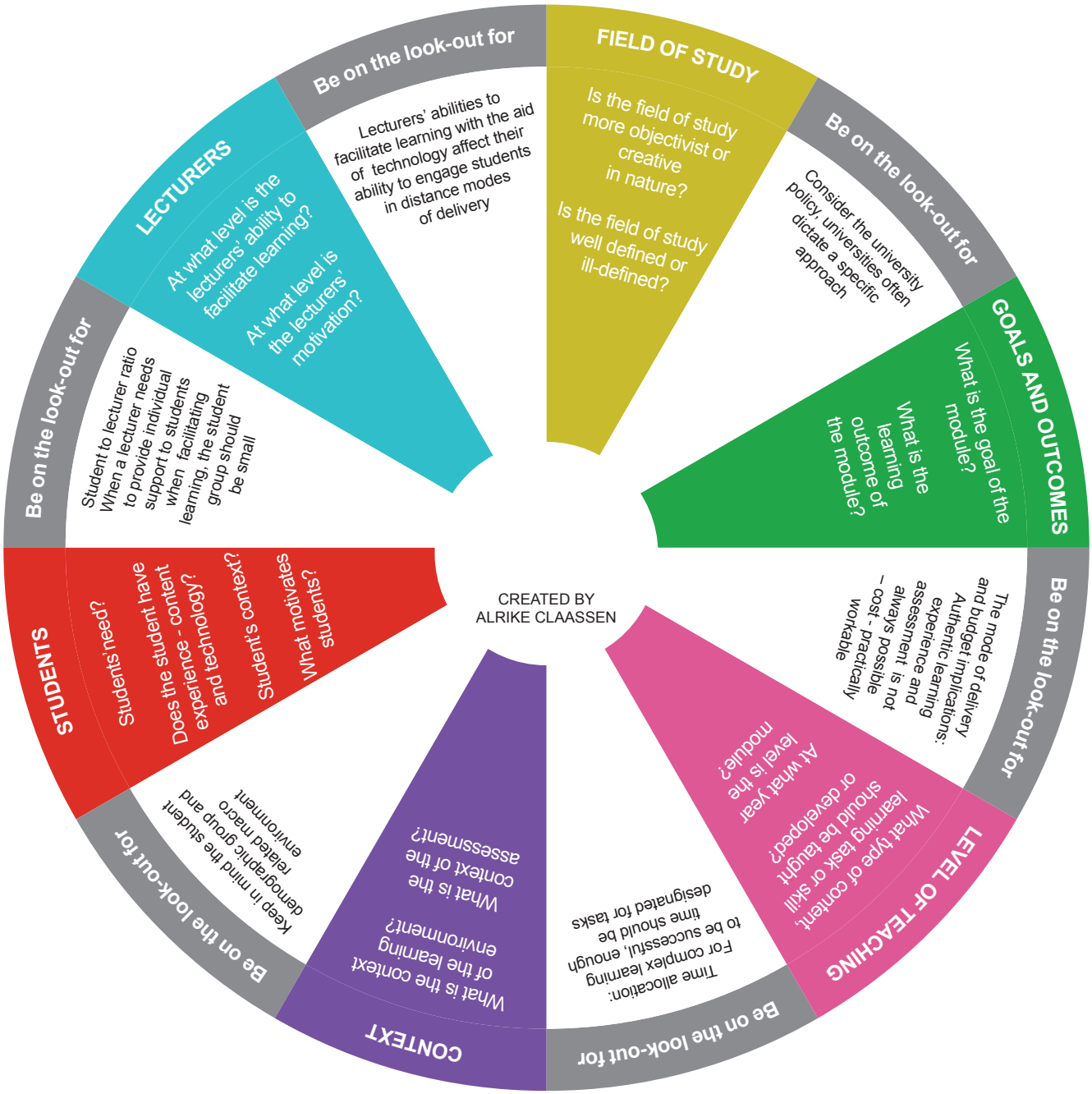
FIELD OF STUDY
Is the field of study more objectivist or creative in nature?
Is the field of study well defined or ill-defined?
Be on the look-out for
Lecturers' abilities to facilitate learning with the aid of technology affect their ability to engage students in distance modes of delivery
LECTURERS
At what level is the lecturers' ability to facilitate learning?
At what level is the lecturers' motivation?
Be on the look-out for
Student to lecturer ratio When a lecturer needs to provide individual support to students when facilitating learning, the student group should be small
STUDENTS
Students need?
Does the student have experience - content and technology?
Student's context?
What motivates students?
Be on the look-out for
Keep in mind the student demographic group and related macro environment
CONTEXT
What is the context of the learning environment?
What is the context of the assessment?
Be on the look-out for
Time allocation: For complex learning to be successful, enough time should be designated for tasks
LEVEL OF TEACHING
What type of content, learning task or skill should be taught or developed?
At what year level is the module?
Be on the look-out for
The mode of delivery and budget implications: Authentic learning experience and assessment is not always possible – cost - practically workable
GOALS AND OUTCOMES
What is the goal of the module?
What is the learning outcome of the module?
Be on the look-out for
Consider the university policy, universities often dictate a specific approach
CREATED BY
ALRIKE CLAASSEN

Table 6.2: Learning event analysis framework (LEAF) tool interpretation sheet

Quadrant name and explanation	Useful strategies	Discussion
Injection quadrant When there are predominantly objectivist elements	Blooms taxonomy revised by Anderson and Krathwohl 2001 (cited by Neumann & Koper, 2010:78)	Blooms taxonomy could be useful to move from behaviourist approach to a constructivist approach. The taxonomy was designed with the purpose of exchanging assessment questions with the intent to classify learning outcomes. In the revised Blooms taxonomy, the lower level categories include remember, understand and apply. The lower levels could be used for a behaviourist approach. The higher-level categories include analyse, evaluate and create.
Integration quadrant When there are both objectivist and constructivist elements, equally important	4C/DC model (Van Merriënboer, 2013)	The 4C/DC model could be useful when working in the integration quadrant, where the focus is on a series of real-life whole tasks, but the learning event starts with a series of tasks and is supported with information. The tasks become progressively more complex and then moves to part task, part practice events. This process is supported by just in time information.
Constructionism quadrant When there are predominantly constructivist elements	Four principles in a constructivist environment (Bers et al Clinton & Rieber, 2010:764)	First students learn by creating a new artefact. Second students make use of concrete objects in order to create meaning. Third students find ideas that open up new meaning to them personally. Fourth students need to self-reflect on the process of learning.

6.3 Limitations of the study

6.3.1 Methodological

I did not complete more than one loop in the design-based research process. I constructed the first draft of then learning design tool from the literature, for participants to view and add their feedback, but it would have been good to do another loop.

6.3.2 Physical limitations

I only managed to obtain 39 people to participate in the quantitative component of the study. Initially, module II was selected for the integration quadrant, but I was unable to get hold of the subject. I sent messages via e-mail and social media, made numerous phone calls and finally decided to use another module. The selected module was h. Even though I managed to obtain three participants from the results of the quantitative component, more subjects should participate in further cycles.

6.4 Value of the study

6.4.1 Value of the study to the learning design community

Elander (2012:185-186) reports on objectivist and constructivist elements that have been most frequently used in the various quadrants related to Cronjé's four-quadrant model. This research study adds to the body of knowledge by indicating:

- the considerations that inform learning designers' decisions when selecting strategies for learning events in higher education
- how learning designers can move from constructivist to objectivist elements.

This study culminated in the Learning Event Analysis Framework (LEAF) tool. The LEAF tool could be used by learning designers working in higher education to guide them through the decision-making process during the analysis phase of ADDIE. The LEAF tool would assist them to establish in which situation constructivist elements would contribute towards optimal learning and in which situation objectivist elements would contribute towards optimal learning.

6.4.2 Value as personal and professional growth

The study added another dimension to my professional identity, i.e. level of confidence. Having worked in the field of learning design for many years, I felt I needed a new challenge to grow. I must admit it was more challenging than I had anticipated, but so was the growth I experienced as a result. I immediately started incorporating research-based principles and ideas I had found as a result of my studies. I have also recently been promoted to senior instructional designer. As part of my duties as senior Instructional designer I am expected to mentor upcoming instructional designers and I

aim to model the way my supervisor mentored me throughout the process, with an ethic of care, brilliant advice and honest feedback.

6.5 Further research

As part of Participatory Action Research Approach and the methodology prescribed by the Design-Based Research, another iteration of the tool is required. This could be accomplished by testing the tool in the higher education context. Collected feedback could be used to create additions and improvements to the learning design tool. Questions could include:

- Would the LEAF tool be of practical use to learning designers working in higher education?
- What changes or additions can be made to improve the LEAF tool for use in other contexts, for example in a corporate training environment?

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