Enhancing the visual literacy of first-year students by means of self-directed multimodal mobile learning

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DECLARATION

I, the undersigned, hereby declare that the work contained in this thesis is my original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

Signature

20 November 2022

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- Soli Deo Gloria -

ABSTRACT

Enhancing the visual literacy of first-year students by means of self-directed multimodal mobile learning

The concept of literacy has progressively developed over time. The latest changes were mainly driven by the affordances offered by technology. Even though the basic literacy skills of reading and writing have not disappeared, their application has evolved from a linear process involving printed text to a process that requires the ability to access and process a multimodal combination of text and images to create meaning. This variety of diverse and complex modes of meaning-making and their technologies, as well as the special skills needed in the 21st-century learning environment, have led to the term multiliteracies. The need to be multiliterate underlines the reality for focused pedagogical attention to not only multiliteracies but also the inclusion of different modes in the teaching and learning process. Even though all the different literacies have a place and a role to play, visual literacy (VL) has been recognised as one of the core literacies of the 21st century. Many studies have been conducted within the VL domain and the body of research is still growing, yet few studies have aimed to determine the VL of students and address their needs. Visual literacy remains largely neglected in the higher education (HE) setting, probably as a result of the lack of practical guidelines as well as the scope of the research field. The aim of this study was to find a way to address the basic and general VL skills needed by students to succeed in a multimodal environment. First-year students within the South African context experience a variety of literacy challenges when entering HE. It would be unrealistic to suggest that there could be a single solution to all these challenges. However, one of the attempts to address these challenges includes academic literacy modules. It seemed a viable idea to examine the possibility of including VL in the academic literacy module. In preparation for doing so, the relevant concepts within the multiliteracies environment – namely literacy, VL, academic literacy, multimodality, self-directed learning (SDL) and mobile learning – were explored to provide the necessary theoretical and conceptual frameworks for the study. A mixed-methods research approach with an integrated methodology was used for the empirical part of the current study. The research question that guided the study implied several contexts that influenced the study, namely the professional, organisational, institutional, and theoretical contexts. The participants in the study were first-year students enrolled in the academic literacy course at a South African university in a rural area. The method included two phases of asking questions and two phases that involved documents and artefacts. The different phases were integrated, as the previous phase served to inform some aspects of the content of the next phase. This integration guided the emergence and refinement of themes relevant to the needs, barriers and opportunities of the

VL of students within the context of the study. The aim of the first phase, a document analysis, was to determine the VL needs of students as well as to determine the extent to which VL received attention in the academic literacy module. The findings of this phase led to the conceptualisation of a framework for incorporating VL into the academic literacy module. The second phase, an online closed-question-type questionnaire, aimed at determining the VL competencies (VLC) first-year students had in respect of what they needed (as revealed by the findings of phase 1) when they entered HE. The third phase in the form of individual semi-structured interviews was used to gain a deeper understanding of the information gathered in phase two. The final phase was an artefact analysis of academic assignments with visual components submitted by the interviewees. This offered a look at the practical implementation of what students had revealed in the previous two phases about their interaction with visuals. The insight in terms of multimodality, SDL and mobile learning, as gained in the theoretical phase of the study, was then applied to the evidence and claims of the empirical phase to determine the suitability of addressing the VL of students by employing self-directed multimodal mobile activities. It was determined that multimodal activities offered the perfect opportunity to foster self-directedness. In addition, the role of the mobile device in embracing the affordances of technology was also confirmed. These conclusions led to several practical recommendations. One suggestion would be the application of the multimodal model of Picciano (2017) in combination with the SDL process of Guglielmino (2013) or the model by Oswalt (2003) to address the VL of students in a structured way. In addition, several recommendations were made in respect of content, activities and ways of fostering SDL. These can serve as a point of departure for lecturers and researchers who wish to apply a multimodal mobile approach to components within their subject area or field of study (in this case, VL) with the aim of also fostering the self-directedness of their students.

Keywords: Visual literacy, academic literacy, multiliteracies, multimodality, self-directed learning, mobile learning

OPSOMMING

Die verbetering van die visuele geletterdheid van eerstejaarstudente deur middel van selfgerigte multimodale mobiele leer

Die konsep geletterdheid het deur die loop van tyd progressief ontwikkel. Die mees onlangse veranderinge is hoofsaaklik aangevuur deur die moontlikhede wat tegnologie bied. Alhoewel die basiese geletterdheidsvaardighede van lees en skryf nie verdwyn het nie, het dit ontwikkel van ’n liniêre proses wat hoofsaaklik uit gedrukte teks bestaan tot ’n multimodale kombinasie van teks en beelde om betekenis te skep. Hierdie kombinasie van uiteenlopende en komplekse modaliteite, asook die tegnologie daarby betrokke, in samewerking met die spesiale vaardighede wat in ’n 21ste-eeuse leeromgewing vereis word, het gelei tot die begrip multigeletterdhede. Die vereiste om multigeletterd te wees, beklemtoon die realiteit dat daar gefokusde aandag gegee moet word, nie net aan multigeletterdhede nie, maar ook aan die inkorporering van verskillende modaliteite in die onderrigleerproses. Hoewel al die verskillende geletterdhede ’n plek en rol het om te speel, word visuele geletterdheid as een van die kerngeletterdhede van die 21ste eeu beskou. Baie studies binne die visuele geletterdheidsveld is reeds onderneem en die hoeveelheid navorsing groei steeds. Slegs ’n paar studies was egter daarop gefokus om die visuele geletterdheid van studente te bepaal en in hul behoeftes te voorsien. Visuele geletterdheid bly grootliks ’n afgeskeepte konsep in die hoër onderwys waarskynlik weens die gebrek aan praktiese riglyne, asook die omvang van die navorsingsveld. Die doel van hierdie studie was om ’n manier te vind om die basiese visuele geletterdhede noodsaaklik vir die suksesvolle funksionering in ’n multimodale omgewing aan te pak. Eerstejaarstudente binne die Suid-Afrikaanse konteks ervaar verskeie uitdagings wanneer hulle die hoëronderwysomgewing betree. Dit sou onrealisties wees om te verwag dat daar ’n enkele oplossing vir al die uitdagings kan wees. Een van die pogings wat geïmplementeer word, behels ’n akademiese geletterdheidsmodule. Dit het na ’n logiese idee gelyk om die moontlikheid te ondersoek om visuele geletterdheid binne ’n akademiesegeletterhdeidmodule te inkorporeer. Ter voorbereiding van so ’n stap, is die tersaaklike konsepte binne die multigeletterdheidsomgewing – naamlik geletterheid, visuele geletterheid, multisonaliteit, selfgerigte leer, en mobiele leer – ontleed om die nodige teoretiese en konseptuele raamwerke vir die studie te verskaf. ’n Gemengde navorsingsmetode met ’n geïntegreerde metodologie is aangewend vir die empiriese fases van die onderhawige studie. Die hoofnavorsingsvraag waarvolgens die studie gerig is, het verskeie kontekste onderstreep wat die studie sou beïnvloed, naamlik die professionele, organisatoriese, institusionele en die teoretiese kontekste. Die deelnemers aan die studie was eerstejaarstudente aan ’n Suid-Afrikaanse universiteit in ’n landelike omgewing wat vir die akademiesegeletterdheidsmodule geregistreer

was. Die metode het twee vraefases ingesluit, asook twee fases van dokument- en artefakanalise. Die onderskeie fases is geïntegreer deurdat die vorige fase telkens inhoudsaspekte van die volgende fase ingelig het. Hierdie integrasie het gelei tot die ontstaan en verfyning van temas in verband met die behoeftes, uitdagings en geleenthede aangaande die visuele geletterdheid binne die konteks van dié studie. Die doel van die eerste fase, ’n dokumentanalise, was om die visuelegeletterheidsbehoeftes van studente te bepaal, asook om die aandag te bepaal wat visuele geletterdheid in die akademiesegeletterdheidsmodule ontvang. Die bevindinge het gelei tot die konseptualisering van ’n raamwerk vir die insluiting van visuele geletterdheid binne die akademiesegeletterdheidsmodule. Die oogmerk van die tweede fase, ’n aanlyn gesloteresponstipe-vraelys, was om die visuelegeletterdheidsvaardighede van eerstejaarstudente met hul toetrede tot hoër onderwys te bepaal betreffende watter vaardighede hulle benodig volgens die resultate van fase een. Die derde fase, wat semigestruktureerde individuele onderhoude behels het, is gebruik om dieper insig te kry rakende die data wat in fase twee ingewin is. Die finale fase was ’n artefakanalise van akademiese werk met visuele elemente deur die deelnemers aan die onderhoude. Dit het die navorser in staat gestel om die praktiese implementering van dít wat in die vorige twee fases na vore gekom het, te evalueer betreffende die studente se interaksie met visuele inligting. Die insig wat deur middel van die teoretiese fase van die studie in multimodaliteit, selfgerigte en mobiele leer verkry is, is op die bevindinge en gevolgtrekkings van die empiriese fase toegepas. Dit is gedoen om te bepaal of die visuele geletterdheid van studente deur middel van selfgerigte multimodale mobiele aktiwiteite aangeroer sal kan word. Die bevinding was dat multimodale aktiwiteite by uitstek geskik is vir die bevordering van selfgerigtheid. Die rol van mobiele toestelle in die benutting van die geleenthede wat tegnologie binne die leeromgewing bied, is ook bevestig. Hierdie bevindinge het tot verskeie praktiese aanbevelings gelei. Een voorstel is die gebruik van ’n multimodale onderrigmodel, byvoorbeeld dié van Picciano (2017) in kombinasie met die selfgerigteleerproses van Guglielmino (2013) of die model van Oswalt (2003) om die visuele geletterheid van studente op ’n gestruktureerde wyse aan te roer. Verskeie aanbevelings is ook gemaak rakende inhoud, aktiwiteite asook maniere om selfgerigtheid te bevorder. Bogenoemde kan dien as beginpunt vir dosente en navorsers wat belangstel om ’n multimodale mobiele benadering tot komponente binne hul vakgebied of studieveld (in dié geval visuele geletterdheid) te volg ten einde terselfdertyd die selfgerigtheid van hul studente te bevorder.

Kernwoorde: Visuele geletterdheid, akademiese geletterdheid, multigeletterdhede, multimodaliteit, selfgerigte leer, mobiele leer

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LIST OF ACRONYMS AND ABBREVIATIONS

ACRL	Association of College and Research Librarians
AL	Academic Literacy
CEFR-VL	Central European Framework for Visual Literacy
CEFR-VC	Central European Framework for Visual Competencies
DBE	Department of Basic Education
DHET	Departments of Higher Education and Training
E-learning	Electronic learning
ENViL	European Network for Visual Literacy
EWP	Education White Paper
FraIM	Framework for an Integrated Methodology
HE	Higher Education
ICT	Information and Communication Technology
IVLA	International Visual Literacy Association
LMS	Learning Management System
M-learning	Mobile learning
MOOCS	Massive open online courses
NLG	New London Group
NWU	North-West University
OECD	Organisation for Economic Co-operation and Development
RSA	Republic of South Africa
SDG	Sustainable Development Goals
SDL	Self-directed learning
SRQ	Secondary Research Question
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VL	Visual Literacy
VLC	Visual Literacy Competencies
VLCS	Visual Literacy Competency Standards
ZPD	Zone of proximal development

CHAPTER 1: INTRODUCTION AND CONTEXTUALISATION

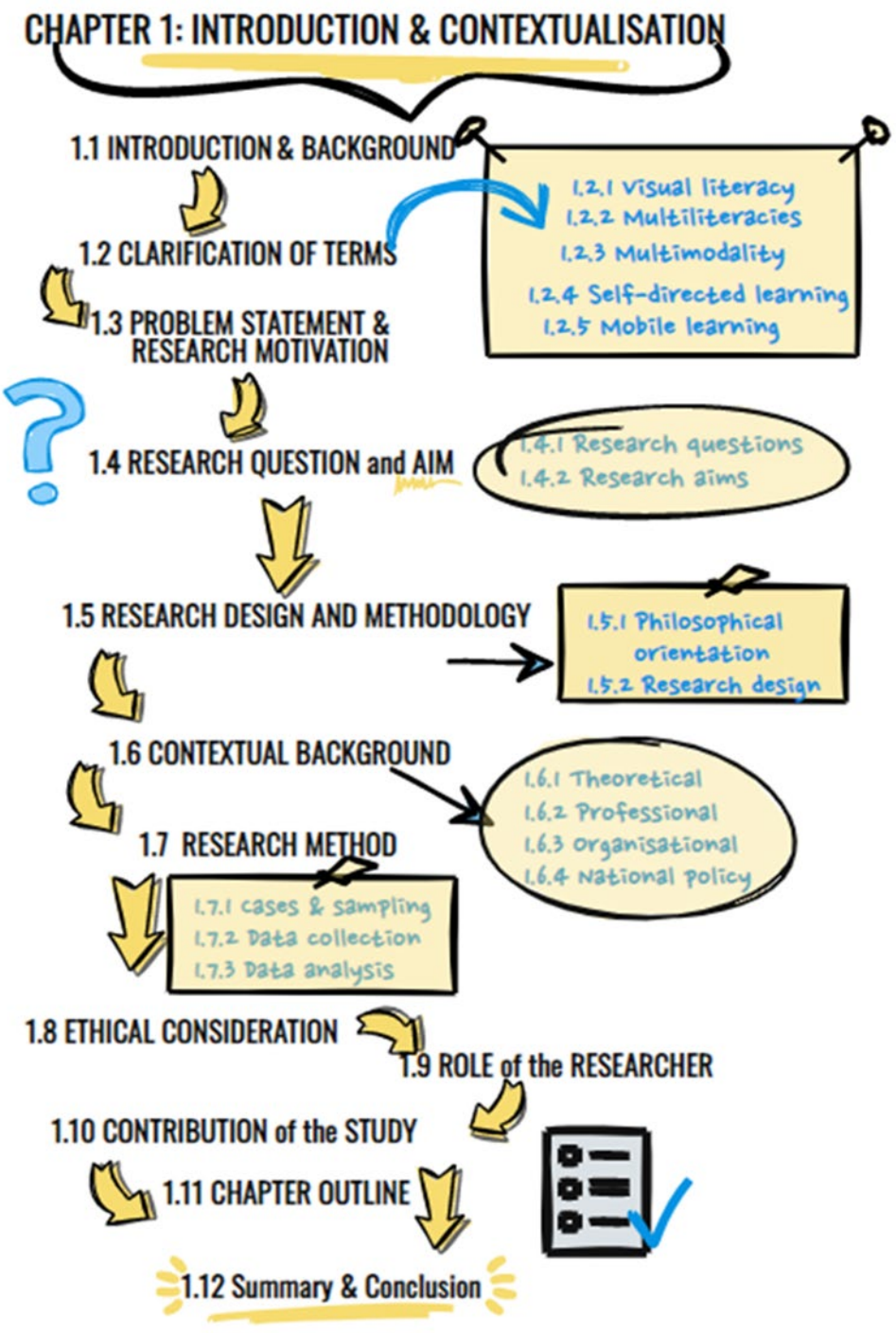


Figure 1-1: Mind map of chapter 1

1.1 INTRODUCTION AND BACKGROUND

For many generations, the definition of a literate individual was a person with the ability to read and write (Oxford, 2018). However, this definition has greatly evolved, especially due to technological developments since the beginning of the 21st century (Avgerinou, 2011). Given the omnipresence and importance of technology in our daily lives, it has become essential for all individuals to engage with new types of literacies. This reality has resulted in a new definition for literacy, which includes 21st-century skills; these have a much wider application as they refer to the skills needed for education as well as the workplace (Van Laar et al., 2020). Pilgrim and Martinez (2013) referred to these skills as the ability to use technology to acquire information and communicate information. However, just engaging with the available technology is not enough; literacy in the 21st century implies a constant learning process and ability to adapt to different environments and modes of communication (Oxford, 2018). The following seven core skills, which all have a digital component, were identified by Van Laar et al. (2017) through a systematic academic review: technical, information, communication, collaboration, creativity, critical thinking and problem-solving.

A seminal moment in the development of literacy was the coining of the term “multiliteracies” by the New London Group (1996). This present-day view of literacy suggests multiple communication forms and ways of making meaning, including a selection of modes such as audio, spatial and visual (New London Group, 1996). In addition, these different modes are embedded in the context of a globalised society where cultural and social diversity leads to identities being expressed during communication (Pilgrim & Martines, 2013).

Preparing students to become competent participants in this online, information-rich environment by exposing them to the needed skills has been identified as a key challenge for education in the 21st century (Organisation for Economic Co-operation and Development [OECD], 2018). However, conservative practices in education have led to a perceived lack of integration of new literacies in higher education (HE) (Ajjan & Hartshorne, 2008; Poore, 2011). In the context of this study, visual literacy (VL) is regarded as one of the neglected new literacies that needs to be addressed. So, what are the implications of the opportunities and challenges associated with these multiliteracies for education?

The following terms are core concepts within this study and therefore need to be clarified in the context of this study to ensure a clear and unambiguous understanding of the research topic.

1.2 CLARIFICATION OF TERMS

1.2.1 Visual literacy

Visual literacy (VL) involves how people perceive objects and interpret and learn from what they see (Elkins, 2008). Visual literacy definitions between 1969 and 1999 all include elements needed for communication: the abilities to understand (read) and to use (write/produce) images, as well as to think and learn in terms of images (Avgerinou, 2003). The widely accepted definition of VL by the Association of College and Research Libraries (2011) includes the abilities of an individual to effectively find, interpret, evaluate, use, and create images and visual media. Definitions of the past 10 years also refer to the ability to produce visuals (Beier, 2013), the communication affordances of VL (Beaudry, 2014) and the relation between VL and digital technology (Beaudry, 2014; Hattwig et al., 2012).

1.2.2 Multiliteracies

Multiliteracies can be defined as an approach towards both literacy and pedagogy: to be "multi-literate" implies the ability to command a variety of diverse and complex modes of expression as well as their technologies (Bateman et al., 2017). Within the educational context, Cope and Kalantzis (2009) as well as Cope et al. (2018)referred to the "transformative pedagogy of multiliteracies". This phrase implies that universities should be aware of the relevant multiliteracies required in HE settings in the 21st century.

1.2.3 Multimodality

Multimodality is related to multiliteracies, as many modes are encouraged to be used in different forms of expression (Lankshear & Knobel, 2011). Multimodal literacies, as proposed by Jewitt and Kress (2003), deal with understanding the different ways in which knowledge is represented as well as the making of meaning. Multimodal learning implies that various modes (e.g., visual, aural, text) are used in the learning process to enhance learning (Birch & Sankey, 2008). Olivier (2020) emphasises that different scholars use the term multimodal learning differently. As regards multimodality, Nouri (2019) refers to the implications of digital technology in respect of new situations for learning.

1.2.4 Self-directed learning

The concept of self-directed learning (SDL) is used predominantly in adult education (Du, 2012; Morris, 2019b). It refers to the process where students take responsibility for planning, executing and evaluating their own learning (Brockett, 1983; Candy, 1991; Gibbons, 2002; Knowles, 1975). This SDL process refers to both external and internal attributes (Brockett & Hiemstra, 1985; Garrison, 1997; Guglielmino, 2008). According to Beckers et al. (2016), the construct of self-

directedness is multi-dimensional. In this regard, Sawatsky et al. (2017) identified these dimensions as the learning process, the characteristics of the learner, and factors influencing the learner's likelihood to engage in SDL. The aim of the SDL process is to attain personal goals (Morris, 2019a). Şentürk and Zeybek (2019) contend that SDL is a requirement for multimodal learning.

1.2.5 Mobile learning

Mobile learning (also referred to as m-learning) is concerned with the physical mobility of students which enables them to engage in educational activities without constraints of physical location (Brown & Mbati, 2015; Kukulska-Hulme & Traxler, 2005; Kumar & Chand, 2019) as well as using wireless and digital devices and technologies (such as mobile phones and tablets) originally produced for public use but now utilised by students in HE (El-Hussein & Cronje, 2010; Odongo, 2010; Parsons, 2014). Mobile learning is perceived in different ways by different scholars. According to Traxler (2005:266), mobile learning can perhaps be defined as 'any educational provision where the sole or dominant technologies are handheld or palmtop devices'. Another perspectives regards mobile learning as an addition to e-learning (Kumar Basak et al., 2018). In the current educational landscape, m-learning refers to the use of a mobile device to access learning material from the Internet through mobile applications (Al-Hunaiyyan et al., 2018).

1.3 PROBLEM STATEMENT AND RESEARCH MOTIVATION

As indicated in the introduction (§ 1.1), literacy in the 21st century entails much more than the ability to read and write text (Brumberger, 2011; Tillmann, 2012). Consequently, any definition of a literate person should include VL skills as an essential requirement (Metros & Woolsey, 2006), as linguistic terms are not sufficient to explain today's world because information, especially online, is mainly driven by visual elements (Avgerinou, 2009; Beatty, 2013; Tillmann, 2012). Visual literacy refers to essential competencies needed by 21st-century learners to interact with the visual elements in both academic and everyday situations (Matusiak & Heinbach, 2018). Traditionally, VL was associated with art history and art education, but it has evolved into an important concept in most academic disciplines and social media settings (Matusiak, 2020). The development in digital technology has driven this change. Images are available and used in all spheres of life – professional, scholarly and social information practices (Beaudoin, 2014; Ewalt, 2016; Yoon, 2011).

In this context, the different modes of communication or interactional multimodality is highly relevant. Kress (2003) conceptualised multimodality in his seminal work, denoting the multiple modes of representation. Gee (2004) referred to the various modalities – images, texts, symbols, sound, et cetera – as ways of building meaning and knowledge. Visual literacy should be

considered within the wider literacies discourse. Multimodal literacy (Kress, 2003; Serafini, 2014), digital literacy (Hobbs, 2017), digital media literacies (Reyna et al., 2018), social media literacy (Rheingold, 2010), VL, web literacy, (Pilgrim & Martinez, 2013), information literacy, and many more (Kedra & Zakeviciute, 2019) indicate the array of modern literacies. These literacies are collectively referred to as "multiliteracies", which implies a variety of diverse and complex modes of expression as well as their technologies (Bateman et al., 2017). Similarly, metaliteracy refers to the media, visual and digital literacies that form part of traditional information literacy (Jacobson & Mackey, 2016).

The context of this study is HE and specifically South Africa. Worldwide, HE has traditionally focused on language-based texts in teaching and learning (Bowen, 2017). The multiplicity and multimodality of communication channels and the strong presence of multimedia texts (New London Group, 1996; Perry, 2012; Sang, 2017) as well as the growing presence of technology (Cloete, 2017; Hugo, 2003; Pillay, 2010; Rambe, 2017) and the need for critical literacy (Cope & Kalantzis, 2000; Antstey & Bull, 2006) all contribute to the many scholarly voices who regard the domination of text and word over other modes of communication as no longer relevant (Bowen, 2017; Felten, 2008; Jacobson & Mackey, 2016; Jordaan & Jordaan, 2013). The proliferation of visual resources further enhances this stance.

The widespread use of visuals also impacts on education and affords new opportunities and possibilities for teaching and learning activities (Elkins, 2007; Matusiak, 2013; Ulbig, 2010). Visual literacy is often recognised as the most important one for 21st-century learners (Avgerinou, 2009; Felten, 2008; Hattwig et al., 2013). In this regard, the Partnership of 21st Century Skills has earmarked VL as the essential literacy for this century (Avgerinou, 2018). This recognition emphasises the need for specific pedagogical attention to VL within the multiliteracies environment (Kedra, 2018; Thompson, 2019; Tillmann, 2012). Lecturers in different disciplines recognise the need for multimodal forms of communication where the traditional literacies of reading and writing are used parallel to other semiotic representation modes like visual images, gestures, diagrams, and graphs (Archer, 2006; Paxton et al., 2017; Reid et al., 2016; Thesen & Van Pletzen, 2006). However, implementation is often a challenge. It is not only technology that plays a role in this change from text to multimodality, but also the students in the classrooms.

The visual mode is the most prominent mode of communication used by young people – they share and create photos, videos, emoticons, GIFs and emojis (Kedra & Zakeviciute, 2019). Oblinger and Oblinger (2005) argue that millennials are natural visual communicators who can integrate tests, sounds and images in a natural way. The digital natives argument (Prensky, 2001) claims that repeated exposure to technologies leads to enhanced thinking skills in visual-orientated areas. Coats (2006) describes millennials as the most visual of all groupings of

students. Cook (2015) confirms that Gen-Z post-secondary students, who now fill HE classrooms, prefer regular educational activities that use technology and visual media. However, more recent research suggests that students lack the skills to interpret and evaluate what is communicated visually (Abas, 2019, Brumberger, 2011) and that they consume academic and social visuals passively (Pettersson, 2019). In the South African context, an additional challenge exists regarding literacy in general and, more specifically, VL.

Students come from diverse backgrounds – academically, socially, geographically and economically. This directly impacts on their literacy levels, and for the sake of this study, VL levels (Bornman, 2016; Nyahodza & Higgs, 2017). This impact is a result of not only the lack of access to infrastructure but also a lack of skills, high levels of poverty and an unchanged mindset to adapt to a multimodal environment (Nyahodza & Higgs, 2017; Tapfumaneyi & Rupande, 2013). Moreover, multiliteracies acknowledge this important shift towards recognising cultural and linguistic diversity in teaching and learning contexts (Jewitt, 2008; Navehebrahim, 2011; Olthouse, 2013; Pilgrim & Martinez, 2013). All of the above realities motivate this study on how the VL of students can be enhanced to prepare them for their future in a visually orientated world.

To do so, the desired as well as the existing VL competencies (VLC) of first-year students were determined. Underpinning the approach to VL in this study, the theoretical discourses around semiotics (Kress & Van Leeuwen, 2001) as well as constructivism (Holmes et al., 2001; Holmes & Gardner, 2006) and connectivism (Siemens, 2005; Mattar, 2018) were considered. The study had a dual focus of applying the theory of SDL, multimodality and mobile learning to the practice of developing the VL of first-year students on a rural campus in South Africa. I intend to investigate how multimodal mobile VL content could be embedded into an existing academic literacy module. Driven by the changing needs and requirements for individuals to function in the modern world, he contents and activities offered to students should contribute towards their self-directedness, in a quest for nurturing life-long learning.

1.4 RESEARCH QUESTIONS AND AIMS

1.4.1 Research questions

The following main research question formed the starting point of the study design:

- *How can the visual literacy of first-year university students be enhanced by means of self-directed multimodal mobile learning?*

In order to ensure a complete understanding of all the components of the research question, the following secondary research questions were formulated:

- Secondary Research Question 1: What are the visual literacy competency standards (VLCS) needed by students in an academic multiliteracies environment?
- Secondary Research Question 2: What visual literacies do rural first-year students bring with them to the university?
- Secondary Research Question 3: What multimodal teaching and learning activities could be used to develop the visual literacy of students?
- Secondary Research Question 4: How could multimodal mobile visual literacy activities contribute towards fostering SDL?
- Secondary Research Question 5: What recommendations could be made with regard to the content, multimodal teaching and learning activities and fostering of SDL skills for a visual literacy component in the academic literacy course?

1.4.2 Research aims

The main research aim of the study was to:

- determine how the visual literacy of first-year university students can be enhanced by means of self-directed multimodal mobile learning.

The following sub-aims supported the main aim above, as the study aimed to:

- through document analysis, determine the visual literacy competency (VLC) needed within an academic multiliteracies environment.
- empirically investigate what visual literacies first-year students on a rural campus bring with them when they enter higher education (HE).
- from the literature, determine the multimodal teaching and learning activities to develop the visual literacies of students.
- establish, through the contribution of the literature, how the multimodal mobile visual literacy activities could contribute towards fostering SDL.
- conclude what recommendations with regard to the content, multimodal teaching and learning activities as well as skills to foster SDL should be focused on in a visual literacy component in the academic literacy course.

1.5 RESEARCH DESIGN AND METHODOLOGY

1.5.1 Philosophical orientation

This study drew on a relativist social epistemology, which proposes that our knowledge and understanding of the world is not static, as the world also changes and what works now will also change over time (Plowright, 2011). This epistemology informs the research paradigm, which

anchors the research process, as it provides the framework for the research. The pragmatic paradigm was relevant to this study. The pragmatic paradigm supports the perspective that the truth can be regarded as “what works”. According to Plowright:

> *Pragmatism rejects the idea that we can never arrive at a final and unequivocal understanding of the world and its characteristics. Our beliefs are ‘work in progress’ and therefore subject to change, amendment, and revision. Knowledge and understanding are neither static nor certain* (Plowright, 2011, p. 184).

The pragmatic paradigm was adopted as the primary goal of the research was not to prove a certain hypothesis but to attempt to address a real-world problem. This real-world problem was formulated as a research question (cf. § 1.4.1), which stood central, and I conducted research that “[had] a purpose, that [was] aimed at informing decisions and activities that impact on the world, and that solve problems” (Plowright, 2011, p. 185). The problem, in this case, was the VL of first-year students. This paradigm informed my decision to use an inductive approach. This approach aims to generate an understanding of the problem to look for possible solutions.

1.5.2 Research design

An integrated methodology research design was used in accordance with the framework proposed by Plowright (2011). The choice of this design was motivated firstly by the fact that the researcher was looking for an innovative approach to mixed-method research. Mixed methods were of importance as both narrative and numerical data would be gathered. The Framework for an Integrated Methodology (FraIM) offered these possibilities. A further motivation was that this framework is regarded as particularly suitable for studies of social or educational phenomena where integrating different research processes is required to produce a coherent whole. The researcher was also fascinated by the fact that the research question serves as a starting point for the research, consequently leading to the practice informing the theory. Although some traditionalists may find this approach strange, the researcher could associate with it due to her own pragmatic approach to real life educational issues.

FraIM provided a basic structure (as illustrated in figure 1-2) for the research project and served as a guideline in the methodological decisions I made.

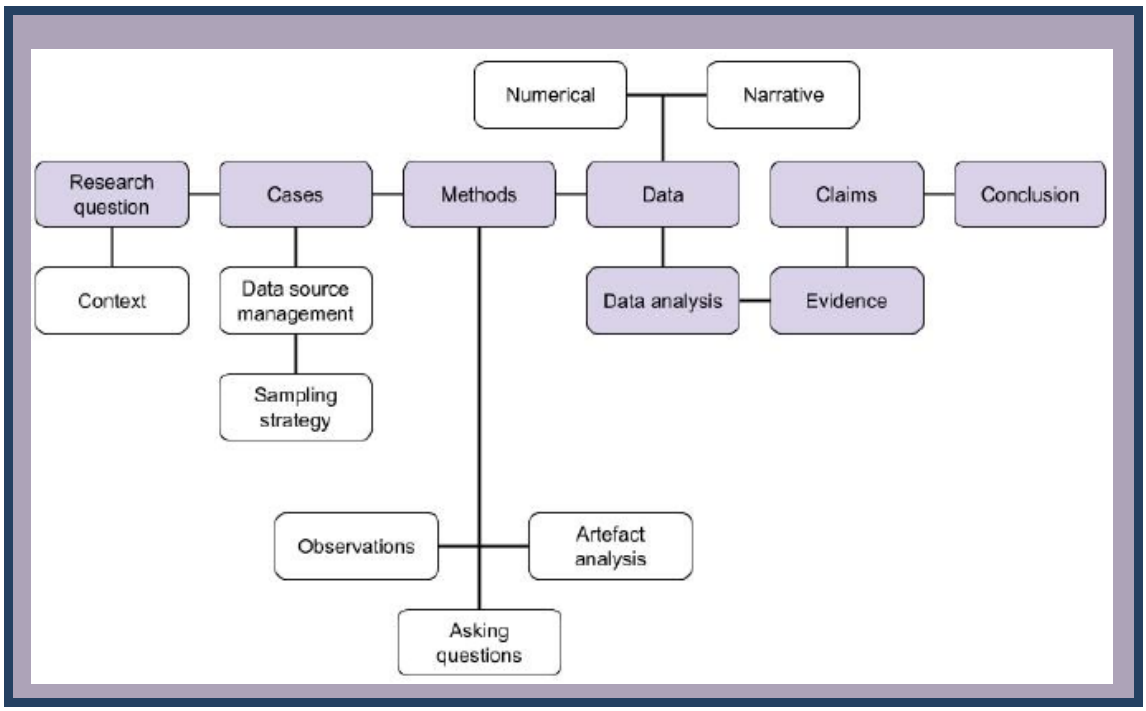


Figure 1-2: Plowright's FraIM structure

(Source: Adapted from Plowright, 2011, p. 9)

An important aspect of FraIM is that although the researcher can have a certain philosophical outlook, the study is not driven by a philosophical position at the beginning of the study. Rather, the research question (see § 1.4) stood central, and I was encouraged to have a "more responsive, flexible and open-minded attitude" (Plowright, 2011, p. 7). An important phase in FraIM is the contextualisation of the research question, as this cannot be truly understood without an understanding of the different contexts as role players in the research.

1.6 CONTEXTUAL BACKGROUND TO THE STUDY

To form a deeper understanding of the origin of the main research question (§ 1.4) and a departure point to apply the specific research design (§ 1.7), the five contexts that influenced the research topic are unpacked. The national and policy context is discussed in one sub-section, as the efforts of the Government to address the challenges in education are converted into policies to ensure implementation.

1.6.1 Theoretical context and conceptual framework

Three theoretical concepts were identified as role players in the conceptual framework of this study, namely social semiotics theory, constructivist learning theory, and connectivism.

Social semiotics is a key role player in the meaning-making process and is concerned with the media used to spread information as well as the modes of communication people use to convey

their understanding of their world across a wide spectrum of social and cultural contexts (Bezemer & Jewitt, 2009). Halliday (1978) introduced the term “social semiotics”, proposing that language cannot be separated from our social reality. In their work *Social Semiotics*, Hodge and Kress (1988) included other semiotic sources than language, namely images and other modes in the meaning-making process, whereas Kress and Van Leeuwen (1996) developed a social semiotic approach to the visual. This social semiotic approach to the visual (Kress & Van Leeuwen, 2001) as well as the focus on the co-operation of modes and the term “multimodality” (Bezemer & Jewitt, 2009) are of particular relevance to this study.

Communal constructivism has its roots in the social constructivism theory of Vygotsky (1978), who argued that learning is a collaborative process where knowledge is created through social discourse and, therefore, cannot be separated from the cultural context in which it occurs. Anderson (2016) contended that the different forms of constructivist theories all agree that the construction of knowledge depends on both individual and collective understanding and backgrounds. The collaborative nature of communal constructivism implies that a collaborative approach to learning would be suitable within this theoretical framework. The term communal constructivism was coined by Holmes et al. (2001) as an expansion of social constructivism and is defined as follows:

> *… an approach to learning in which students not only construct their own knowledge (constructivism) as a result of interacting with their environment (social constructivism), but are also actively engaged in the process of constructing knowledge for their learning community. (p. 1)*

According to Holmes and Gardner (2006), communal constructivism provides a platform for e-learning, where students can engage in new learning, contribute and store their knowledge in a communal knowledge base that is accessible to other learners. In this study, m-learning is regarded a natural expansion of e-learning, bringing with it the affordances of no learning restrictions with regard to time and place (Crescente & Lee, 2011). In addition to the relevance of m-learning in this study, both self-directed learning and multimodality can be associated with a constructivist approach to learning: when students are actively engaged in their own learning, learning becomes student-centred and SDL can be fostered (Olivier, 2019). In a multimodal learning environment, students can produce, distribute and save materials in different forms with the assistance of technology. In this regard, Pachler (2001) proposes that learners should be taught higher-order thinking skills and information, media and visual literacies (i.e., 21st-century skills, § 1.1).

The constructivist theory underpinning the learning process assisted by technology is known as connectivism. Despite the arguments by some scholars that connectivism does not constitute a new theory of learning (Bell, 2011; Clarà & Barberà, 2014), it can be regarded as a development of constructivism driven by the use of technology in education (Mattar, 2018). Siemens (2005), in his classical article, discussed the limitations of constructivism as a learning theory in the 21st-century due to the lack of reference to learning through technology. Learning theories need to be adjusted in an age where knowledge is assimilated in non-linear ways and where actions previously performed by learners are now carried out by technology (Mattar, 2018). An important function of technology in connectivism (whether it is regarded as a learning theory or pedagogy for online and distance education) is the role it plays in the concept of *zone of proximal development* (ZPD) as conceptualised by Vygotsky (1978). ZPD refers to "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86). In other words, it refers to the "space" between what learners can achieve on their own and what they can achieve when supported by the instructor or knowledgeable peers (Mattar, 2018). Regarding connectivism in this study, it is believed that technology could offer support to learners through the ZPD by providing the tool (e.g., a mobile device) and the opportunity to collaborate with others to construct knowledge. The second context that influenced the study was the professional context of the researcher.

1.6.2 Professional context

I have 28 years of experience as a secondary school language teacher of three languages. In the language syllabus of both home language and first additional languages, learners are exposed to the interpretation of visuals like advertisements and cartoons. The Reading and Viewing section of the syllabus refers to the "[i]ntensive reading of multimodal and visual texts" and describes the desired skills as "[l]earners (should) apply their knowledge of images and visual elements to understand how these support writing in multimodal texts" (DBE, 2012, p. 30). The technological developments have enabled teachers of many subjects to incorporate a variety of media (e.g., videos, images, and PowerPoints) into their lessons. In some instances, learners must record their own videos or make image boards to share their work. These multimodal presentations often have a strong visual component.

For the past seven years, I have been a university lecturer in academic literacy. The content of the course supports students in their acculturation in the academic environment and aims to address the skills needed to succeed. The content of the module is discussed as one of the data sources in the document analysis phase of the study (see chapter 6), but includes study skills,

finding, reading and understanding relevant academic texts and the writing and referencing skills required for academic assignments.

In both these educational settings, the growing impact of the visual engagement of learners and students with mobile devices in different contexts has led me to obtain a Master of Education degree in language learning with mobile applications (apps). One of the findings confirmed the impact of visual elements to motivate users to engage with the language applications (Mathee, 2017).

Over the three decades of my career, digital developments have led to a shift in literacy from static textbook images to interactive visual elements and multimodal ways of sharing information. Information in different forms is available with the click of a button. Mobile technology, the Web and social media lead to the effortless viewing and sharing of images worldwide (Matusiak et al., 2019). The COVID-19 pandemic and, consequently, the forced move to more hybrid and online teaching practices intensified the spotlight on the affordances of technology and transliteracy in the academic context. On the other hand, it also exposed the potential barriers to learning if students do not have the means, knowledge, or experience to understand these different literacies and technologies. As a lecturer, I am confronted daily with students who find themselves in this unknown territory and, as a result, experience feelings of anxiety, inferiority, incompetence and demotivation.

First, students increasingly have to make sense of information shared through different modalities, of which the visual is one. My observations in this regard brought the following questions to mind: Do they even know how to interact with the visual materials they are exposed to? What can be done to enhance their VL? Second, the question regarding mobile phone usage is whether students rely on mobile devices for study purposes or just engage with them on a social level. Third, students are expected to work more on their own, and although the information is everywhere, I was interested in determining if they had the qualities needed to be self-directed. This research was an attempt to understand these aspects better and find some answers. The study also took place within a specific organisational context.

1.6.3 Organisational context

The research was conducted on one campus of a three-campus university in a rural setting in one of the mostly rural provinces of South Africa. The university, in its current format, came into being after the original merger of two of the campuses in 2004 (NWU, 2015). The merger has resulted in a student body that is more demographically diverse than ever (Lalenlde & Mgijima, 2018). The context of the campus relevant to this study reflects a student body with huge differences in schooling, race, financial and other resources (Chetty & Pather, 2015).

The challenges experienced by many of these students include a lack of the needed finances and academic readiness, an inability to adapt to the academic and social world on campus, and language barriers (Chetty & Pather, 2015). According to Pather and Dorsamy (2018), universities need to focus on understanding the challenges students face, especially those related to social and academic adaptation. Such a focus could foster the success and retention of specifically first-year students through effective support.

Within the organisational context, this study wanted to emphasise the role and responsibility of HE institutions to recognise the educational potential of the visual modes by introducing at least some elements of VL education across all disciplines (ACRL, 2011; Bleed, 2005; Felten, 2008). Despite the calls for training in VL, it is still to be systematically addressed in formal education (Bowen & Whithaus, 2013; Elkins, 2007; Gee, 2000; Hattwig et al., 2013; Jordaan & Jordaan, 2013; Kędra & Žakeviĉiūtė, 2019; Kress & Van Leeuwen, 1996; Lankshear & Knoble, 2003). The final context is related to policy within the national context.

1.6.4 National and policy context

Since 1994, several national White Papers have reshaped the South African education system. The Constitution of South Africa, incorporating the Bill of Rights, informed the transformation in education. It stipulates equality and the right of all to both basic and further education (The Constitution of South Africa, 1996).

The Education White Paper 3 (EWP, 1997) envisaged HE institutions as organisations offering wider access to tertiary education for students coming from poor socio-economic backgrounds (Pather & Dorsamay, 2018). In reality, student enrolment at 26 public universities has increased by half a million students since 1994. The biggest part of the student body is now Africans, and the Government has set a target of increasing university enrolment to 1.5 million by 2030. The motivation is to address the still-existing disparity between the population size and student numbers, which currently stand at one million students out of a population of 55 million (Tjønneland, 2017).

Although the sharp increase in student numbers should be regarded as reaching a set target, HE faces many challenges: racial and gender disparities still exist, and frustration due to inequality and socio-economic challenges, such as extreme poverty and unemployment, have led to student protests on campuses, causing disruption to academic programmes. The White Paper on Higher Education (Department of Higher Education and Training, 2014), titled “Building an expanded, effective and integrated Post-school System”, addresses not only the challenges faced by the complex HE landscape of South Africa but also seeks to redefine the role of HE and create institutions of excellence (Chetty & Pather, 2015). Regarding this role, the Government expects

institutions of HE to, among others, contribute to a larger degree towards innovation, poverty reduction and inclusive economic development (Council of Higher Education and Training, 2016) and also stipulates the provision of high-level skills to students in preparation for their successful entrance into the labour market (Department of Higher Education and Training, 2016).

In addition to these expectations and new roles, the COVID-19 pandemic forced educational institutions to change the way education is approached – new policies and online modes of instruction had to be implemented at short notice. One of the major realities that emerged is the strong digital divide between urban-rural areas and the inequality in access to the Internet (Olivier, 2018; Stats SA, 2020). These realities influenced the readiness of students entering HE for the first time, on top of the "normal" challenges associated with the transition to HE. Another crucial element of this context speaks to the literacy levels of students.

1.6.4.1 Student literacy levels

The way the students who enter our classrooms communicate is overwhelmingly visual; images represent the mode of communication in their daily activities – they share videos, engage in video chats, and use emoticons, GIFs and emojis to convey their ideas (Kędra & Žakevičiūtė, 2019). These students in our classrooms have many names: millennials, post-millennials, Digital Natives (Prensky, 2001), and Capurro (2017) goes a step further by referring to them as Homo Digitalis, emphasising their transition from a written culture to the culture of verbal and visual communication (Dyak et al. 2022). However, despite their technological competence in handling their mobile devices, they are often visually illiterate, as they do not know how to interpret and evaluate images or how to use them to communicate effectively (Brumberger, 2011; Emanuel & Challons-Lipton, 2013).

In addition, the moment they enter HE, text plays a central role. Even though education has changed significantly due to the COVID-19 pandemic and students are exposed to visual teaching methods, like online classes and PowerPoint presentations, a large amount of information is still communicated through text. In the context of this study, the textual content of highly academic course material offers an extra challenge to non-mother-tongue speakers.

These factors are further advanced by the existing low literacy levels of students entering HE: The majority of South African learners simply have not acquired the normal milestones with regard to numeracy and literacy when they enter HE (Du Plessis, 2015). This leads to high dropout rates and consequently, bad results of HE institutions, as referred to in the previous section: only 50% of undergraduate students manage to graduate within five years – two-thirds of this group

receives funding from the national financial aid scheme, adding an additional financial burden (Tjønneland, 2017).

Major improvement in primary and secondary education seems like the logical solution. However, this will not happen overnight. In a bid to address the lack of relevant literacy, many South African universities have already initiated programmes like academic literacy courses more than 20 years ago to intervene and support students to acquire the literacy levels expected at university level (Hlalele, 2010; Skillen, 2006; Townsend, 2010). However, the way information is shared in the technology-driven 21st century requires radical and fast adaption of the educational practices in HE if institutions wish to fulfil their mandate of preparing students for the modern world where the norm for conveying data, information and emotions has changed from text to the visual (Foster, 2008; Meyer, 2010; Tillmann, 2012).

This “visual turn” offers a substantial challenge to institutions and lecturers, as a large body of lecturers are still more comfortable and skilful when using words rather than visual material (Kędra & Žakevičiūtė, 2019). This study aimed to evaluate the VLC of students to contribute towards the development of this important literacy.

In conclusion to the section, some photos which could offer a better idea of the context of this study, have been included (Addendum A). Now that the different contexts relevant to the study have been explained, the rest of the research process can be discussed.

1.7 RESEARCH METHOD

The study included a literature review of the main concepts used in the study. The following keywords were used to find relevant literature: VL, SDL, multimodality, and mobile learning. For the empirical research, FraIM proposed an integrated methodology, which rejects the traditional dichotomy between qualitative and quantitative methods (Plowright, 2011). The main focus is on gathering appropriate data to address the research questions. “Cases” refer to the sources of information, for example, documents, artefacts, or participants (in the case of people).

1.7.1 Cases and sampling

The first phase of the study involved documents and VL frameworks as cases. These were selected through purposeful sampling, as they were regarded as trustworthy documents that could provide the information needed. The first set of documents was the module overview and academic rules for the introductory and advanced academic literacy modules offered at the institution where the research was conducted. The second document set included the VLCS and Framework for VL as compiled by the American Association of College and Research Librarians (ACRL, 2011). These documents could provide information on the trends, approaches and

content regarding VL in the United States. A similar motivation, this time with regard to Europe, informed the selection of the third set of documents, namely the Common Framework of Reference for VL as well as the Revised Common Framework for Visual Literacy as compiled by the European Network for Visual Literacy (ENViL, 2016).

After the document analysis, cases for participation in phase 2 (i.e., an online questionnaire survey) were sampled using a purposive, non-probability sampling strategy, which generated a convenience sample. The sampling strategy was a recruitment process involving an invitation to all the participants in the questionnaire who had indicated their interest in learning more about VL. The cases were first-year students enrolled for the academic literacy module. The cases for the third phase (i.e., semi-structured interviews) were also first-year students enrolled for the academic literacy module who had completed the online questionnaire. The cases for the fourth and final phase of the study were inanimate objects in the form of academic assignments, which included visuals. To obtain these artefacts, non-probability, purposive sampling was employed. Certain criteria were in place – for example, the artefacts had to include visuals and had to be original academic work submitted in a module other than academic literacy. In addition, the artefacts were collected from the same group of participants who participated in the semi-structured interviews.

1.7.2 Data collection

The data collection was done during four research processes (referred to as phases), tapping into the advantages of different research approaches in one study by "supporting the integration of different elements of the research in the process of studying a topic, without favouring a certain element over the other" (Plowright, 2011, p. 4). This is a suitable approach for the exploratory nature of this study. Table 1-1 provides an overview of the four phases of data collection.

Table 1-1: Data collection phases

Phase	Cases	Collection method	Purpose
1	Information-rich documents	Internet	To obtain an overview of the academic literacies module, as well as to determine the perceived VLC deemed as necessary for students as identified by leading VL organisations in other countries.

2	First-year students enrolled for the academic literacy module	Google Forms online questionnaire (Addendum C)	To obtain information on aspects as identified in phase 1 and informed by the framework conceptualised after phase 1, e.g., background, device ownership and use; VL competencies first-year students bring with them as well as their knowledge and perception of VL.
3	Students who participated in phase 2 and indicated an interest in further involvement.	Individual semi-structured online interviews (Addendum D)	To gain deeper insight into key aspects related to VLC as identified after the analysis of phase 2.
4	Artefacts in the form of academic assignments submitted by participants in phase 3.	Online submission by participants.	To evaluate the practical application of VLC as informed by participant responses in phases 2 and 3.

1.7.3 Data analysis

Both numerical and narrative data were collected in this study, therefore different methods of analysis were applied. The movement between the different types of data to better understand the research topic is one of the key features of FraIM. The first phase consisted of document analysis, implying an analytical deconstruction of the documents to gain access to trends and patterns related to a specific subject matter (Creswell & Plano Clark, 2007).

The responses to the questionnaire, as administered in phase 2, were treated in a pragmatic way, implying that the data need not be analysed exclusively through statistical means. Likert-scale ratings were used as indications to trends and not regarded as absolute values. Two cycles of analysis were employed: Firstly, the predominantly numerical data was downloaded onto a Microsoft Excel spreadsheet and categorised according to the sections as pre-determined after phase 1. The second cycle consisted of indicative qualitative analysis (Saldaña, 2011), employing thematic coding. This was done with the aid of the designated software of ATLAS.ti™ as well as the assistance of an additional coder. These interventions were employed to ensure the trustworthiness of the analysis (Turner & Daniel, 2010).

The data collected in phase 3 (semi-structured interviews) were narrative, and the analysis was done according to the process proposed by Creswell (2013), which culminated in thematic coding (Boyatzis, 1998). The analysis of the data from phase 4 in the form of visuals in academic assignments was done through the deconstruction of the artefacts into numerical categories which could then be reported on in a narrative format to explain trends and patterns.

1.8 ETHICAL CONSIDERATIONS

Even though the research was classified as “low risk” by the North-West University’s Faculty of Education Research Ethics Committee, the cases were still, to a large extent, human participants. The protection of the participants and their rights and interests during all stages of the process was thus imperative.

Data collection only commenced after an ethical clearance had been issued by the North-West University’s Faculty of Education Research Ethics Committee (Addendum E). The questionnaire as well as the schedule for the semi-structured interviews, were also submitted. With regard to ethics, the following issues were considered:

- Participants were informed about the nature of the study, and only students who provided written informed consent took part in the study (Addendum B).
- Although the participants were required to include their student numbers in the questionnaire, the students’ confidentiality and privacy were respected at all times, and the identity of students remained confidential.
- The students' marks for the academic literacy module were in no way influenced by the research.
- Participation in the study was voluntary and optional, and participation did not have an impact on any assessments.
- Participants had the option to withdraw from the study at any stage.

1.9 ROLE OF THE RESEARCHER

Due to the huge potential number of participants and the reality that during Covid-19 where students were not on campus, the participants and the researcher did not have any close connection. In addition, the data collection of phase 2 which involved the completion of the questionnaire, was done online, so there was no direct contact between the participants and the researcher. In preparation for the semi-structured interviews for phase 3, the researcher communicated the necessary arrangements with the volunteers through email. The interviews were conducted through Zoom, so this phase did not entail direct contact between the parties.

A possible conflict of interest was considered due to the position of myself as researcher at the same institution where I am employed as lecturer. The challenge of possible predispositions and

assumptions were to a large extent mitigated by the fact that the participants were not taught by me during the period before, during or after the research. Furthermore, I did not interact with them through direct contact and did not have any prior knowledge related to their performance, or background. As far as loyalty to my institution is concerned, the aim of the research was not only to “find out”, but also to address the findings by working on practical solutions which would benefit both the students and the institution while the focus was not actually to evaluate the existing practices at the institution. Contribution of the study

This study was conducted within the *Research Entity of Self-Directed Learning*, and as such aims to construct new knowledge and understanding in fostering SDL in students. In addition, the possible contribution of multimodal mobile activities has been explored to this regard. The study was also conducted against the background of an academic literacy module which addresses various components relevant to first-year students' academic requirements and acculturation. The study also attempted to apply the multimodal mobile activities to develop the VL of students while at the same time fostering their self-directedness. As explained in section 1.3, little research has been done on either the VL needs or competencies of students in the South African context. In this regard, a framework for the incorporation of VL into the existing academic literacy module was conceptualised. This study, therefore, makes a theoretical as well as a methodological and practical contribution towards the scholarship of SDL and VL.

1.10 CHAPTER OUTLINE

This thesis comprises 10 chapters.

Chapter 1 provides the outline of the research. It gives a brief background to the study and explains the research problem. An account of the integrated mixed-methods design applied in the study is provided, followed by the main research question and the sub-questions and aims that guided the research activities. The different contexts that influenced the choice of the research topic and were directly relevant to the research question, as well as the other research aspects relevant to FraIM were also alluded to. In addition, the ethical considerations, the role of the researcher, and the contribution of the study are presented.

Chapter 2 provides a literature review and background information on literacy in general as well as academic literacy. As far as literacy is concerned, the major changes in the views on literacy are considered with reference to the key moments in the historical development of the concept. This is followed by literacy in the context of this study, namely HE, with specific reference to the challenges in the South African HE environment. Lastly, the concept, practices of and approaches to academic literacy in HE are discussed.

Chapter 3 is dedicated to VL. A historical overview, including crucial developments, definitions and shared concepts throughout the eras, is followed by a reference to the challenges within the field. The chapter culminates with a look at VL in HE, with specific reference to the body of research, motivation to attend to VL, VL skills as well as the different approaches towards the acquisition of VL.

Chapter 4 is the final theoretical chapter and attends to the three concepts relevant to the study: multimodality, SDL and m-learning. The three sections follow a similar approach, namely starting with the contextual background followed by the conceptual background. This is followed by relevant aspects, such as the application within the educational context, existing models, as well as challenges. With SDL, attention is also given to the different role-players as well as the fostering of self-directedness. At the end of the chapter, a synthesis on the three concepts is provided.

Chapter 5 describes the methodology of the study in detail. The inclusion of this chapter was deemed important, and motivated due to the use of a specific mixed-method design which has some components and processes the reader might not be familiar with.

The following four chapters (6–9) describe the four phases of empirical research. Due to the different research methods employed in each phase (cf. figure 1-1), the components relevant to FraIM, namely case selection, methods, data collection and data analysis, evidence and claims, will be discussed in the relevant chapter

Chapter 6 describes phase 1 of the empirical research, namely the document analysis. The aim of this phase was to gain insight into two topics: the academic literacy programme and the attention given to VL; and the approaches and perceived VLCs required by students in the 21st century. This information was obtained from two sets of documents from the United States and Europe. It resulted in the identification of seven categories used as a guide in the following phase.

Chapter 7 describes the phase 2 research activity, namely asking questions in the form of a questionnaire. The aim of this research activity was to gain insight into the seven categories as identified after phase 1. The categories addressed participants' background, mobile device ownership and usage patterns, perception of BL, and VL competencies when entering HE. The results in the form of evidence and claims are also presented.

Chapter 8 describes the phase 3 research activity, namely asking questions, this time in the form of individual semi-structured interviews. The aim of this phase was to gain a deeper insight into some key issues identified through the evidence of phase 2. All the components relevant to FraIM,

as explained above, were again attended to. The results in the form of evidence and claims are also presented.

Chapter 9 describes the final phase of the research, namely artefact analysis. The aim of this phase was to observe the practical application of the VLCs, as referred to in the previous phases. The evidence and claims which are presented will assist in the final synthesis of the results from all the phases.

Chapter 10 concludes the work by providing an overview of the research project as well as a synthesis of the findings and conclusions reached. The significance and limitations of the study, as well as recommendations for future research, conclude the chapter.

1.11 SUMMARY AND CONCLUSION

This chapter provided a roadmap for the study by attending to all the different aspects that were considered in preparation for this study. The background to the conceptualisation of the study, explaining the problem statement and stating the research questions and aims, was provided. First-year students within the South African context experience a variety of challenges when entering HE. These challenges are addressed in partly compulsory academic literacy modules. However, even though VL is regarded as one of the core literacies of the 21st century, it only receives limited attention. In this context, a question arises as to how the VL of students can be enhanced. The view of the concept of literacy has undergone major changes over the last three decades, mainly driven by the affordances offered by technology. In addition, academic literacy is also approached in a variety of ways by different institutions. The next chapter therefore explores the terms *literacy* and *academic literacy* to provide the relevant contextualisation for this study.

CHAPTER 2: LITERACY

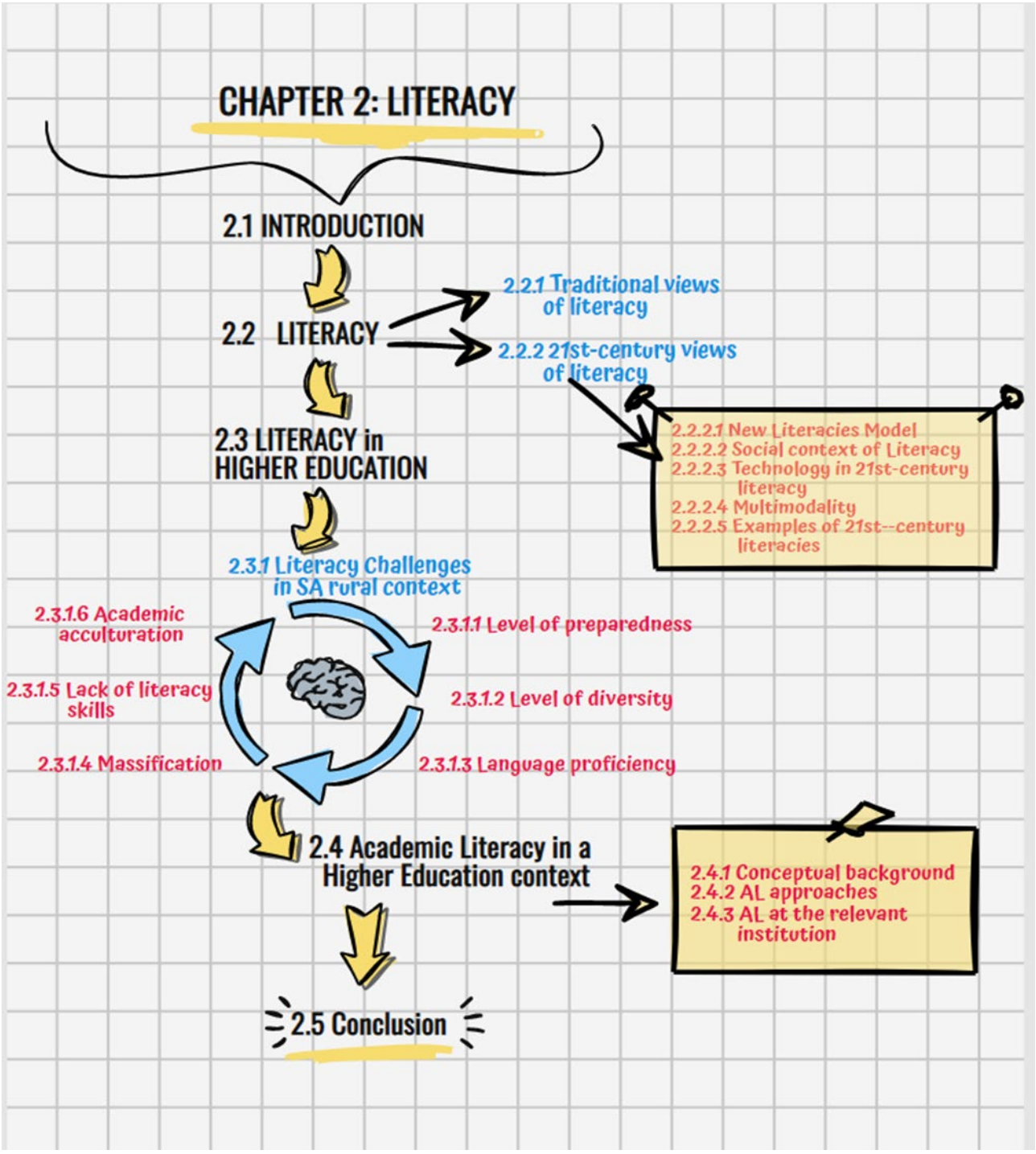


Figure 2-1: Mind map of chapter 2

2.1 INTRODUCTION

The concept of literacy has always been problematic to define, as it changes and adapts according to the needs and practices of groups of people. Literacy is quickly evolving to encompass skills that extend beyond reading and writing with pen and paper. Students today must be able to navigate the online space to successfully access information and opportunities (Tucker, 2014).

Therefore, before the focus can be placed on VL as core element of this study, it is necessary to briefly address the context, complex nature and interconnectedness of different types of literacies relevant to this study. This chapter aims to provide this contextualisation in preparation for addressing the following research questions about VL:

Table 2-1: Research questions guiding this phase of the study

Research question:	
Secondary research question 1:	What visual literacies do rural first-year students bring with them when they enter HE?
Main research question 5:	How can the visual literacy of first-year university students be enhanced by means of self-directed multimodal mobile learning?

The chapter consists of two main sections, each with relevant subsections. The first section (§ 2.2) focuses on the concept clarification of literacy in general and highlights the main differences between traditional literacy (§ 2.2.1) and 21st-century literacies (§ 2.2.2). Literacy in the HE context (§ 2.3) is discussed, with specific reference to the challenges in HE in the rural context of this study (§ 2.3.1). This is followed by a concept of specific relevance to this study, namely academic literacy (AL) (§ 2.4). The subsections address essential components, such as the conceptual background in the context of the study (§ 2.4.1), approaches towards AL (§ 2.4.2) and AL at the relevant institution (§ 2.4.3). The chapter is concluded with a summary of the discussed content (§ 2.5).

2.2 VIEWS ON LITERACY

2.2.1 Traditional view of literacy

Traditionally, literacy was associated with reading and writing. The United Nations Educational Scientific and Cultural Organization (UNESCO) is one of the key organisations that has been concerned with literacy over the past six decades. They regularly update and broaden the

definition (Wagner, 2011). At the beginning of the new millennium, their definition still focused mainly on the traditional views on reading and writing traditional texts: the 2004 definition stated that "[l]iteracy is the ability to identify, understand, interpret, create, communicate and compute, using printed and written materials associated with varying contexts" (Montoya, 2018, p. 2), whereas in 2006, they indicated that "[t]he most common understanding of literacy is that it is a set of tangible skills, particularly the cognitive skills of reading and writing" (UNESCO, 2006, p. 149). Winch et al. (2011, p. 697) also focus on reading and writing in their definition: "[Literacy is] the ability to read and write; a synthesis of language, context, and thinking that shapes meaning." This definition is aligned with those by Bawden (2001) and Moats (2000).

The majority of these definitions, with the exception of texts in Arabic, are based on a linear view of "text" – that is, something that can be read from left to right (Cope & Kalantzis, 2000; Walsh, 2010). In addition, these definitions and approaches confirm the reality that the concept of literacy was historically – even as recent as the end of the previous century – primarily associated with language, thus excluding other modes of meaning-making (Archer, 2006; Kress & Van Leeuwen, 2020).

Another important aspect in the traditional view of literacy is the "autonomous" model of literacy, according to which literacy is reduced to a set of generic, technical and unitary skills or competencies that are neutral to social, political and cultural influence (Picard, 2006; Street, 1984). In practice, this means little to no recognition of the possible diverse social and cultural backgrounds of readers and conventions embedded in texts (Norris & Phillips, 1994, 2003; Sørvik & Mork, 2015). However, around the turn of the century, definitions started to include the social contexts of literacy (Gee, 1996; Lankshear & Knobel, 2003; Warschauer, 2010).

Street (2003) also questions the previously mentioned autonomous approach by indicating that it could imply forcing Western notions of literacy onto other cultures. Policymakers – including UNESCO – started to recognise the limitations of literacy as a single universal concept (Robinson-Pant, 2012). In the multicultural context of this study at a rural-based university in South Africa, such a narrow approach could negatively influence the perceived literacy of students from diverse backgrounds and cultures. In addition to the social contexts, the definition of literacy had to be expanded to include the skills necessary to function in the information and knowledge society of the 21st century (Van Deursen & Van Dijk, 2014).

2.2.2 21st-century literacies

The clear need for the transformation of the literacy concept has been acknowledged since the end of the 20th century by, among others, Baynham (1995), Gee (1996) and Street (1995). In the context of this study, three major aspects stand out regarding what the concept of 21st-century

literacy entails: first, the “New Literacies model” historically represents this new view of literacy (§ 2.2.2.1); second, in this new literacy model, the social context is regarded as an integral part (§ 2.2.2.2); and third, technology is a major component of being literate (§ 2.2.2.3).

2.2.2.1 New Literacies model

In contrast to the autonomous model of literacy mentioned in the previous section (§ 2.2.1), “New Literacies” is regarded as an “ideological” model of literacy (Street, 1984, 2003). This model regards literacy as a social practice rooted in cultural and ideological contexts (Barton & Hamilton, 1998; Lee et al., 2014; Gee, 2008; Jewitt, 2008; Sørvik & Mork, 2015; Street, 1984, 1995, 2003, 2005). This is a crucial shift from the traditional view as discussed in the previous section (§ 2.2.1) and implies a much more complicated scenario for literacy, as, according to Leu et al. (2007, p. 6), “the construct means many different things to many different people”. Oxford (2018) adds to this by stating that in addition to the above, lifelong learning and the ability to adapt in different areas of life are important components of being literate in the 21st century.

The term “New Literacies” was first used by the New Literacies Studies (NLS) movement during the 1990s. In the interest of avoiding confusion, one should take note of the difference between the terms *new literacies* (lower case) and *New Literacies* (upper case) as presented at a later stage by Leu et al. (2004, 2011). This umbrella analogy explains it well: The overarching umbrella represents New Literacies, whilst everything in the field under the umbrella represent the technologies and contexts that are studied and are referred to as new literacies (Leu et al., 2011).

It also refers to a dual approach towards literacy and pedagogy: To be multiliterate implies that a person can command a variety of diverse and complex modes of expression as well as the technology used by them (Bateman et al., 2019). Consequently, multiliteracies was defined as the multiple ways of communicating and making meaning, including such modes as visual, audio, spatial, behavioural and gestural (New London Group, 1996). Therefore, a “pedagogy of multiliteracies” (Cope et al., 2018) entails a broader representation and multimodal communication (Cope & Kalantzis., 2020; Walsh, 2010), wherein “text” is often non-linear.

2.2.2.2 Social context of literacy

The term “multiliteracies” was first used by the New London Group in 1996 to refer to a “new” approach to literacy. This new approach was motivated by several factors, of which the social context was one: a shift in the usage of the English language within different cultures was recognised, influencing communication. This new approach to literacy suggests multiple communication forms, leaving room for a globalised community’s cultural and linguistic diversity (Bateman, 2014). The implication is that literacy involves much more than making meaning by

decoding a word or a sentence (Sørvik & Mork, 2015) – it entails engaging and participating in "particular ways of thinking about and doing reading and writing in cultural contexts" (Street, 2003, p. 79). In addition, it considers how literacy has been influenced by "social, cultural, and technological change" (Anstey & Bull, 2006, p. 23). When we regard literacy in this way, it becomes a social activity, involving people's values, social relationships, culture, attitudes and beliefs regarding text (Cervetti et al., 2006; Drackle, 2006; Sørvik & Mork, 2015).

The 2006 and 2012 UNESCO definitions both refer to this social relevance of literacy: "[Literacy is] a tool of personal empowerment and a means for social and human development" and portrays a social semiotic and communal constructivist approach in acknowledging the unique literacies of different communities"; "… literacy involves a continuum of learning in enabling the individual to achieve his or her goals, develop his or her knowledge and potential and participate fully in community and wider society" (Montoya, 2018). This mirrors the "Zeitgeist" of social responsibility and human rights – that invisible force relevant to the current epoch in history.

2.2.2.3 Technology in 21st-century literacy

The influence of technology on the literacy concept is a dynamic process that is still continuing (Pilgrim & Martinez, 2013). As Budd (2021) contends, in the digital age, information is shared through a variety of sources and mediums, and people need to be able to decode all this data to share new information. This variety of semiotic sources for meaning making, ranging from text to images and other modes, was already acknowledged in *Social Semiotics* by Hodge and Kress (1988). Pilgrim and Martinez (2013, p. 60) acknowledge the importance of technology by suggesting that the 21st century of literacy "increasingly reflect[s] technology use and the abilities necessary to problem-solve, collaborate, and present information through multimedia". The 2018 definition of the European Literacy Policy Network (European Declaration of the Right to Literacy) also includes digital literacy: "[Literate] individuals can effectively understand and use written communication in all media (print or electronic), including digital literacy" (Montoya, 2018). This is supported by Parker (2018), who notes that technological advances imply infinite ways of being literate, necessitating whole new sets of skills in addition to reading and writing. Goldstein (2016) adds to these views by contending that being literate demands an ability to understand and interpret digital groupings of different modes – visual, verbal, written, signs, or musical. So, even though the basics of reading and writing have not changed, the activity has evolved from processing a linear printed text to being able to access and make meaning of a multimodal combination of text and image (Luke, 2003).

2.2.2.4 Multimodality in 21st-century literacy

Multimodality, as conceptualised by Kress (2003), not only refers to the multiple modes of communication and the variety of ways print and media are represented as part of 21st-century literacy but also determines the ways readers approach literacy (Pilgirm & Martinez, 2013). Kress (2010) ascribed these changes in the concept of literacy to the media that drives this ever-developing array of communication modes, especially the shifts from book to screen.

On a practical level, to be literate implies that an individual must make meaning of different types of "texts". Regarding text, scholars find themselves constantly transforming their ideas about what is regarded as text that can be "read" and "written" (Larson, 2013). Traditional texts were handwritten or printed, linear, static, and physically bound. On the contrary, contemporary texts are often digital texts that are nonlinear, multimodal and not restricted to time or space (Dalton & Proctor, 2008). These multimodal texts are typically a combination of different forms, including words, sounds, computer graphics, video clips, blogs, and digital photos (Cope & Kalantzis, 2017; 2020; Walsh, 2010; Zammit, 2015).

2.2.2.5 Examples of 21st-century literacies

The ever-expanding list of "new literacies" includes multimodal literacy (Kress, 2003; Serafini, 2014), digital literacy (Hobbs, 2017), digital media literacies (Reyna et al., 2018), social media literacy (Rheingold, 2010), VL, web literacy (Pilgrim & Martinez, 2013), information literacy, and many more. One of the more recent terms is "metaliteracy", which refers to the media, visual and digital literacies that form part of traditional information literacy (Jacobson & Mackey, 2016). Table 2-2 highlights some of the most dominant literacy concepts of the 21st century and what they entail.

Table 2-2: Summary of the major 21st-century literacy concepts

Term	Description	Scholar / Entity
Information literacy	The ability to recognise the need for information, and the ability to retrieve, evaluate and effectively use this information.	ALA (American Library Association), 2000
Multiliteracies	The multiple ways of communicating and making meaning	New London Group, 1996
New Literacy	The use of new technologies to gather and share information	Coiro et al., 2008

Digital Literacy	The ability to find, evaluate, use, share and create content through using information technologies and the Internet	Steel, 2009
Web Literacy	The knowledge and use of specific skills needed to locate, analyse and communicate information found in the online environment	Lawrence, C. 2022
Media literacy	Ability to access, analyse, evaluate and create the content in a variety of contexts. Aware of the impact of media exposure. Choose to receive useful content and avoid unwanted content that the media offers	European Association for Viewers' Interests, 2014
ICT literacy	Ability to use digital technology, communication tools, and/or networks to access, manage, integrate, evaluate and create information for a learning society	The International ICT Literacy Panel, 2007
Visual literacy	The ability to find, interpret, evaluate, use and create images and visual media	Association of College and Research Librarians, 2011

The above-mentioned literacies, as well as others not relevant to this study, are collectively referred to as “multiliteracies”. The term implies a variety of diverse and complex modes of expression as well as their technologies (Bateman et al., 2019) and describes interlinked skills needed in 21st-century learning that involve modalities other than print – for example, communication via the Internet and through new technologies (Coiro et al., 2008; Pilgrim & Martinez, 2013).

From the above discussion, a few conclusions can be drawn of the concept of 21st-century literacy:

- Most recent literacy definitions still include the concepts of reading and writing while also referring to speaking as well as viewing or VL.
- Contemporary definitions include cultural relevance, critical thinking, critical literacy and the use of appropriate modes of communication (Huilcapi-Collantes et al., 2019; Kearney, 2020; Schwartz, 2018).

- Literacy today measures how effectively a person can communicate in different spheres (Khapp et al., 2018) and choose suitable modes for relevant contexts (Fellowes & Oakley, 2019).
- The ability to use and produce electronic and multimodal texts is crucial (Fellowes & Oakley, 2019).

It is clear from the brief discussion above that literacy today is regarded as a complex and dynamic concept, evolving with society. Even the meaning of "new" in respect of any development (in this case, literacy) becomes outdated very quickly, as the field constantly develops – what is new today, is dated tomorrow (Olivier, 2016). Parker (2018) also makes two important comments: first, it is almost impossible to be completely literate in the 21st century due to the rapid growth of areas in which one needs literacy skills; second, a final definition for literacy is highly unlikely due to the central role of rapidly developing digital technologies influencing the literacy concept.

The aim of the next section is to show the impact of 21st-century literacy in the context of HE and to refer to some of the major challenges.

2.3 LITERACY WITHIN A HIGHER EDUCATION CONTEXT IN THE 21ST CENTURY

In traditional education, the connection between literacy and language resulted in the mode of writing generally being overemphasised, leading to the neglect of other modes (Archer, 2017; Kress, 2005; Kress, 2010; Kress & Van Leeuwen, 2020; New London Group, 1996).

Though most people now acknowledge the existence of an array of different modes, literacies, and literacy practices, it is almost disturbing to realise that the curricula of schools and the majority of tertiary programmes are still dominated by a single literacy. It is probably easier and cheaper to use a one-size-fits-all approach (Robinson-Pant, 2012). However, this is not what is needed for 21st-century education to remain relevant and prepare students for the future.

Regardless of the name we give to the type of literacies needed by students, they all reflect the change regarding what is required in the 21st century (Pilgrim & Martinex, 2013). The change in the concept of what literacy entails, as discussed in the previous section (§ 2.2.2), emphasises the need for specific pedagogical attention to multiliteracies as well as the incorporation of a variety of modes, both in teaching and learning as well as assessment (Kedra, 2018; Thompson, 2019; Tillmann, 2012).

Mastering the new literacies is just one component of literacy in the 21st century. Educational institutions, like society as a whole, have been impacted by social, cultural and technological changes, which has resulted in "literacies" being defined as a form of social communication

(Beaunoyer et al., 2020). New literacies in the educational context, as alluded to by Kist and Pytash (2015), refer to sophisticated technological ways to interact with multimodal texts. Furthermore, these new literacies enable users to access information, process it by critically evaluating its relevance, and integrate it with other knowledge (Leu et al., 2018). Regarding writing as a form of communication in the 21st century, the whole concept has been transformed by the affordances offered through multimodal digital communication: Students are empowered with endless possibilities, as they not only act as consumers but also become producers and creators of texts. They can effortlessly share anywhere and anytime by the press of a button on their mobile devices (Mills & Unsworth, 2017; Papadopoulou et al., 2019).

Esperat et al (2021) highlight both digital literacy and information literacy as essential for coping in the current HE environment. In addition, they provide students with skills such as problem identification, critical thinking, problem-solving and communication (Rizqiana, 2021). However, in 2020, with traditional education being disrupted by COVID-19, role players in education also had to note the digital inequalities that fundamentally impact on the differences in access to knowledge and literacy through technology. These inequalities are closely linked to social, cultural, political and economic power, or the lack thereof (Beaunoyer et al., 2020). This has a definite influence on the way literacy should be approached in an HE environment where, in the case of this study, first-year students from a variety of social, linguistic and cultural backgrounds are brought together. Even before the disruption of COVID-19, context-specific challenges existed in HE.

2.3.1 Literacy challenges within the South African rural context

A review by the South African Council on Higher Education of the period 2009 to 2019 (Department of Higher Education and Training HEMIS database, 2019) shows that although the average success rate for students enrolled through contact mode of learning was 82.5% in 2019 (HEDIA, 2021), only 29% of students enrolled for a degree in 2011 completed their three-year degree within three years; with nearly half of the students (47%) took six years (double the allotted time) to complete their three-year degree (Statistics South Africa, 2019). These are the newest numbers available, as the government publishes this kind of information once every four years, with the next report due in 2023.

The implication of these figures in terms of the measures that universities have put in place or plan to put in place to support students towards success through, for example, an Academic Literacies course, is that the challenges contributing towards these less-than-desirable statistics need to be determined. This process of determining factors contributing to student failure in the South African HE context is complex. Some of the key factors linked to literacy are referred to below.

2.3.1.1 Level of preparedness

Following international trends, first-year students experience a series of challenges upon entering HE. Their inadequate level of preparedness is noticed repeatedly (Van Schalkwyk, 2008; Scott, 2009; Van Dyk, 2010; Van Dyk & Coetzee-Van Rooy, 2012). The reality in South Africa is that over the past few years, the gap between secondary and HE education systems has widened and as a result, many students who enter HE come from a secondary school environment that did not prepare them for HE studies and they lack the necessary study and self-management skills to succeed in an HE environment (Cliff & Yeld, 2006; Department of Higher Education and Training, 2014, p. 6; Butler, 2013; Cliff, 2014, Maddock & Maroun, 2018).

This is not only a concern from the side of institutions, according to the 2017 PPS Student Confidence Index (SCI) survey, but the majority of students also felt unprepared for the shift from secondary to tertiary education (Govender, 2017). This unpreparedness is one of the factors contributing to such a large number of students failing in their first or second years at tertiary institutions (Oosthuizen & Cassim, 2016; Wilmot & Merino, 2015).

2.3.1.2 Levels of diversity

The literacy challenges resulting from the diverse student bodies are not unique. Different countries experience commonalities but, at the same time, unique situations. In the American context, literacy challenges, including, among others, language and social acculturation of immigrants and refugees who study at American institutions, are nothing new – this was already acknowledged at the end of the previous millennium (Rosenthal & Kouzmin, 1996).

In the United Kingdom, role players in tertiary institutions recognise the need to support the ever-expanding culturally and linguistically diverse student body by developing their academic literacy to ensure student progress and performance (Calvo et al., 2020).

In New Zealand, student success and retention are also cause for concern, as many undergraduate students are international students who come from non-mainstream backgrounds. Furthermore, local students are often the first generation in their families to attend a tertiary institution (McWilliams & Allan, 2014).

At South African HE institutions, students come from diverse backgrounds – academically, culturally, socially, geographically, and economically. This directly impacts on literacy levels, which are often co-related with a lack of skills, high levels of poverty and difficulty adjusting their mindset to adapt to a multimodal environment (Bornman, 2016; Nyahodza & Higgs, 2017; Tapfumaneyi & Rupande, 2013).

2.3.1.3 Language proficiency

The language barrier is another major contributing factor. The level of language proficiency of a large number of students who enrol to study in English is poor due to the fact that for the majority of South Africans, English is only a second, third or even a fourth language (Baker et.al., 2019; Smit, 2017). As is the case in the rest of the world, the adoption of English as medium of instruction (EMI) has become a regular phenomenon in HE (Fenton-Smith et al., 2017; Weideman, 2021). All the reasons and questions arising from this phenomenon cannot be discussed in this study. However, one of the key issues is the constant concern about the low level of proficiency in English of students in EMI programmes, not only in the South African context but worldwide (Humphreys, 2017; Nguyen et al., 2017). This effect is documented as a serious influence on the students' abilities to understand lecturers, read books, or participate in academic discussions (Macaro et al., 2017). Furthermore, this low language proficiency also manifests in a lack of higher-order language-thinking skills, identified as crucial both locally and internationally (Rizqiana, 2021).

2.3.1.4 Massification of HE

HE worldwide has been influenced by a changing demographic context and a growing student population (Clarence & McKenna, 2017). These changes contribute towards the massification of university education, with large numbers of students entering academic institutions instead of vocational training (Scott, 2009; Selyutin et al., 2017; Tlali et al., 2019; Van Dyk et al., 2009). These students often do not possess the needed literacy levels to succeed at HE institutes.

2.3.1.5 Lack of literacy skills

Another challenge is the current tertiary education environment that requires students to become familiar with many new skills, which are also defined as "literacies" (see § 2.2.2). The average student cannot acquire these skills by themselves or through "osmosis" (Brady, 2013). If students do not possess the basic language and literacy skills, they will have great difficulty functioning in an academic environment, communicating at an academic level and becoming academically literate (Van de Poel & Gasiorek, 2012).

2.3.1.6 Academic acculturation

Research has shown that students are motivated by, amongst others, their ability to adapt and integrate into the HE environment (Brinkworth et al. 2009). This is referred to as academic acculturation. According to Van Dyk and Van de Poel (2013, p. 45):

> *… success in HE depends inter alia on students' motivation and ability to adapt to new ways of pursuing, interpreting, organising, producing and communicating knowledge, and to get accustomed to the norms, standards, procedures, values and linguistic forms that constitute academic life.*

One of the key components of this integration is the ability to understand, interact and contribute by using the language that is used within the academic context – also known as academic discourse (Van Dyk & Van de Poel, 2013). Students struggle with this: for one, the multimodal character of teaching and learning in HE is far removed from the experience of the majority of students who come from a rural school context. Van de Poel and Gasiorek (2012) emphasise the need for students to add new literacy skills to already existing skills and to get acquainted with the academic language and culture of an HE institution. All of this is part of becoming academically acculturated.

Some of the mentioned factors that contribute towards student failure are beyond the control of tertiary institutions (Fouché, 2013). However, since it has been determined that a lack of these academic literacy abilities contributes to bad academic performance and, consequently, low throughput rates (Olivier, 2015; Van Dyk et al., 2011; Weideman & Du Plessis, 2020), universities are constantly looking towards ways to support students. This is where appropriate academic literacy courses can play a role.

2.4 ACADEMIC LITERACY IN AN HE CONTEXT

Within the HE context, students need to be introduced to the specific literacies required at HE institution, generally referred to as "academic literacies" (Olivier, 2015). Many universities worldwide, and also in South Africa, have initiated academic literacy courses to intervene and support students in the transition from school towards acquiring the necessary literacy skills expected at the university level (Skillen, 2006, p. 140; Townsend, 2010). This is done with the sole purpose of assisting students in obtaining their qualifications effectively and efficiently (Van Dyk & Van de Poel, 2013).

Although academic literacy is not the main focus of this study, it is important for the context of this study on the VL of first-year students. Therefore, the next section provides a brief background to and context on the nature of academic literacy (§ 2.4.1), followed by an overview of approaches to academic literacy in tertiary institutions (§ 2.4.2). The section concludes with a discussion of the specific context and needs within the South African HE milieu.

2.4.1 Conceptual background

With literacy being such a complicated concept to define (see § 2.2), it comes as no surprise that academic literacy, also referred to as “academic discourse” (Gee, 1990; Van Schalkwyk, 2008), has been proven equally complex and difficult to define (Butler, 2013; McKenna, 2004; McWilliams & Allan, 2014; Van Dyk & Van de Poel, 2013, p. 47; Van Schalkwyk, 2008).

A number of assumptions are generally made about academic literacy. The first of these is that the mastering of academic literacy can be done by ticking a few boxes, as it is regarded as a set of generic, unitary and neutral skills mostly aimed at proficiency in writing within the tertiary sphere (Lillis, 2019; Lillis & Scott, 2007; Van Schalkwyk, 2010). Second, academic literacy is frequently associated with remediation and learning support, suggesting that only some students have some kind of knowledge or skills gap that must be addressed (Henderson & Hirst, 2006; McWilliams & Allan, 2014). This view of academic literacy implies the third assumption of academic literacy, namely that it is seen as basic communication and language skills that students should master when they enter HE (Henderson & Hirst, 2006). These seem to be an oversimplification of a much more complex scenario.

Boiarsky et al. (2003) contend that a definition of academic literacy should include a belief in critical thinking. The same ideas are shared by Knowles and McGloin (2007) and Naber et al. (2014), who also emphasise the importance of critical reading and writing to do the work required at university level.

In recent research, scholars linked the current landscape in which communication takes place with academic literacies in investigating the role of global concepts such as mobility, ideologies, identities and technologies that influence students (Wargo & De Costa, 2017). This suggests an increased focus on social and cultural justice within the approach towards academic literacies, as Shipka (2016, p. 251) suggests, “[we should] consider how concretely engaging with different modes, genres, materials, cultural practices, communicative technologies, and language varieties impacts our abilities to negotiate meaning”.

By looking at the assumptions above, it is clear that the notion is not interpreted uniformly by different groups, as suggested by Parkinson et al. (2008, p. 12): “… academic literacy, which is a more restricted notion than literacy as a whole and might thus be expected to be clearly one thing is … interpreted differently by different groups”. However, this lack of a uniform definition and approach should not be seen as negative. Rather, the different HE institutions must address the specific needs of their unique student body. The approach relevant to the institution where this study was conducted is discussed in section 2.4.3.

2.4.2 Academic literacy approaches

There is an ongoing debate as to whether academic literacy should be a generic (common-core) or subject-specific or discipline-specific course (Carstens & Fletcher, 2009; Clarence & McKenna, 2017; Jordaan & Jordaan, 2013; Wargo & De Costa, 2017). Van de Poel and Van Dyk (2015) conducted an in-depth study on the generic or subject-specific approach towards academic literacy, looking at the strengths and weaknesses of both. The table below highlights the core aspects.

Table 2-3: Academic literacy approach (Van de Poel & Van Dyk, 2015, p. 172-173)

Academic Literacy (AL) Approach	Levels	Strengths	Weaknesses
Generic ***No specific content requirements***	Institution	Material development easy: no subject-specific knowledge required handbook possible	Often perceived as remedial training Integration at macro level only
	Lecturers	Linguistic profile only	Low status
	Students	Materials may include study / thinking skills… Broad acculturation	Courses may be perceived as: irrelevant, too easy, not transferable to other courses
AL approach **AL experts teach subject-specific content**	Institution	AL organised institution-wide	AL experts need to be appointed and integrated into disciplines (faculty members)
	Lecturers	Potential to develop subject-knowledge	May not have adequate subject knowledge Possible low status in the eyes of institution and students
	Students	Interest and motivation high	Courses may be perceived as not important Low class attendance
Subject-specific approach **Disciplinary experts teach AL**	Institution	Experts paid by faculties	Lecturers may need additional training and coaching

	Lecturers	High status Potential to develop AL knowledge	Lack of AL knowledge (genre, style, metalanguage, writing conventions) May not spend teaching on AL, but on content
	Students	High face validity Focused acculturation	False comfort with low AL levels
Collaborative approach **AL and disciplinary experts teach in tandem**	Institution	Synergy between disciplines and colleagues Real CLIL	Time-consuming, not efficient unless colleagues remain in own domain
	Lecturers	Possibility of inter-disciplinary collaboration and research	Difficult to organise Lecturer's perception of difference in status may interfere; turf wars
	Students	Perception of holistic, integrated teaching	Potential confusion: two lecturers in one class; two lecturers in different classes

The conclusion these two researchers drew was that there was no decisive evidence to suggest that either of the approaches was more effective than the other. The academic literacy courses of the various universities worldwide therefore differ in content and nature and are based on different needs, approaches, models and theories (McWilliams & Allan, 2014). Academic literacy could be taught "in symbiosis with subject-specific content" and could be viewed as "situated on a continuum and the pendulum will sometimes swing towards content-specific teaching and sometimes towards academic literacy teaching" (Van de Poel & Van Dyk, 2015, p. 171).

Another crucial point of discussion on academic literacy is the so-called autonomous or deficit approach, which views academic literacy as representing a technical skill only that can be "fixed" by offering remedial writing support only for students who are not mother-tongue speakers (Freeman, 2018). The various approaches followed in South Africa HE could, according to Clarence and McKenna (2017), be categorised as "academic literacy support", manifesting in different ways – for example, lecturers teaching disciplinary literacies; modules that are embedded into other courses; independent courses focusing on generic instead of discipline-specific writing skills. Boughey and McKenna (2015) criticise this autonomous model of literacy

development, as the responsibility of becoming literate to a great degree rests with the students, who cannot manage the challenge.

The clear relevance of core components of 21st-century literacy (§ 2.2.2) can be recognised in the contributions made by the New Literacy Studies movement to refute this approach. They criticised the deficit approach and conceptualised literacy as consisting of three basic components, namely study skills, academic socialisation, and academic literacies (Van Dyk & Van de Poel, 2013). According to Lea and Street (1998, p. 1), academic literacy is not about teaching skills to remediate some deficits but rather to treat literacy as "social practices and as resources rather than as a set of rules formally and narrowly defined".

The deficit approach is also deemed outdated and narrow, as it does not consider "sociocultural values, beliefs and power relations" as having an effect on literacy (Harper et al., 2011; Lea & Street, 1998; Scott & Turner, 2009, p. 152; Street, 2011; Wingate, 2015). Another point on which the deficit approach has been criticised is that it does not make provision for non-linguistic modes such as the visual, digital and gestural and deems academic literacy to be only concerned with linguistic matters (Carstens, 2012).

The New Literacy Studies movement's alternative approach suggests a pedagogy that includes all learners from different educational and cultural backgrounds and motivates them to develop and communicate the literacy practices and knowledge they bring with them (Lea & Street, 1998; Leask & Bridge, 2013; Wingate, 2015). This approach broadens the academic literacy concept from a purely linguistic approach to a multiliteracies approach that includes the social, cultural and contextual practices students use to communicate effectively and construct new knowledge in their field of study (Freeman, 2018; Street, 2005; Wingate, 2015).

This broader approach considers the shift in the cultural context of tertiary institutions worldwide over the past decade. Globalisation, internationalisation and the policies related to HE have resulted in a complex and diverse student population giving rise to many challenges (Calvo et al., 2020). This shift serves to underline the criticism against the deficit approach towards academic literacy, as it tends to regard Western literacy practices as superior to those of other cultures (Freeman, 2018). Research shows there is a long way ahead, as the deficit approach is still used in many English-speaking universities (Lea & Street, 2006; O'Shea et al., 2016; Wingate, 2015).

Just like with the AL definition, it is clear that, as regards the approach, there is no one-size-fits-all generic course that can be applied universally when it comes to academic literacy and the interventions needed at tertiary institutions (McWilliams & Allan, 2014; Van Dyk & Van de Poel, 2013).

2.4.3 Academic literacy at the relevant university

As noted in the previous section (§ 2.4.2), there are different approaches to incorporating academic literacy in institutions of HE. The choice of approach is, to a great degree, influenced by contextual factors such as staff availability, financial guidelines, the number of credits assigned to a course, and student numbers. Within the institutional context of this study, the academic literacy module is the responsibility of a designated group of academic literacy lecturers within the School of Languages. Students are taught in faculty specific groups, but no real faculty-based approach is followed regarding the content. The faculty is also not involved in the academic literacy development module's arrangements, content, or approach. The faculty grouping is mainly for administrative purposes, like timetable, venue and student availability, and does not imply unique faculty specific content or approaches.

The academic literacy module is offered in both semesters. On entering the institution, all new first-year NWU students write a compulsory academic literacy placement test (called the Test of Academic Literacy Levels). The result of this test serves as a guideline to determine for which academic literacy module(s) a student should register. In practice, it means that some students whose skills are evaluated as adequate would only take the "advanced" academic literacy module. However, within the context of this study, most students must take the academic literacy module during both semesters to address the skills deemed necessary in an HE environment.

The university represented in this study also offers the facilities of a writing centre or laboratory that students can approach for assistance with academic assignments as well as compulsory academic literacy courses to introduce students to the academic world and all its literacy requirements.

The analysis of the content of the curricula for the two semesters forms part of the document analysis of the study (see chapter 6). Determining the position of VL in relation to the rest of the module was one of the important focus points. Only brief attention is given to the basic course details here.

The content of the course is based on the expected abilities of an academically literate student, taken from the definition of academic literacy by Weideman (2003). It is important to note that, according to Weideman (2013, 2021), these skills or competencies are not based on a grammar-based view of language but rather on an open and interactive view of language. The abilities of an academically literate student can be divided into the following categories, as portrayed in table 2-4:

Table 2-4: Required academic literacy abilities, according to Weideman (2006a)

ABILITY	DETAIL
understand	a range of academic vocabulary in context
	relations between different parts of a text; being aware of the logical development of (an academic) text via introductions to conclusions; and knowing how to use language that serves to make the different parts of a text coherent.
	distinctions between essential and non-essential information, fact and opinion
	propositions and arguments; distinguish between cause and effect; classify, categorise, and handle data that make comparisons
	sequence and order; do simple numerical estimations and computations that are relevant to academic information that allow for comparisons to be made and can be applied for the purposes of an argument
	what counts as evidence for an argument; extrapolate from information by making inferences; and apply the information or its implications to other cases than the one at hand
	the communicative function of various ways of expression in academic language (such as defining, providing examples, arguing)
interpret	different kinds of text type (genre); showing sensitivity for the meaning that they convey and the audience that they are aimed at
	make meaning (for example, of an academic text) beyond the level of the sentence
interpret & use	metaphor and idiom, and perceived connotation; word play and ambiguity
	information presented in graphic or visual format

produce	information presented in graphic or visual format

It must be mentioned that this definition by Weideman was already conceptualised in 2003, which is almost 20 years ago. Although it is still relevant and used as the blueprint for the outcomes of the academic literacy module at the NWU, a whole array of other literacy abilities needed by university students in order to be successful has since been acknowledged – these include the use of online databases and performing searches involving the fluent use of technology. This speaks to the change in the semiotic landscape: instead of just reading a book printed on paper, a literate individual in the 21st century should be able to use sophisticated technological ways to read and write multimodal texts (Bezemer & Kress, 2009; Karchmer et al., 2005; Kress, 2000; Kress & Van Leeuwen, 2006). Often, these images are essential for understanding the text and do not serve a mere decorative function (Rowsell et al., 2013). As eluded by Rowsell and Burke (2009), images in digital media add a whole new dimension to related texts compared to printed texts. The researcher believes that students would benefit from an enhanced multimodal approach with a bigger focus on VL.

2.5 SUMMARY AND CONCLUSION

This chapter gave an overview of literacy in general and also academic literacy. Some important interrelated conclusions stand out. First, the academic literacy needs of students are so diverse and complex that it would be ignorant to assume that an academic literacy course can solve all the challenges experienced by students and that it is a magical wand that can guarantee the success of all students. It is clear from the literature on academic literacy that the content of an academic literacy course should address the situation, the context and the needs of the student body. External factors such as affordability, sustainability and other restrictions also play a role in the type of academic literacy interventions institutions can offer (Olivier, 2016). Furthermore, the academic literacy needs of students are not constant and are subject to continuous change. Therefore, any academic literacy interventions should be evaluated and updated continuously to stay relevant to the needs of students.

The culture of perception as relevant to the learning process of current students revealed more than 30 basic forms of visual information they are confronted with in education (Finley, 2014). This underscores the reality that the concept of VL has gained momentum in education over the past decade or two. This reality, supported by the need to stay relevant, was one of the motivations for this study: the researcher believes that the mentioned changes in the way we communicate in the 21st century, as well as the multiliteracies the general public and students

are confronted with, necessitate a more focused approach towards modes like the visual. This is the focus of the next chapter.

CHAPTER 3: VISUAL LITERACY

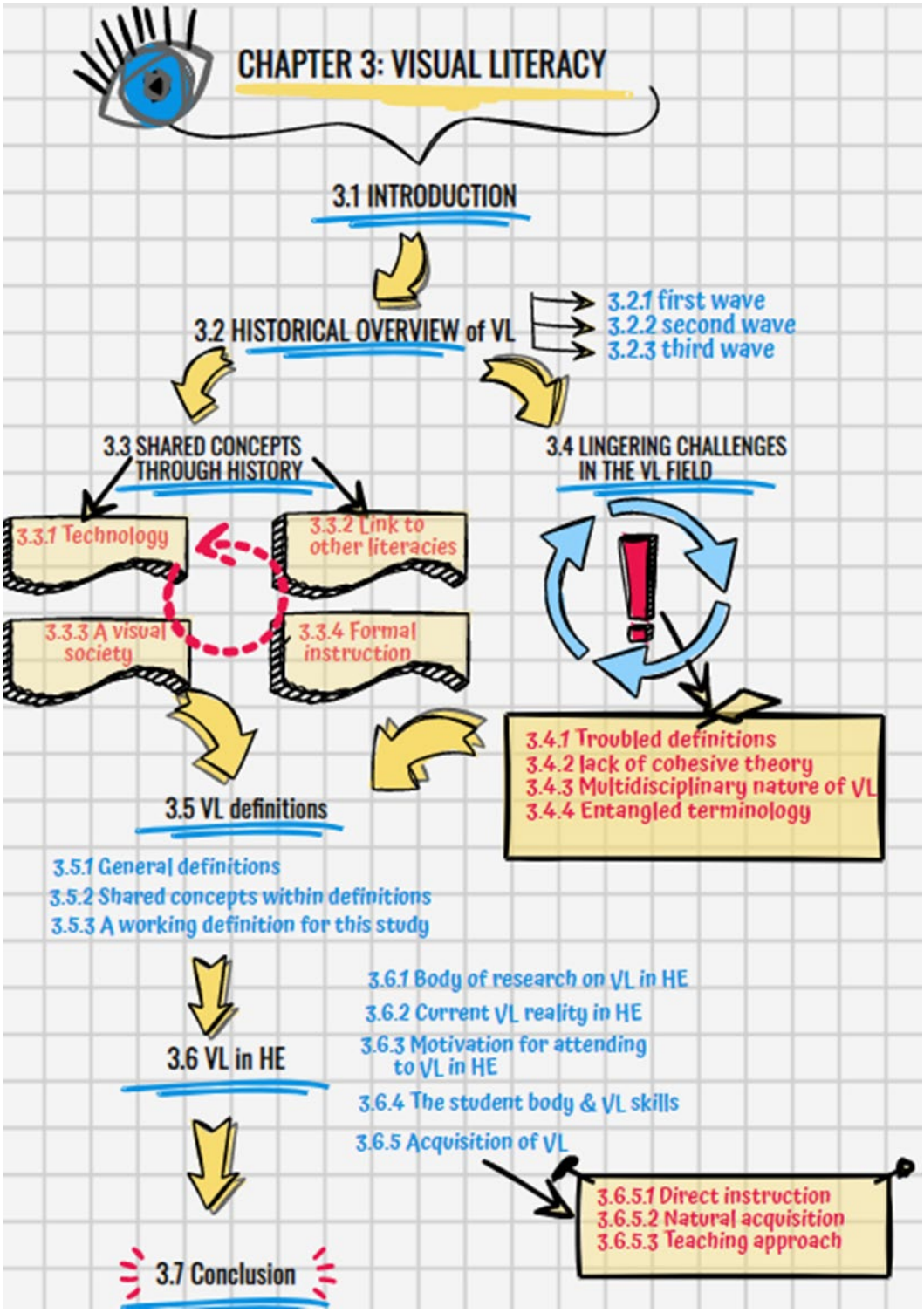


Figure 3-1: Mind map of chapter 3

3.1 INTRODUCTION

In the previous chapter, the complexities of what literacy entails and the multitude of literacies that exist were discussed. This was followed by a look at the specific literacies needed by students in HE as well as the ways these needs could be addressed within the academic environment. In the context of this study, one of the ways these needs are addressed is in an academic literacy course. Although the whole spectrum of literacies has its role and function within the broader 21st-century literacies, the prominent role of the visual has been acknowledged since the latter part of the 20th century in a variety of academic disciplines (Fransecky & Debes, 1972; Kress, 2005; Messaris, 2012). In addition, the partnership of 21st-century skills has identified VL as one of the essential literacies for this century (Avgerinou, 2018, 2021).

This chapter aims to give more insight into the concept of VL and was directed by the following research question:

Research question:	
Secondary Research Question 2:	What visual literacies do rural first-year students bring with them when they enter HE?

The chapter provides a historical view of the concept, referring specifically to momentous occasions within the chronological development (§ 3.2). The shared concepts in the different historical timeframes are deemed important for the consistency within the field (§ 3.3). The contextual background attends to the lingering challenges within the VL field, which also impacted on this study (§ 3.4). Looking at the various definitions of VL in the scholarship informed the working definition for this study (§ 3.5). The section on VL in HE (§ 3.6) is of specific practical relevance to provide conceptual insight. It starts with a summary of the existing body of research (§ 3.6.1), followed by an overview of the current VL reality in HE (§ 3.6.2) which informs the motivation for including VL in the HE context (§ 3.6.3). The visual skills of the student body are dealt with (§ 3.6.4) before the section is concluded with a look at the acquisition of VL skills (§ 3.6.5). The chapter is concluded with a summary of the discussed content (§ 3.7).

3.2 A HISTORICAL OVERVIEW OF VISUAL LITERACY

Within the context of the 21st-century types of literacies, as introduced in the previous chapter, it may seem that the term “visual literacy” (VL) is new. However, this is far from the truth, as the long history of the use of visuals can be traced back to the ancient philosophers who used images to communicate to Aristotle and Pythagoras, who used anatomical and mathematical illustrations,

and Plato, who used visual images in his teachings of geometry. Even the parables and metaphors used in the Bible were seen as a way of creating images in the listeners' minds to enhance the message being shared (Pettersson, 2017).

The history of VL as a field of study can be traced back to 1935 through the references made to it by Davis in *Art Education in North America* (Peña, 2018). Most scholars suggest the formal concept to be 50 years old, as they contribute the actual inception of the VL concept to Johan Debes (1969). He was instrumental in founding the International Visual Literacy Association (IVLA) (Avgerino, 2007; Beatty, 2013; Brumberger, 2019; Fransecky & Debes, 1972). It was also through the contribution of Debes that VL began to feature in fields other than art, like media studies and subjects concerned with technology.

Peña (2018) visualised the past 85 years through a Glass Cast interface, which traced documents containing references to VL and divided them into three VL “waves” or stages. A summative overview of this historical development of VL is given below to understand the focus, constants and turning points in the history of VL.

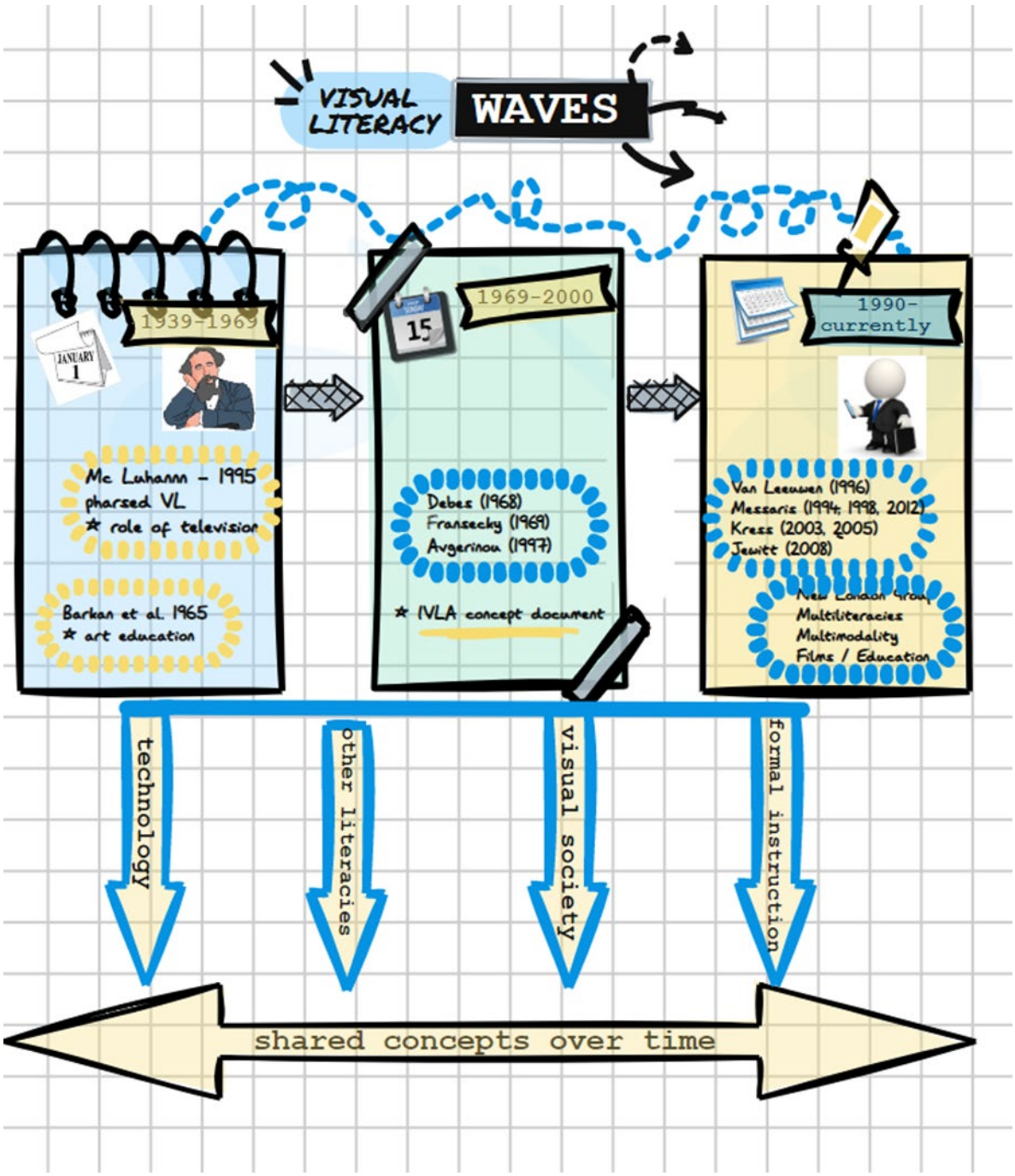


Figure 3-2: The three stages ("waves") of VL 1939–2020 (adapted from Peña, 2018)

3.2.1 First VL wave

During this period of three decades, ranging roughly from 1939–1969, VL was mainly associated with art education (Peña, 2018). McLuhan (1955) was one of the first scholars to use the phrase "visual literacy" and the first to connect VL to television and its possible future. This also introduced the possible influence of technological developments like television on the role of visuals in the future (Barkan et al.1965).

3.2.2 Second VL wave

Matters regarding a definition dominated this phase in the history of VL (Debes, 1969) as well as the founding of the International Visual Literacy Association (IVLA). Several scholars contributed their ideas through concept documents (Avgerinou & Ericson, 2002; Avgerinou & Pettersson, 2011; Debes, 1968, 1969; Fransecky & Debes, 1972).

3.2.3 Third VL wave

The third wave started around 1995 and coincided with the multiliteracies and multimodality movements (Jewitt, 2008). The New London Group (1996), Kress (2003, 2005), Kress and Van Leeuwen (1996) and Messaris (1994, 1998) – all of them involved in education, with the latter mainly involved in the film industry – are some of the leading scholars during this era in the history of VL.

3.3 SHARED CONCEPTS THROUGHOUT THE HISTORY OF VL

3.3.1 Technology

The first attribute that has been present throughout the development of VL is the reference to technology. According to Davis (cited by Peña, 2018) the traditional art museum can be seen as the “technology” during the initial development of VL. Reference to audio-visual instruction and technologies used in educational settings already occurred during the first wave (Allen, 1995; McLuhan, 2005). During the second phase, the attention on technology involved in VL moved to the use of the camera, mainly through the support of Debes and the VL movement to Eastman Kodak – the major camera producer of the time (Stuart, 2005). The Internet and the development of other digital technologies played a crucial role in altering the direction of discussions on VL during the third wave – VL had now entered the domain of both academic and general media (Bamford, 2003; Messaris, 2012; NLG, 1996).

3.3.2 Expanding towards other kinds of literacies

During the first wave, Daves (cited by Peña, 2018, p. 128) was one of the first to argue that just reading and writing were no longer enough and that other literacies were necessary to take part in the more complex world. McLuhan (1955, p. 104) stated that due to movies and the television “we have lost book literacy without acquiring visual literacy”. During the second phase of VL, the New London Group (NLG) strongly supported the idea of expanding the notion of what it meant to be literate and subsequently went ahead to publish their manifesto of the new literacies movement in which VL was declared one of many equally important literacies (NLG, 1996).

3.3.3 A more visual society

The idea of pictures having meaning and not just being there to fill a space emerged during the first wave of the recognition of VL (Rowsell et al., 2013). During the second wave, even more bold references were made to the presence of visuals in society as a whole – for example, by Fransecky and Debes (1972, p. 5) referring to the "… new students … (being) more visual, better informed…" and Fillion (1973, p. 308) declaring that "[w]e are deeply [immersed] in a visual culture". The current focus, which links to the idea expressed by Fillion, acknowledges the Internet as playing a leading role in the visual culture of the time we live in and has led to VL being increasingly acknowledged in educational environments (Association of College and Research Librarians, 2011; Beier, 2013; Kress, 2003; Little et al., 2015).

3.3.4 Formal instruction

The appeal to reform the curricula to extend to the everyday lives of today's students who are engulfed by visual information and visual media was first made in 1939 by Davis, who perceived visual perception as something that had to be taught (cited by Peña, 2018, p. 132). This call was repeated as television, the first commonly available source of visuals, became more dominant. However, from the onset of VL, some scholars believed VL could develop by itself through regular exposure (Allen, 1959). Scholars representing the second wave of VL proposed the need to teach VL and new programmes were developed (Ausburn & Ausburn, 1978; Francesky & Debes, 1972; Marantz, 1972). This call received less attention for a period, but since the first decade of the 21st century, renewed arguments have been offered towards the cause of formal instruction. This is addressed in another section of this chapter (§ 3.5.3).

3.3.5 Relevance of the above for this study

The four common aspects that have prevailed throughout the history of VL are, according to the researcher, even more relevant today than at any other time. The role of technology is set to become more dominant in future, also in education – we just need to look at the use of online teaching and learning which was necessitated during the COVID-19 epidemic. As indicated in a number of post-Covid studies (Harper, 2020; Riccaboni, 2022; Ramos, 2021; Thompson, 2020), the impact on the pandemic has been felt in both research and studies. These impacts were both positive and negative: The measures put in place world-wide during the pandemic provided growth opportunities across the scholarly community with regard to sharing solutions and enhancing research on a new level (Ramos, 2021). Some of the negative impacts include isolation of both students and academics, attempting to fulfil their respective roles, being it studying, supervising, or connecting on an acceptable level (Thompson, 2020). This should be considered in the 'new normal'.

Enhanced even further by Covid-19, technology and visual elements have become so intertwined, the one can barely be mentioned without involving the other. This served as motivation for this study, as students from all backgrounds need to be taught how to access, process, and produce visual material relevant not only to their studies but also as members of a visual society.

The second shared attribute since the conceptualisation of VL – namely the existence and importance of multiliteracies – is becoming more and more pronounced as new literacies are conceptualised. In many of these, the visual play a key role.

Third, if we live in a visual society as claimed throughout the history of VL, it should be of importance for institutes of HE to determine the skills students possess regarding visual material in order to be able to address the deficits so as to prepare them for the future and offer them suitable tutelage in VL.

Lastly, on the matter of formal education: This speaks to the core business of this study, namely, to determine the VL skills students possess in order to come up with a plan for formal instruction in VL, which has been proposed for almost 80 years now.

With the motivation for attending to VL in an educational context as provided above, the researcher had to ask herself why VL still seemed to be a neglected literacy in formal instruction in HE. The following section on challenges in the field (§ 3.4) sheds some light on the conceptual developments displayed in the scholarly conversations.

3.4 LINGERING CHALLENGES WITHIN THE VL FIELD

3.4.1 Troubled definitions

Since the initial definition of VL in 1969, scholars have shared several viewpoints, opinions and definitions of the concept. In these definitions, the personal background of the researcher often played a role, and the emphasis was placed on different aspects of the concept. For the last 50 years, scholars have attempted to establish a universal definition of VL (Avgerinou & Pettersson, 2011; Michelson, 2017; Serafini, 2017; Thompson, 2019) or have tweaked and expanded the original definition (Avgerinou & Pettersson, 2011; Baca, 1990; Braden & Hortin, 1982). However, up to now, a lack of agreement as to what it means to be visually literate exists (Ausburn & Ausburn, 1978; Avgerinou, 2003; Avgerinou & Pettersson, 2011; Brill et al., 2007), and definitions have, among others, varied between being broad to being subject specific. Some researchers have even rejected the whole concept of VL (Pettersson, 1994).

The difficulty in agreeing on a uniform definition for VL can also be attributed to the complex nature of the term. As indicted by Moore (1994), perception and the understanding and

communication of visual material played a key role in the history of VL. This process is referred to as “visual thinking”, also denoted by Hortin (1984, p. 25) in his perception of VL as being “a method or process of thinking” rather than a concept *used* for thinking. Seppänen et al. (2006) views VL as a form of learning where the student can think reflectively and critically about visual material.

However, as the practical implementation of VL in HE against the background of existing definitions was of core interest to this research rather than theoretical issues, the researcher could not be hampered by this lack of uniformity and adopted a working definition within the HE setting (§ 3.5.2).

3.4.2 Lack of a cohesive theory

Since the establishment of the term “visual literacy” and the subsequent founding of the International Visual Literacy Association (IVLA), several scholars have attempted to offer fresh insight into a theory of VL (Avgerinou & Ericson, 2002; Avgerinou & Pettersson, 2011). In a study conducted by Brumberger (2019) on VL publications, she found that the majority were not research articles but case studies describing teaching and assessments relevant to VL. This shows a lack of attention to matters relevant to theory building. A solid theoretical framework would contribute towards the definition of the field of VL, enable a more focused research agenda, and clearly indicate the areas in need of research (Avgerinou & Petersson, 2020).

A theoretical framework for VL, with disciplinarity, pedagogy, practice and social impact as the main focus areas, was developed by Brumberger (2019). In their contribution towards a theory for VL, Avgerinou and Pettersson (2020) propose a theory for VL grounded in the five areas of knowledge, namely: visual communication; visual language; visual learning; visual perception; and visual thinking. It is hoped that this study can contribute towards a solid framework supporting the field of study.

After her study on VL publications, Brumberger (2019) noted “…even more articles that are conceptual or theoretical in nature—proposing frameworks and models for understanding and defining visual literacy” (p. 5). This point towards the ongoing attempts for a reliable theoretical framework.

3.4.3 Multidisciplinary nature of VL

A third factor contributing towards the neglected position of VL, specifically in education, is the fact that scholars from a multitude of disciplines and different subject areas explore VL differently in their various contexts (Blummer, 2015; Hattwig et al., 2013; Thompson, 2019). These fields

include arts, anatomy, graphic design, communication, architecture, a variety of sciences, and education (Avgerinou & Ericson, 2002; Bamford, 2003; Elkins, 2007; Thompson, 2019).

According to Brumberger (2019) and Moore et al. (1994), this diversity has a definite impact on the development and definition of VL. On the one hand, the field can benefit from the many perspectives. On the other hand, it adds to the complexity of presenting a clear identity, complicating a clear research agenda (Avgerinou & Pettersson, 2011; Brill et al., 2007; Levie, 1978). However, the challenges in the research field of VL should not take away the urgency to directly address basic VL competencies in teaching and learning in HE (Metros & Woolsey, 2006).

3.4.4 Entangled terminology

Two challenges exist regarding the terminology: the first is the interlinked nature of what has become known as 21st-century literacies; the second is the terms used in the field of VL.

Throughout the development of the VL concept, it has been clear that it has a polysemic nature (Peña, 2018). In the 21st century, the definition for being literate has become closely linked to collecting and sharing information using technology (Pilgrim & Martinez, 2013). Not only has the literacy concept changed, but dozens, if not hundreds, of literacy types and combination terms have been conceptualised, leading to an overlap in respect of describing the skills needed to function in the 21st century. Examples of these are information literacy, new literacies, multiliteracies, multimodal literacy, digital literacy, and web literacy (§ cf. 2.2.2.5; Dron, 2019; Newfield, 2011; Pilgrim & Martinez, 2013).

Literacies containing the term “visual” in the name include visual communication (Moriarty & Kenney, 1995), critical VL (Newfield, 2011), digital VL (Brumberger, 2019; Spalter & Van Dam, 2008), image literacy (Emanuel et al., 2016), visual competency (Müller, 2008), visual-numeric literacy (Tønnessen, 2020), and data visualisation (Archer & Noakes, 2020). The term “alternative literacies” has been suggested to include all types of new literacies (Dron, 2019).

Regarding this vast selection of literacies where the visual is an important component, Spalter and Van Dam (2008) regard the most important change in this overlapping array of literacies as the role of the visual. Avgerinou (2009) contends “visual literacy seems to be among the most critical [literacies]”, and Kedra (2018) also perceives VL as the most crucial literacy for educational purposes.

The reality and relevance of the existence of a multitude of literacies and their connection to other components that played a role in this study – namely multiliteracies, multimodality, self-directed learning, and mobile learning – are discussed in the next chapter (chapter 4).

The second terminology issue, as indicated, is the different terms that indicate relevance within VL. Such terms include “visual intelligence”, “visual semiotics” and “visual rhetoric”, “visual perception”, to name but a few. Concerning the teaching and learning process, “visual learning”, “visual language”, “visual thinking”, “visual memory”, “visual communication”, visualisation and graphicacy are popular terms. I had to make a pragmatic decision about which to use in the present study. This decision was made according to the overarching field of the study, namely academic literacy. Therefore, the term used in this study was the broad concept of “visual literacy”.

Regarding terminology, visual language refers to a specific system of communication using visual elements mainly in fields where the visual stands centrally, for example, design, art and photography. These terms provide visual semiotic resources for expressing and developing visual ideas. Examples of such visual language include exposure, line, shape, colour, form, motion, texture, pattern, direction, orientation, scale, angle, space, and proportion (Kress & Van Leeuwen, 2002; 2006). These require specialised knowledge.

This study was concerned with the general and basic VL skills that first-year students possess and need against a generic background. Although some of the specialised terms may be relevant to this study and the VL required by students at a basic level, it was not the aim nor the purpose of this study to explore these niche areas within the visual domain. Rather, the focus was on creating an awareness of the visuals students encounter in their everyday lives and assisting them in developing the basic VL skills needed to succeed in both an HE environment and the world outside of academics.

3.5 VISUAL LITERACY DEFINITIONS

In one of the most recent articles published on the definitions of VL, the general VL definitions coined between 1969 and 2013 were identified, and 11 definitions most relevant for HE in general were selected (Kedra, 2018). A summary of the general definitions as well as some additions by the researcher follows. These are deemed as relevant to the topic of this study, namely the VL of first-year students in a general context and not within specific specialised fields of study where the visual is pre-dominant, for example, the arts or design.

3.5.1 General VL definitions

Table 3-1 gives an overview of VL definitions between 1969 and 2014:

Table 3-1: General VL definitions (1969–2014)

Definition	Scholar	Year

Visual literacy refers to a group of vision-competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences. The development of these competencies is fundamental to normal human learning. When developed, they enable a visually literate person to discriminate and interpret the visible actions, objects, and symbols, natural or man-made, that he encounters in his environment. Through the creative use of these competencies, he is able to communicate with others. Through the appreciative use of these competencies, he is able to comprehend and enjoy the masterworks of visual communication.	Debes	1969
Visual literacy refers to a group of vision competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences. The development of these competencies is fundamental to normal human learning. When developed, they enable a visually literate person to discriminate and interpret the visible actions, objects, and symbols natural or man-made, that he encounters in his environment. Through the creative use of these competencies, he is able to communicate with others. Through the appreciative use of these competencies, he is able to comprehend and enjoy the masterworks of visual communications.	Fransecky & Debes	1972
Visual literacy can be defined as a group of skills which enable an individual to understand and use visuals for intentionally communicating with others.	Ausburn & Ausburn	1978
Visual literacy is the ability to understand and use images, including the ability to think, learn, and express oneself in terms of images.	Braden & Hortin	1982
Visual literacy is the learnt ability to interpret visual messages accurately and to create such messages. Thus, interpretation and creation in visual literacy can be said to parallel reading and writing in print literacy.	Heinrich et al.	1982
VL is the ability to comprehend and create images in a variety of media in order to communicate more effectively	Considine	1986
(VL) can be defined as the ability to identify, analyse, interpret, evaluate, and produce visual messages	Lacy	1987
IVLA uses four “official definitions” 1) A group of vision competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences.	IVLA	1993

2) The learnt ability to interpret the communication of visual symbols (images), and to create messages using visual symbols. 3) The ability to translate visual images into verbal language and vice versa. 4) The ability to search for and evaluate visual information in visual media.		
Three specific abilities which may impact HE are associated with visual literacy, namely the ability to visualize internally, to create visual images and to read visual images.	Box & Cochenaur	1995
VL refers to a group of largely acquired abilities, i.e., the abilities to understand (read), and use (write) images, as well as to think and learn in terms of images.	Hortin Avgerinou	1984 & 2001
VL is the ability to both interpret and create visual media, and argues that this form of literacy is now as essential as more traditional forms of literacy	Bleed	2005
VL can be defined as the ability to read and interpret visual codes and artefacts, (signs, diagrams, maps, images, films, models and visualisations and so forth). To be visually fluent one would also be the ability to decode and interpret (make meaning from) visual messages and also to be able to encode and compose meaningful visual communications. It includes the ability to visualize internally, communicate visually, and read and interpret visual images competent in creating visual resources that inform and communicate.	Metros & Woolsey	2006
Visual Literacy involves the ability to understand, produce, and use culturally significant images, objects, and visible actions.	Felten	2008
The richest definitions include both an interpretative and a productive component. In other words, they stipulate that the ability to analyse and interpret images and other visual material, although critical, is not by itself sufficient for full VL; it must be accompanied by some ability to create visual material.	Brumberger	2011
VL is a set of abilities that enables an individual to effectively find, interpret, evaluate, use, and create images and visual media. VL skills equip a learner to understand and analyse the contextual, cultural, ethical, aesthetic, intellectual, and technical components involved in the production and use of visual materials. A visually literate individual is both a critical consumer of visual media and a competent contributor to a body of shared knowledge and culture.	ACRL Hattwig et al.	2012 2013
VL has been established as a strategy that can be used to decode, interpret, and understand the visual world, much like a written or oral text.	Beier	2013

VL combines the use of a variety of visual products (lists, tables, graphics, graphic organizers, concept maps, mind maps, argument maps, timelines, systems maps, videos, movies and art) with teaching, learning and assessing processes, and creates interconnections of visual, oral, written, visual representation, numeracy and technological / digital literacy.	Beaudry	2014

More definitions with minor differences for VL exist – almost every scholar working with the concept compile their own definition. This is mainly because the basis of the VL concept is intertwined with so many other disciplines (Avgerinou, 2021). The core components of the tabulated definitions can roughly be divided into three skills-related components, which all contribute towards VL as visualised in figure 3-3:

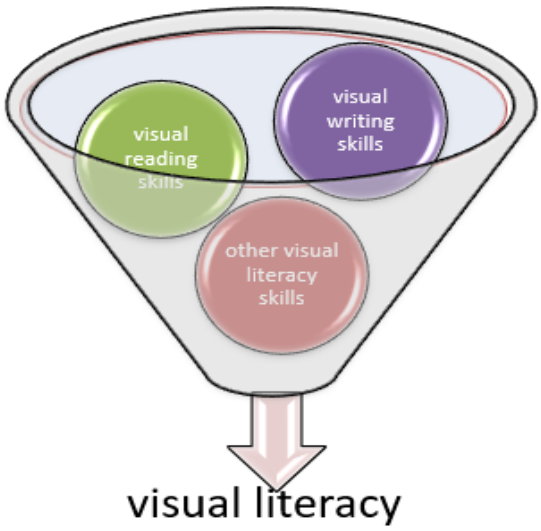


Figure 3-3: Skills-related components of VL

These components are important for the research question that guided this chapter, namely what VL skills students need to cope in HE.

The majority of the definitions (cf. table 3-1) focus mainly on the first two categories, namely visual reading and writing skills (Ausburn & Ausburn, 1978; Braden & Hortin, 1982; Considine, 1986; Debes, 1969; Felten, 2008; Fransecky & Debes, 1972; Metros & Woolsey, 2006), whereas Box and Cochenaur (1995) included “other VL skills” specifically for prospective teachers like visualisation, dual coding and visual learning styles, and the selection of prepared visual teaching material. Hortin (1984) and Avgerinou (2001) expanded their definitions to include the ability to learn and think in images.

Some of the more recent definitions have three added components relevant to students, namely the ability to analyse and produce visual materials, incorporating the essential interpretive and productive components (Beier, 2013; Brumberger, 2011) and a definite focus on technology, the interdisciplinary use of visuals, and the emphasis on visuals as a way of communicating (Beaudry, 2014; Hattwig et al., 2013; Metros, 2008). The third recent component of the VL definition would be the intertwining of VL with digital technology and digital literacy (Avgerinou, 2009; Beaudry, 2014; Hattwig et al., 2013; Spalter & Van Dam, 2008).

In the above definitions of VL, the terms competency, skills and abilities are used repeatedly and interchangeably to refer to what it means to be visually literate (Avgerinou, 2009; Kedra, 2018). The three terms may seem confusing, so for the purpose of this study, the term competency was seen as a broad category informed by specific skills and abilities that can be mastered through relevant teaching and learning processes, thus representing the knowledge component of being a visually literate person. Avgerinou (2001) refers to a skill as a learnable, teachable ability that can be developed. In an educational context, this means that deliberate teaching of VL skills can assist a student in becoming a competent and visually literate individual (Kedra, 2018).

3.5.2 Shared concepts within the VL definitions

In their contribution towards a definition for VL, Avgerinou (2001) as well as Avgerinou and Pettersson (2011, 2020) have made a valuable contribution by identifying the commonalities between the major definitions as presented in table 3-1. Figure 3-4 provides a visual representation of these shared concepts.

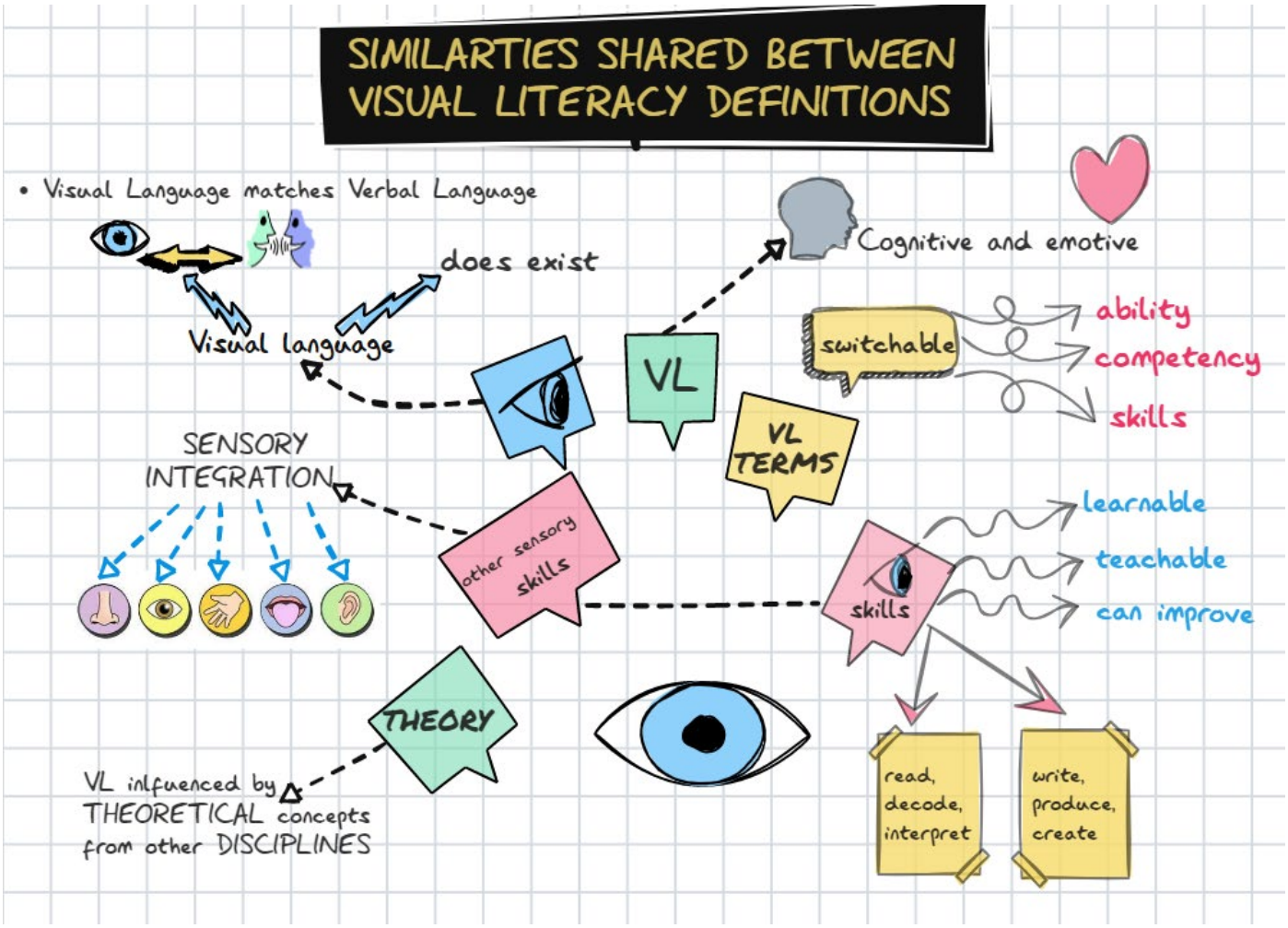


Figure 3-4: Shared concepts in VL definitions

3.5.3 A working definition for VL in this study

Tapping into the insight gained through studying the definitions of VL scholars of the past 40 years as well as the *enGauge* report (Lemke, 2002) and the VL standards of the ACRL (2011), a working definition for VL for this study was decided upon. Three main requirements were identified for the working definition of VL in this study. First, the definition needs to translate theory into practice, as it should inform concrete and measurable competencies that can form part of a teaching and learning programme. Second, the definition should be relevant to the multimodal technological era in which students function. Finally, it should be multidisciplinary, as it should relate to all study fields engaged in the academic literacy course.

Based on the above criteria and guided by the context of this study on the VL of first-year students on a rural campus, the following working definition was compiled:

Visual literacy is a dynamic process that focuses on the individual's ability to access, process and produce a variety of multimodal text types by making use of different formats, with a special focus on the use of technology. During this process, the social context of all forms of communication should always be regarded as important in the meaning-making process.

After engaging with the definitions for the concept of VL, it is time to focus on the context of this study, namely HE and the position of VL within this system.

3.6 VISUAL LITERACY IN HE

3.6.1 Body of research on VL in HE

A comprehensive analysis by Brumberger (2019) of all the published articles between 1981 and 2017 in the *Journal of Visual Literacy* – the flagship publication for the research field of VL – has contributed substantially towards valuing the research. Her literature review revealed the following:

- Many articles were reports on pedagogical case studies on teaching and learning matters, not research articles.
- Even more articles were of a conceptual or theoretical nature with the aim of understanding and defining VL.
- Only 27% of the articles (104 out of a corpus of 375+) could be classified as research articles.
- However, during the past decade, the number of research articles has almost doubled – evidence of the focus shift in the body of research.
- The VL research corpus published in the *Journal of Visual Literacy* (JVL) can roughly be organised into four categories: disciplinary, pedagogical, practice, and social impact.

Even though the focus of research over the 37-year period has shifted, the one constant through all the phases is the ever-present focus on pedagogy or teaching and learning. This signifies one of the key theoretical principles of VL, namely that VL can and must be taught and learnt (Avgerinou & Pettersson, 2011; 2020). In addition, the key terms of the different decades also give an indication of a paradigm shift in education, where the earlier focus on testing and instruction has been replaced by a more student-centred and social relationship approach (Brumberger, 2019).

Studies by Avgerinou (2009) and Ervine (2016) focus on the review of curricula to address the VL needs arising from the digital society we live in. In addition, professional educational organisations

and scholarly associations are increasingly using forums such as workshops and conferences to stimulate the discussion and processes involved in the pedagogy of VL (Kedra, 2018). These include the publication of frameworks such as the Common European Framework of Reference for VL (Wagner & Schönau, 2016), the Australian Visual Literacy White Paper (Bamford, 2003), the New Secondary School Curriculum in Hong Kong (Cheung & Jhaveri, 2016), and the ACRL Visual Literacy Competency Standards for Higher Education (2011) in the United States.

According to the literature review discussed previously (Brumberger, 2019), the key question in the pedagogical strand is how students can best be supported to develop their VL abilities. In the opinion of the researcher, this highlighted a gap in the research and served as motivation for this research study on how to enhance the VL of first-year students from a rural background.

3.6.2 Current reality on VL in HE

Visual literacy has been identified as one of the key skills for the future by the *enGauge* report; in almost all industries, knowledge workers need significant VL skills, so the workforce for the 21st century – which must urgently be prepared – needs the ability to create and critically interpret visual content (Lemke, 2002; Min, 2019; Minor, 2021; Prensky, 2001).

Over the past few years, studies have been initialised to determine students' use of visual material in HE (Kedra, 2018). The results show a need for the development of VL skills in university students, as "their visual competencies are not always aligned with faculty expectations or academic demands" (Hattwig et al., 2013, p. 64). In addition, the use and production of visual materials have been shown to be more challenging than the same activities with textual material (Hattwig, et al., 2013). Unsworth (2017) ascribes this to a lack of attention to VL skills in literacy programs, leading to a lower-than-expected performance in multimodal reading.

Despite the expressed need for VL in HE, it seems the development of VL as a crucial 21st-century skill has received little to no attention in the curricula of universities (Goldstein, 2016; Jordaan & Jordaan, 2013; Yenawine & Miller, 2014). Visuals are often still regarded as just an illustration or add-on instead of an independent source of knowledge (Kedra, 2018), and students are not afforded the opportunity to develop their visual skills (Little et al., 2015). Cherepovska (2014), in addition, refers to the problems associated with the implementation of VL methods. Furthermore, the reality that VL is a long-term project, is often not understood. The random use of an image every now and then will not enhance the VL of students; it will probably rather strengthen the perception that visuals just act as 'fillers' (Kedra & Zakeviciute, 2019).

Even though the availability of visual resources has opened the debate on the place of images in HE (Bleed, 2005; Elkins, 2007; Felten, 2008), a gap exists regarding VL teaching strategies – to a large extent, they are non-existent (Loerts & Belcher; 2019; Min, 2019; Williams, 2019). The reluctance and unfamiliarity with the concept as far as educators are concerned, seem to be a contributing factor (Loerts & Belcher, 2019).

When evaluating activities incorporating visuals as described in the literature, most of these activities are still related to writing, demonstrating the traditional text-based approach in HE (Kedra & Zakeviciute, 2019). In short, it seems as if the reluctant shift towards incorporating visuals into the classroom is influenced by the novelty of the idea, which, as a result, is regarded as challenging by all parties (Loerts & Belcher, 2019). However, motivation for the incorporation of VL in HE does exist.

3.6.3 Motivation for attending to VL in HE

Learning in the 21st century is progressively regarded as a complex, situated process that is impacted by various factors, namely the increased interaction with multimodal texts through visual, electronic and interactive media in all subject areas (Callow, 2008) as well as the almost involuntary emergence of students into visual culture and the immediacy that comes from having visual materials at one's fingertips, also in educational contexts (Bowen & Whithaus, 2013; Elkins, 2007; Kress & Van Leeuwen, 2020; Gee, 2000; Lankshear & Knoble, 2003). These realities all contribute towards the motivation for incorporating VL into the HE setting. The digitally transformed world we live in, the technological changes, the availability of all kinds of devices, as well as the ability of these devices to receive and create graphic and visual material could be seen as one of the main drivers for educational institutions not being able to ignore the importance of the visual mode anymore (Matusiak et al., 2019; Spalter & Van Dam, 2008).

On a practical level, Avgerinou, (2007), Burmark, (2002) and Oblinger (2003), respectively, motivate their drive for pedagogical attention to VL by referring to the digital information era and the abundance of visual sources, while the movement from print to digital material also provides a solid motivation for the importance of students having certain VL competencies (Jenkins, 2007; Toledo, 2007). Lecturers in different disciplines in HE recognise the multimodal forms of communication where the traditional literacies of reading and writing are used in parallel with other semiotic representation modes like visual images, gestures, diagrams, and graphs (Archer, 2006; Paxton et al., 2017; Reid et al., 2016; Thesen & Van Pletzen, 2006). This has played a role in the recognition of the need for the introduction of visually orientated teaching in all study fields (Bleed, 2005; Hattwig, et al., 2013; Kedra, 2018; Tillmann, 2012). Kremen and Ilin (2020) focus their motivation for VL in HE on the affordances of new pedagogical technologies as well as the current

visual culture, which places VL in an influential and significant position in education. By introducing elements of VL education across disciplines, HE institutions can enable students to interact purposefully in their scholarly and global environment (Le Roux, 2009).

In more recent contributions in the field, the following advantages of teaching with visual material have been noted: the inclusion of visuals in learning material can assist students with a better understanding of course content and the active acquisition of knowledge (Chai, 2019; Gadelshina et al., 2019; Loerts & Belcher; 2019; Thompson, 2019). Loerts and Belcher (2019) argue that images improve memory, which benefits learning.

According to Burmark (2002), VL is a learned skill and a cornerstone of communication in the 21st century. Another motivational factor towards attending to VL, is the results from one of many research studies, conducted by 3M Corporation, which found that humans process visuals 60 000 times faster than text (Burmark, 2002). Another advantage, as mentioned by Chai (2019) and McLeod (2019), is that teaching visually helps to develop the creativity of students and in this way opens up new learning possibilities. Image-based learning can also assist students in expressing their thoughts and opinions (Chai, 2019; Loerts & Belcher, 2019). In most mentioned papers, the role of VL in enhancing critical thinking skills is mentioned (Kedra & Zakeviciute, 2019).

3.6.4 The student body and VL skills

The students in classrooms also contribute towards the need for attention to VL. The visual mode is the most prominent mode of communication used by young people, as they share and create photos, videos, emoticons, GIFs, and emojis (Kedra & Zakeviciute, 2019). Oblinger and Oblinger (2005) argue that millennials are natural visual communicators who can integrate text, sound and images naturally. Although contentious, the digital natives' argument (Prensky, 2001) is that repeated exposure to technologies leads to enhanced thinking skills in visual-orientated areas. Coates (2006) describes millennials as the most visual of all groupings of students. Capurro (2017) even refers to the current students as *Homo Digitalis*, indicating the transition from the written to the visual communication culture through the digital mode.

Cook (2015) confirms that Generation Z post-secondary students, who now fill HE classrooms, prefer regular educational activities that use technology and visual media. According to Clark and Lyons (2011), people can learn better from visuals and words combined than from words alone when they are used effectively. Bamford (2003) furthermore emphasises that visuals are becoming one of the main forms of communication of instructional resources that are delivered across a range of media and platforms. In current perceptions of education, students are deemed

to be active participants who construct their own knowledge (Carter, 2018), and what better way than to do so through the multimedia channels that are available?

The unlikely reality that, although students constantly consume and produce visual material, they are unaware of the underlying principles and connections between the types of technology they engage with, serves as another motivation to offer some kind of training in VL (Spalter & Van Dam, 2008:94). Simply put, “they are not visually literate. They do not have the skills to understand how to analyse and decipher an image and make ethical decisions [about the] validity and [value of the information]” (Metros, 2008:98). Pettersson (2019) agrees that they consume academic and social visuals passively. In turn, research by Abas (2019) and Brumberger (2011) suggests that students lack the skills to interpret and evaluate what is communicated visually. So, if students need to master VL skills and competencies, what approaches should be followed?

3.6.5 The acquisition of VL

An aspect that has been debated since the recognition of VL is whether VL is innately acquired or is a set of skills that should be taught. This has led to two distinct models with their own supporters and motivation: the direct instruction model, and the natural acquisition model (Peña, 2018). These two approaches can be seen as linked to the “autonomous” and “ideological” models of literacy as conceptualised by Street (1984, 2005). Another matter relevant to the teaching of VL is the subject-specific versus a generalised approach.

3.6.5.1 Direct instruction

According to this model, VL is regarded as a set of skills or competencies that can and should be taught during formal instruction (ACRL, 2011; Ausburn & Ausburn, 1978; Bamford, 2003; Fransecky & Debes, 1972; Metros & Woolsey, 2006). The fact that VL is seen as a skill or competency that can be acquired also implies that a person can be regarded as “visually illiterate” – meaning that the person has not mastered the skills to “read” and “write” in visual communication situations (Williams, 20:110). According to Kedra (2018), even if we have the physiological ability to see, being visually literate does not come naturally, and students need to be exposed to the vast number of specialised visuals they need to interpret every day.

3.6.5.2 Natural acquisition

The alternative model, as supported by some scholars, regards VL as a skill that is acquired through natural processes like personal perception, personal experience and socialisation with others (Messaris, 2012). This model assumes that any person who can see will develop VL, only excluding people who are visually disabled – a notion that does not form part of this study.

Here, we must agree that having the skills to understand visual stimuli also depends on what kind of visual material are relevant to the situation. Humans learn from the moment they open their eyes, and we do naturally acquire some visual knowledge – for example, a child can understand from the expression on his mother's face and her body language if she is angry.

Therefore, it seems that both these approaches can be applied. We could view it as with basic literacy – a person does learn to speak and write "spontaneously" in their natural surroundings during the first years of their lives; they still have to be taught the more detailed concepts. Another important issue that cannot be ignored is the cultural component of VL (Peña, 2018). Some students will need to learn how to handle certain visual material, as they have never been exposed to it and the skill has not been acquired in school (Kress & Van Leeuwen 2006).

In the South African context, at the institution where the current research took place, one of the aims of the academic literacy course is to negate the backlog of some students. This backlog is due to various factors – an unequal secondary schooling experience, limited exposure to visual material, and different social and cultural contexts. The aim is to address the main components of reading and writing for academic purposes to enhance the chances for the possible academic success of all students.

The same attention should be given to the "reading and writing" of visuals for academic use and for basic use in the world outside. Even after their studies, students would still need VL skills to fully function in the visual-rich world. Mastering the basic skills would enable and motivate them to keep on learning in a self-directed way, even after their formal education has ended. Information technology and mobile devices provide the infrastructure and means to access these visual materials, and social media and entertainment, such as video games, provide the opportunity for engagement.

However, mere interaction with visual materials, no matter how regular, would not supply students with the necessary skills to engage critically with visual material. In order to transform print-centric institutions of HE into institutions where visuals are not seen as a mere aesthetic add-on and entertainment and where the so-called "visual learners" of the 21st century have difficulty expressing themselves visually (Metros & Woolsey, 2006), students must be exposed to basic VL competencies and guided towards understanding in a structured way.

3.6.5.3 Teaching approach

The teaching approach towards VL can be subject-specific or generic (Anderson et al., 2015). Disciplines such as architecture, design, art, and graphic design require specialised and in-depth education in visual aspects. These disciplines, however, were not relevant to this study and were

attended to in this case. Some subjects like geography, biology and other sciences also have a history of incorporating visuals relevant to their subject-specific requirements.

This study focused on a generic approach and a quest to introduce all students to some basic elements of VL across all disciplines (ACRL, 2011; Bleed, 2005; Felten, 2008). Although a subject-specific approach in faculties seems to be the desired approach, it is not viable in the current circumstances within the HE setting where the research study was conducted. The reasons for this are a lack of sufficient lecturers to present such a course as well as the reality that the current lecturers in subject-specific areas might not have the knowledge or motivation to teach VL and would find it difficult to incorporate it into their syllabus. Furthermore, no generally accepted teaching strategy can assist lecturers (Loerts & Belcher, 2019). The generic approach would allow for VL to be addressed as part of the academic literacy course at the university.

3.7 SUMMARY AND CONCLUSION

This chapter provided an overview of the core concept relevant to this study, namely VL. The section on the history of VL aimed to provide a chronological account of the trends, historical moments, and constant factors since the formal inception of the concept in the middle of the previous century. The growing availability of technology and the ease of access through modern technology, which uses the visual mode, can be seen as a critical turning point in the development of VL.

The next section looked at the challenges associated with the field. These continue to exist and to some degree hamper the transition from theory into practice. Of these, the multidisciplinary nature of VL and the way it is intertwined with other literacies seem to be a major influence in the status of the concept. The lack of theory or one universal definition can, in my view, to some degree be attributed to the constant development of the concept within the different contexts where VL is relevant. A working definition for this study was formulated to serve as a guideline during the empirical phase.

This following section looked at VL within the context of this study, namely HE. The section on the existing research aimed to provide an overview of trends and developments. This revealed that the pedagogical strand has always been central. Despite this, challenges exist with the transition between theory and praxis. The gap, as identified in this study, is to find ways of support and guide students in the development of their VL and to develop teaching strategies. The main research question of this study aimed to address this issue by finding ways to enhance the VL of first-year students on a rural campus. Other factors that impact on the relevance of VL in HE include the current student body and the motivation for incorporating VL into the curricula of HE

institutions. A brief overview of the different views on the acquisition of VL as well as teaching approaches concluded the chapter.

Concerning this study, multimodality, mobile learning and self-directed learning (SDL) have been identified as possible contributors towards enhancing the VL of first-year students. In chapter 4, these three concepts are explored more closely.

CHAPTER 4: THEORETICAL CONCEPTS RELEVANT TO THE STUDY: MULTIMODALITY, MOBILE LEARNING AND SELF-DIRECTED LEARNING

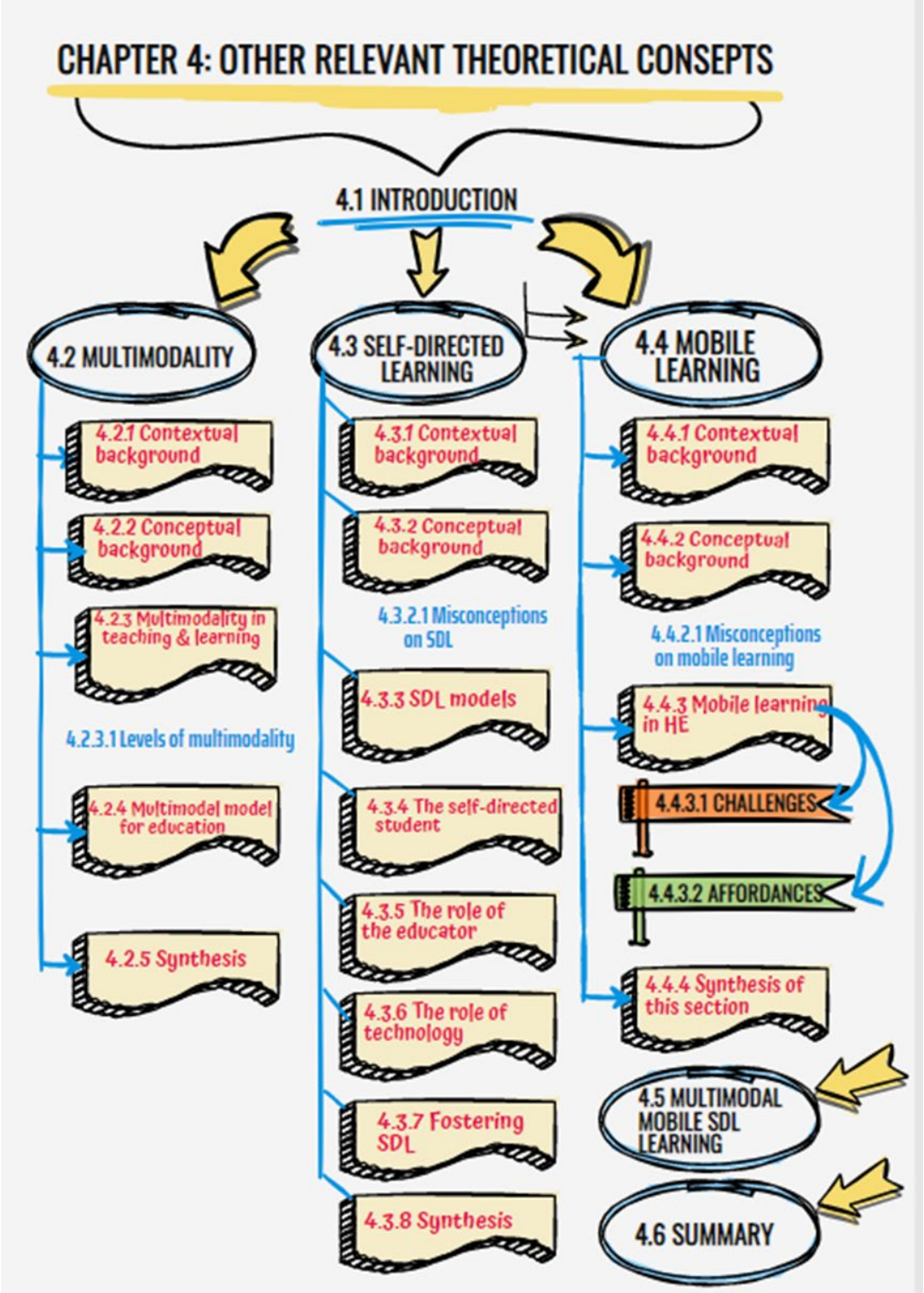


Figure 4-1: Mind map of chapter 4

4.1 INTRODUCTION

Chapter 3 was dedicated to the core concept of this study, namely VL. Multimodality, mobile learning and SDL are three additional concepts identified as possible contributors towards the development of the VL of students. The aim of this chapter is to give a conceptual overview of these components. In addressing this aim, I was guided by the following research question:

Table 4-1: Research question guiding this phase of the study

Research question:	
Secondary Research Question 4:	How do the multimodal mobile visual literacy activities contribute towards fostering SDL?

4.2 MULTIMODALITY

4.2.1 Contextual background

Multimodality – referring to non-linguistic modes of communication in semiotics – has been receiving attention as far back as the 1930s (Mills & Unsworth, 2017). It was the recognition that the different ways of meaning-making did not function separately but in fact always occurred together that sparked the initial interest in the concept. The early research by ground-breaking scholars like Kress and Van Leeuwen (1996), Lemke (1998) and Martinec (2000) focused on the contribution of communication resources not using language – for example, visuals, music, movement, and facial expressions – to make meaning (Jewitt & Henriksen, 2016).

Multimodality has since grown into a substantial field of research approached from different perspectives as, according to Jewitt (2008, p. 12), "[it] can be understood as a theory, a perspective or field of enquiry or a methodological application". Within the HE pedagogical context of this study, I focused on the methodological applications of multimodality. The development and affordances of digital technology enable people of all ages, across all cultures, continents and societies to produce and share multimodal content using the Internet and mobile technologies (Jewitt et al., 2016; Mills & Unsworth, 2017). This has also impacted on educational practices and students are required to engage in multimodal activities in the classroom (Olivier, 2020). Special skills are needed to use a variety of modes in comparison with the single traditional writing mode (§ 2.3). The importance of multimodal literacy in teaching and learning is discussed in section 4.2.3 after the concept has been clarified.

4.2.2 Conceptualising multimodality

Multimodal learning is grounded in the social semiotic theory (cf. chapter 1 – theoretical foundation). Crystal (2008, p. 431) defines semiotics as "[t]he scientific study of the properties of

signalling systems, whether natural or artificial". Kress (2010) contends that social semiotics theory is concerned with meaning in all its forms. Multimodal semiotics is a multifaceted concept, sharing its history and features with other approaches, especially in the educational domain. Both semiotics and Halliday's social semiotic theory of communication, which proposes that language has a social and cultural foundation (cf. Halliday, 1978; Jewitt et al., 2016; Kress, 2010), are relevant to multimodal literacy.

Multimodal literacy is a concept that developed from the need for skills to interact within a multimodal environment (Crawford, 2018). The concepts of "multiliteracies" and "multiliteracies pedagogy", as proposed by the New London Group (1996) (cf. § 1.1, 1.2, 2.2.2.1, 2.2.2.2, 2.3), are central to multimodality and focus on multiple semiotic settings (Kajee, 2011). Walsh (2010) defined multiliteracies as "the ability to construct meanings through reading, viewing, understanding, responding to and producing and interacting with multimedia and digital texts" (p. 213).

The term "multimodality" was first used in the late 1990s by scholars working in the field of social semiotics, among others, the New London Group (1996), and Kress and Van Leeuwen (1996). Kress (2014, p. 61) defined the term *mode* as "the name for a culturally and socially fashioned resource for representation and communication". The adjective "multimodal" implies a situation where more than one mode is involved (Olivier, 2020). Essentially, multimodality implies the combination of a variety of semiotic modes, for example, images, gestures, or sounds, as well as digital, electronic and graphic modes (Kress & Van Leeuwen, 2001; Pahl & Rowsell, 2005). Lenters (2018) and Mills and Unsworth (2017) define multimodality as the study of language where two or more modes of meaning are used.

Although multimodality is often associated with 21st-century technologies, Mills and Chandra (2011) argues that multimodality is nothing new, since communication requires the engaged parties to attend to different kinds of meanings – be it spoken or written, visual images, movement, sounds, or gestures. Therefore, all language and literacy practices can be regarded as inherently multimodal. Within the 21st-century context, multimodality, more than ever, implies a variety of diverse and complex modes of expression as well as their technologies available to produce multimodal texts in digitally mediated environments (Bateman et al., 2019; Eisenlauer & Karatza, 2020; Mills & Underworth, 2017).

As this study aimed to identify multimodal teaching and learning activities that could assist in developing the VL of students (SRQ 3), the next section discusses multimodality within the teaching and learning context.

4.2.3 Multimodality in teaching and learning

In a multimodal learning situation, meaning is constructed through sharing of semiotic resources between student and lecturer. Kress (2010) defines learning as follows:

> *Learning is the result of the transformative engagement with an aspect of the world which is the focus of attention by an individual, on the basis of the principles brought by her or him to that engagement; leading to a transformation of the individuals' semiotic/conceptual resources. (p. 182)*

Howard Gardner's theory of multiple intelligences underscores the idea that learners should be offered the opportunity to engage with multiple modalities in the teaching and learning context (Picciano, 2017). Picciano (2017, p. 172) also argues that "too much teaching and learning is linguistically based (reading, writing, and speaking) and that the other intelligences are underutilized". The advantages of a multimodal approach, specifically in the context of language teaching, has been recognised in several studies. O'Hallaran et al. (2016) found that a multimodal approach, using visuals, for example, can assist students in improving their understanding as well as producing of texts in the target language. Busa (2010, 2015) noted that a multimodal approach could enhance the cognisance of the target culture, whereas Shih (2014) also mentioned the role of a multimodal approach in comprehension as well as the finding that multimodal approaches could motivate learners.

According to Street et al. (2011), the constant exposure of learners to multisemiotic digital content in their everyday lives must serve as motivation to find ways to integrate multimodal resources into the classroom if we wish to capture (and retain) their attention. The digital developments impact on the way we communicate and interact, also in the HE environment, as contended by O'Halloran et al. (2016):

> *Changes in higher education, especially in the use of digital technology, have revolutionized traditional academic practices, with an increasing recognition of the need for students and teachers to develop multimodal competencies across a range of communicative platforms.* (p. 256).

Institutions of HE have come a long way as far as teaching practices and modes of delivery are concerned. López et al. (2013) state that the development in information and communication technologies (ICTs) plays a defining role in the teaching practices of HE in the 21st century. The current modes of delivery, including "traditional" face-to-face delivery (internal), online (external), or mixed (blended) modes provide a range of possibilities and multiple opportunities (Gillett-Swan, 2017). It, therefore, seems possible, and desirable, to incorporate multimodal teaching and

learning activities to develop the VL of students. The different levels of multimodality in the teaching and learning context, as conceptualised by Olivier (2020), offer valuable insight into the multimodal process.

4.2.3.1 Levels of multimodality in multimodal learning

The four different levels of multimodality that act interactively in the teaching and learning context, as conceptualised by Olivier (2018, 2020), are presented in the figure below:

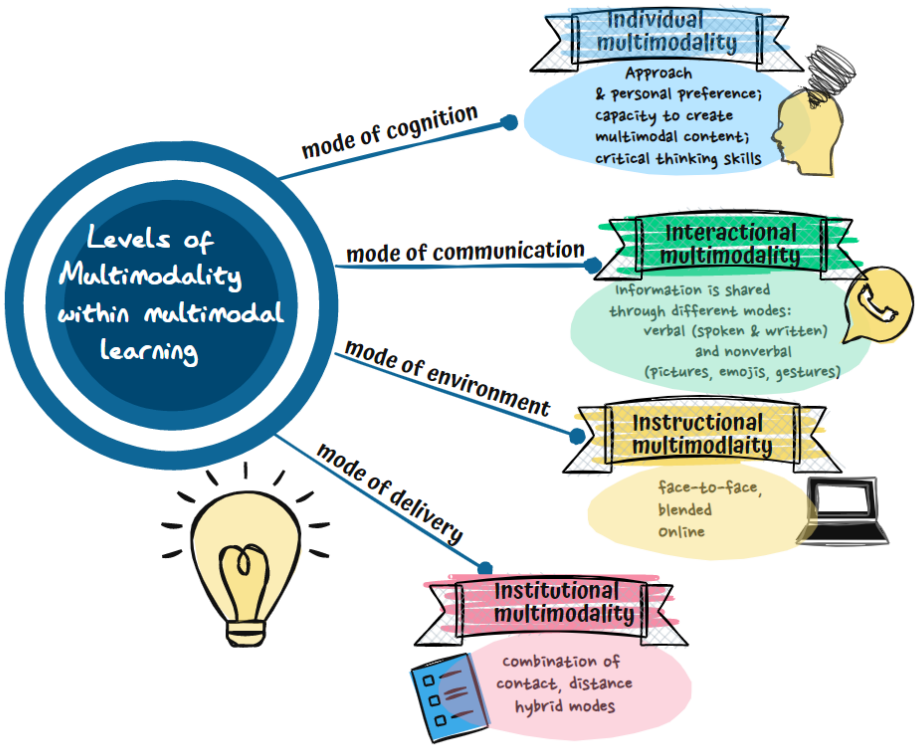


Figure 4-2: Four levels of multimodality in teaching and learning contexts (adapted from Olivier, 2020)

Each of these levels have a role to play in a multimodal learning environment.

4.2.3.1.1 Level 1: Individual multimodality

The first level relevant to the mode of cognition is individual multimodality. This level focuses on the individual preferences of students in respect of the different modalities as well as the way they are approached (Olivier, 2020). Howard Gardner (1983), in his theory of multiple intelligences, acknowledged the individuality of learners, which influence the way they learn best. This has important implications for pedagogy, as it suggests multiple learning modalities. The choice between modalities allows learners to, on the one hand, engage in teaching and learning activities

according to their preference and interests while, on the other hand, challenging their own abilities by attempting less-preferred methods (Gardner, 2009).

Part of individual multimodality is the ability of students to create their own multimodal content, a capacity which, as explained by Redman (2018), is inhibited by the teacher-centred approach. Such an approach could negatively impact on the self-directedness of students (Olivier, 2020). However, the movement away from instructor-centred teaching and learning to a more student-centred approach supported by multimodality has been noted as a developing trend in HE. This approach can be recognised in active participation and discussions by students on online platforms as well as the flipped-classroom approach and tasks that need to be completed instead of listening to lectures (Han, 2022

4.2.3.1.2 Level 2: Interactional multimodality

This level, concerned with the mode of communication, is referred to as interactional multimodality and focuses on how interaction in the teaching and learning situation takes place. Here, the role of electronic mediums such as mobile phones, tablets and laptops to support the transfer of information through different modes is evident (see chapters 2 and 3). Learning management systems (LMS) and e-mails can make use of verbal semiotic resources (e.g., document uploads). Applications such as WhatsApp and Telegram are suitable for both verbal and non-verbal resources by using typed messages but also visuals (e.g., screenshots of content), sounds (e.g., voice recordings to give feedback or instruction), pictures (e.g., to share research activities), emojis and animations such GIFs (sent between students to, e.g., express emotions), or a combination of modes. This type of multimodal communication opens up alternative ways for diverse or non-traditional students to communicate (Newfield & Maungedzio, 2006). It could support students who experience language barriers (cf. § 1.2.2) due to studying in a language that is not their mother tongue (§ 6.7). Instructions can also make use of different modes.

4.2.3.1.3 Level 3: Instructional multimodality

This level is relevant to the mode of the teaching and learning environment and is referred to as instructional multimodality. To a large extent, the development of instructional technology and teaching and learning practices in education have been advancing side by side (Olivier, 2018). ICTs have become essential in the 21st-century classroom and play a role in a multimodal approach towards teaching and learning. On a practical level, instructional multimodality refers to the traditional mode, namely face to face, where the lecturer and students are in a classroom. The online environment refers to classes taking place using technology and the different role players are not in the same location.

The term blended learning (BL) can have multiple meanings and is interpreted differently by different scholars. In HE, blended learning has become the rule rather than the exception with the wide-spread use of smartphones and laptops and the increased connectivity. The blended environment uses the hybrid mode of delivery and can be defined as courses with a combination of face-to-face and online components (Harriman, 2004; Malczyk, 2018). This implies the possible combination of a variety of mediums, technology and compatible devices. Two other educational approaches employing multimodality are e-learning and gamification.

E-learning can be seen as a direct result of the advent of computers in the 1960s and the subsequent proliferation of computers in educational contexts of e-learning (Holmes & Gardner, 2006). Sangrà et al. (2012, p. 152) defined e-learning as follows:

> *E-learning is an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication, and interaction and that facilitates the adoption of new ways of understanding and developing learning.*

As regards gamification, Schaaf and Mohan (2017) acknowledge both the positive and disruptive potential when including game-like features in the learning process. In the context of this study, where SDL (§ 4.4) as well as the use of mobile devices for learning (§ 4.3) are relevant in a field where the visual stands central, the possibilities of incorporating game-based activities to enhance VLC could be relevant.

One of the challenges that could exist when considering multimodal instruction is to find a suitable pedagogical approach grounded in relevant learning theories. According to Olivier (2020), the theoretical basis for instructional multimodality can be found in traditional learning theories. Two of these are relevant to the theoretical grounding of this study, namely constructivism (Bosch, 2017; Olivier, 2011; Picciano, 2017) and connectivism (Amina, 2017; Picciano, 2017). The mode of delivery is determined by the relevant institution, and irregular adaptions need to be made to stay relevant in the changing educational context.

4.2.3.1.4 Level 4: Institutional multimodality

The final level is concerned with the mode of educational delivery as determined by the educational institution. Several educational trends have influenced the different approaches to multimodal delivery. The traditional mode has been the contact mode. Online education has grown substantially because of several factors. One such factor is the current student body who is comfortable with online technology. Two unexpected factors influencing the mode of delivery, which served as pivotal moments within the South African context, are the student protests in

2015–2016 (Nyamupangedengu, 2017) as well as COVID-19 (Du Plessis et al., 2022). This led to a substantial move towards the hybrid mode. In the South African context, the distance mode of delivery has also gained momentum to assist a socially and culturally diverse student population in accommodating work, travel, childcare, as well as challenges of time and place (Han, 2022). The mode of cognition is unique for each individual and is referred to as individual multimodality.

These four levels of multimodality provide valuable insight into teaching and learning in a multimodal environment. It is clear from the above discussion that both mobile learning and SDL, which are important within this study, are highly relevant at the different levels of multimodality. A multimodal model for teaching and learning could contribute towards the practical implementation of multimodal activities.

4.2.4 Multimodal model for education

As discussed above, educational developments have necessitated the reconsideration of educational theories and their application within changing teaching and learning contexts. In a bid to address this need, Anderson (2011) tried to devise a single theory or model for online education. This model, however, did not make provision for any face-to-face mode. Picciano (2009) made an important contribution to blended learning with his “blending with pedagogical purpose model”. He also developed a modified version of the model by incorporating components of other theories and models to conceptualise a “multimodal model for online education” (Picciano, 2017). Although the environment where this study was conducted is not exclusively online, the online component is well-utilised and especially relevant to the hybrid mode of delivery which has gained momentum during and directly after the COVID-19 pandemic. Scholars like Schwab, who coined the term 4IR, is of the opinion that more radical system changes can be expected (Schwab, 2016). This implies an even greater focus on hybrid and distance modes. In addition, the extensive mobile use by students (cf. § 4.2) contributes towards a larger online involvement. His model can also be adapted to include face-to-face instruction. Therefore, I regard this model as insightful when considering a VL component in the existing academic literacy module. The model is presented in figure 4-3:

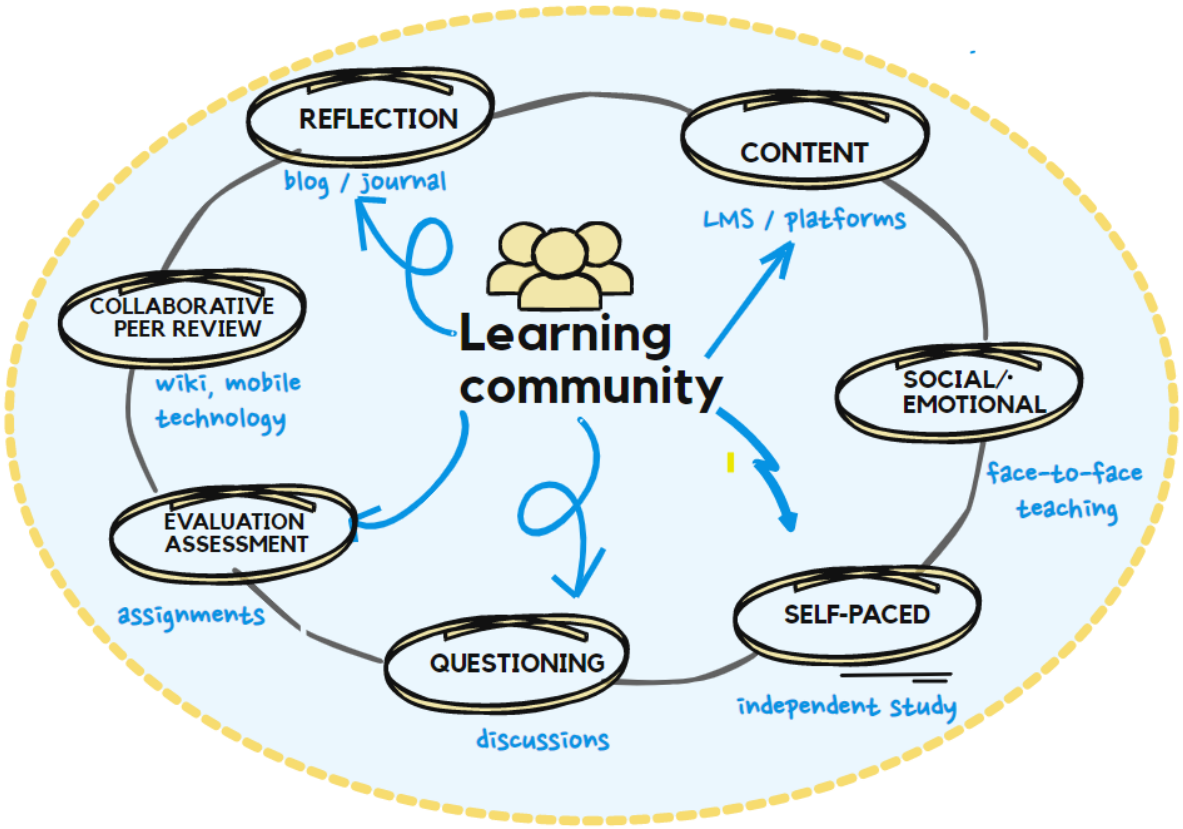


Figure 4-3: Multimodal model for online education (adapted from Picciano, 2017)

Aspects of this model I find relevant in the context of this study are as follows:

- Pedagogical objectives drive the approach.
- The model includes attributes of well-known educational theories and models.
- The seven pedagogical goals or components are clearly structured and compatible with the VLCS.
- The concept of a learning community (Garrison et al., 2000; Wenger & Lave, 1991) is positive for the co-construction of knowledge.
- The self-study component supports SDL.
- The flexibility of the model.
- The model is adaptable to developments in technology and teaching and learning approaches.

This model could offer a starting point to plan multimodal teaching and learning activities that could foster self-directedness.

4.2.5 Synthesis

This section explained the contextual background of multimodality and also shared some of the most common views on the conceptualising of multimodality. This confirmed the relevance and importance of developing multimodality in education. The levels of multimodality in multimodal learning, as conceptualised by Olivier (2020), offered valuable insight into the different perspectives when engaging in a multimodal learning approach. Finally, Picciano's multimodal model for (online) education was considered as a possible start to design teaching and learning activities to enhance the VL of students. The second concept that can be supported by a multimodal approach is SDL.

4.3 SELF-DIRECTED LEARNING

4.3.1 Contextual background

The literature on SDL extends back to the 1800s, when before formal schooling, most people in society were self-taught (Candy, 2009). Shortly after the middle of the previous century, American scholars (Knowles, 1970, 1975; Tough, 1971) published work on the nature of adult learning in informal contexts (Merriam, 2001; Morris, 2019b). As far as adult learning is concerned, two other terms in addition to SDL are also used, namely andragogy and heutagogy. Although the three terms can be seen as related, they indicate slightly different pedagogical approaches. According to Blaschke and Hase (2019), the aim of andragogical orientated teaching is to provide a structure for students to act self-directedly. With heutagogy, however, learners are expected to control their own learning process by identifying their own goals, learning processes and goals. As this study is concerned with young adults in an organized educational structure, the term SDL will be used.

Knowles (1975) defined SDL as a process in which students take control of their own learning by way of planning, selection of resources and enactment. His work was central to reorientating adult educators from their approach to "educate people" to "helping people learn" (Knowles, 1975). Since then, SDL has been extensively researched and "has been one of the fastest-growing and most-researched areas of education ... [and] is an essential skill for [teaching and learning] in the 21st century" (Guglielmino, 2013, p. 2). One of the key theories providing the foundation for SDL is the self-determination theory (Deci & Ryan, 2004). This is a modern theory based on positioned motivation and learner autonomy (Hartnett et al., 2011) and supports the advantages of online technology supported learning (Van der Westhuizen & Mentz, 2020).

Morris (2019a) combined the key foundational positions of different scholars to create an overview of the concept. Figure 4.4 summarises the key foundations of SDL (Morris, 2019b):

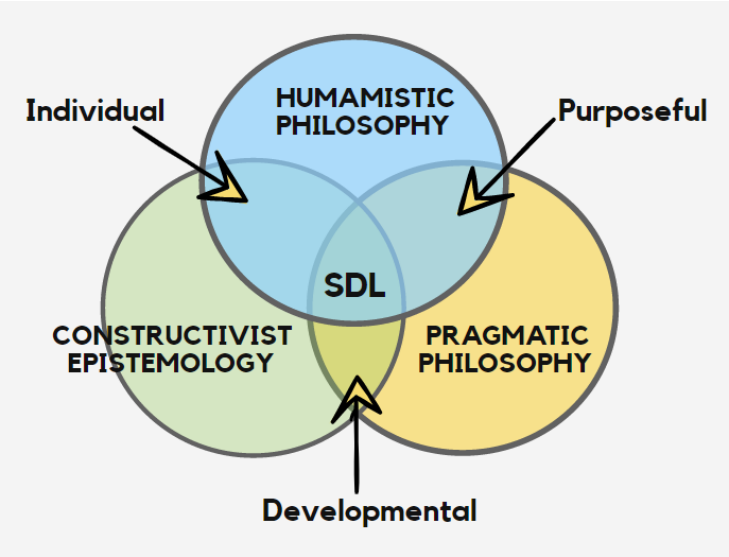


Figure 4-4: Foundational positions of SDL (adapted from Morris, 2019b)

The figure indicates that SDL is grounded in the humanistic and pragmatic philosophy[1] as well as constructivist epistemology.[2] When combined, they create an SDL process that is individual, purposeful and developmental (Morris, 2019a).

SDL as concept needs to be addressed in more detail.

4.3.2 Conceptual background

SDL can be approached in different ways. It can be considered as one component of the movement towards learner-centred learning (Olivier, 2020). Brocket and Hiemstra (2019) regard SDL as both a process and a learner preference. SDL, according to Bosch (2017), is an approach where students take responsibility for their own learning. Guglielmino (2013) conceptualised SDL as a process consisting of definite steps: first, learners identify their needs, then they set learning goals and prepare a learning plan; after accessing learning sources, they execute the plan; the final phase is evaluating both the results and the overall process. The characterised SDL learners, as identified by Boyer et al. (2014), translate this process into the steps taken by the learner: they determine their own learning goals; resources are selected according to these goals; they choose their own preferred learning strategies; and have the ability to reflect on the outcome of the learning process. In addition, the communicative construction of knowledge during the SDL

[1] The humanistic philosophy in the educational context refers to a process of learning where personal growth leads to self-actualisation (Groen & Kawalilak, 2014); pragmatic philosophy refers of applying theoretical concepts to real-life contexts (cf. § 1.4) to determine their validity.

[2] Constructivist epistemology combines the nature and theory of knowledge with constructivism, striving to understand the nature of knowledge in practice, requiring learners to solve real-life problems (Morris, 2019a).

process opposes the central position of the educator as the main source of information in the teaching environment (Boyer et al., 2014).

As with all intricate concepts, the aim towards a uniform definition is often problematic. The widely accepted definition of SDL by Knowles (1975) defines SDL as a learning process where more than one person may be involved – these persons can be peers, teachers, tutors, parents, mentors, or any other knowledgeable persons:

> *[SDL is] a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing, and implementing appropriate learning strategies, and evaluating learning outcomes*. (Knowles, 1975, p.18)

The relevance of the social or communal element of SDL is mentioned by Ehlers (2013, p. 116-117) as "the concept of SDL comes to be of enormous importance to social learning". The importance of the social aspect of SDL is also mentioned by Brockett and Hiemstra (2019).

Moreover, the definition by Guglielmino and Long (2011) adds a 21st-century perspective: "[SDL is] a dynamic combination of attitudes and skills, essential for dealing with the complexity that individuals face in all aspects of their lives" (p. 1). The reference to the combination of attitudes and skills relates SDL to the concept of life-long learning, of which SDL is regarded as both a prerequisite as well as a contributor (Botha, 2012; Du Toit-Brits & Van Zyl, 2017). In this study, as regards self-directed multimodal mobile learning activities, this definition by Guglielmino and Long (2011) was used as departure point. For the sake of clarity, a brief overview of existing misconceptions about SDL is needed.

4.3.2.1 Misconceptions about self-directed learning

Terms such as self-education, autonomous learning and self-initiated learning have been used interchangeably with SDL in the literature. This is a result of understated differences between these terms and SDL (Dehnad et al., 2014; Saks & Leijen, 2014). The concept of self-regulated learning (SRL) instead of SDL also appears in the literature. Although there are similarities, there are several differences as well.

Gandomkar and Sanders (2018) state that SDL refers to a general approach to learning employed by students, whereas SRL refers to temporary strategies applied to a specific task and not learning in general. Another difference is concerned with who takes the responsibility for creating the learning environment: in SDL, it is the "learner", whereas in SRL, it is the "teacher" (Gandomkar & Sandars, 2018; Saks & Leijen, 2014). Another crucial difference is that self-

directed learners are always self-regulated, which is not true vice versa (Gandomkar & Sandars, 2018).

The previous two sections attempted to give an overview of the context and concept of SDL. Attention is now turned to the more practical aspects of the realisation of SDL in the learning context.

4.3.3 Self-directed learning models

In order to find a way of fostering SDL in the educational environment, a number of SDL models have been designed. A brief overview of the models considered as major contributors is provided in table 4-2 on the next page.

Table 4-2: Overview of SDL models

	SDL components	Models				
		Long	Candy	Brockett & Hiemstra	Garrison	Oswalt
Learning Situation	**Opportunity**	Educators have a responsibility to give students the opportunity for SDL	Nothing explicit	Educators have a responsibility to give students the opportunity for SDL	Educators have a responsibility to promote student control	Extent to which educators foster SDL
	Support	There should be a balance between pedagogical and psychological control	Nothing explicit	Educators need to support students, regardless of their personal responsibility	Nothing explicit	Expertise, guidance and materials provided by educator
	Collaboration	Possible but not necessary	Nothing explicit	Students do not learn in isolation	Collaboration with others promote control over learning context	Student-student, group and student-educator interaction
Components of learning	Motivation	Nothing explicit	Nothing explicit	Nothing explicit	Entering motivation, task motivation and volition	Enthusiasm or eagerness of doing something; self-efficacy and volition
	Context	Nothing explicit	Distinguish between student control in an institutional setting and autodaxity	Defines social context as institutions of learning	Students taking control of resources in the learning context	Resources, peers and external factors in the learning environment
	Cognitive	Nothing explicit	Nothing explicit	Nothing explicit	Construct own meaning, critical thinking and reflection	Critical self-refection
Students' Attributes	**Content skill**	Nothing explicit	Student's SDL skills may differ in different learning areas	Nothing explicit	Nothing explicit	Mastering basic skills within content area promote SDL skill
	SDL skill Level of self-directedness	High psychological control will proceed to SDL without pedagogical assistance.	Level of SDL skill will be higher in familiar learning areas	Students assume responsibility for planning, implementing and evaluating the learning	Nothing explicit	Level of self-directedness in specific learning area is influenced by skill level in that area

				process		
	Willingness Willingness to direct own learning	Willingness to direct own learning leads to better SDL skills	Willingness and capacity to direct own learning (self-management)	Willingness and desire	Self-management and goal setting	Personal decision to invest time and effort

This chapter does not lend itself to a thorough discussion and synthesis of all the models. However, as put forward by Bosch et al. (2019) and Tredoux (2012), the model as designed by Oswalt (2003) provides a suitable perspective for the implementation of SDL in the teaching and learning environment and incorporates a large number of SDL components. Figure 4-5 presents my perception of the model, as conceptualised by Oswalt:

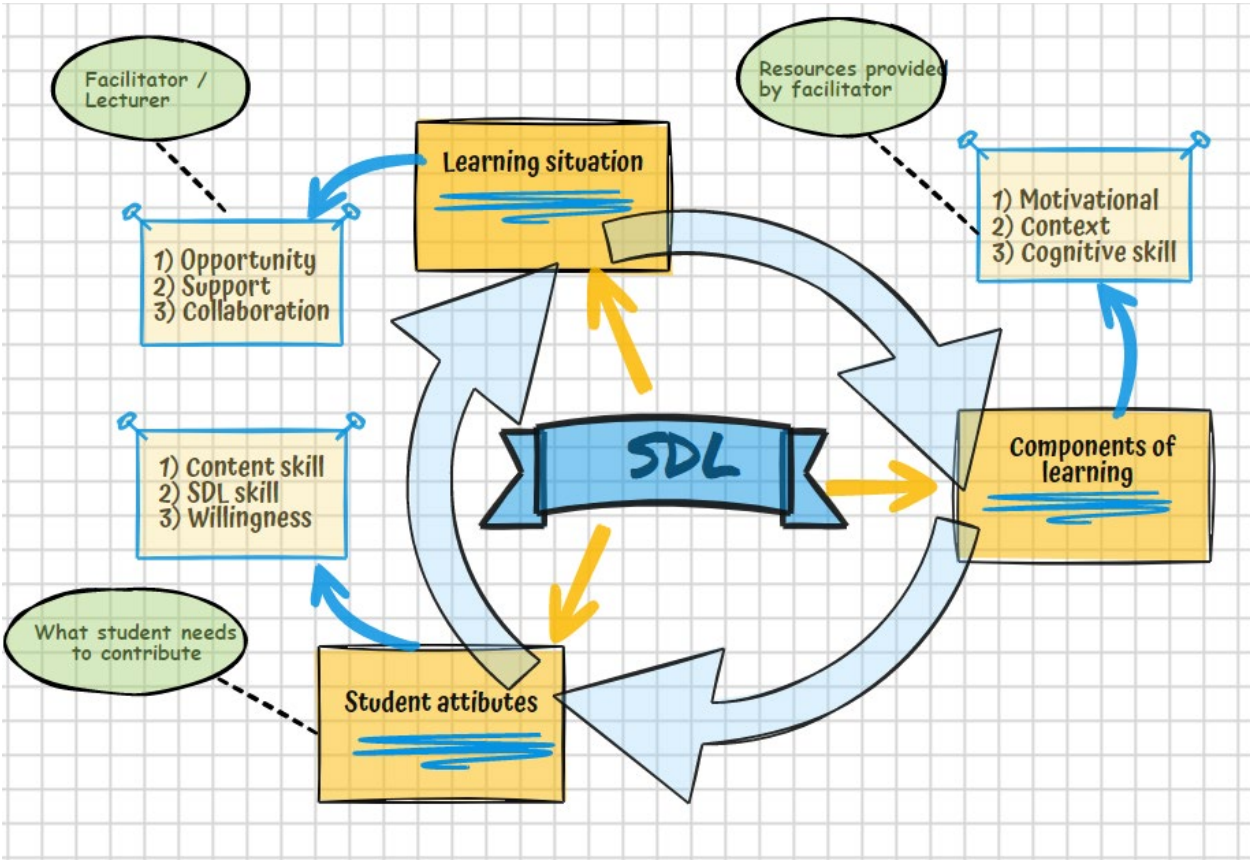


Figure 4-5: Oswalt's model for self-directed learning

Source: Adapted from Oswalt (2003, p. 22)

Oswalt (2003) organises the nine identified key contributors towards SDL into three groups: a) the learning situation; b) the components of learning; and c) the student attributes needed with in an SDL setting. I would translate it into the three role players within the process: the lecturer; the students; and the "materials". The lecturer is primarily responsible for the learning situation, which includes opportunity, support and collaboration (Oswalt, 2003). The lecturer must provide the opportunity for students to develop their SDL skills and also provide the necessary support. Support includes expertise, guidance and materials in the learning situation. According to Oswalt (2003), collaboration with peers and support groups is essential for the successful implementation of SDL.

The attributes that are centred with the student are not only connected to the attitude of the student (willingness) but also imply pre-knowledge related to content: if students have no pre-knowledge, they would find it very challenging to direct their own learning (Oswalt, 2003). The reference to student willingness is a particularly important determiner and indicates that SDL can only occur if the student is willing to invest time and effort to develop the skills needed to become self-directed. The components of learning as included by Oswalt (2003) are the cognitive, motivational and contextual components. The cognitive components include self-reflection of both the process and the learning material, whereas the motivational components speak to the level of confidence experienced by the students as well as their ability to stay committed to the task This would include managing contextual factors – for example, learning material, peers and environmental factors – which can be controlled (Oswalt, 2003).

When Oswalt's (2003) and many of the SDL models were conceptualised, face-to-face teaching and learning was still the norm. His model, therefore, does not make any reference to the environment or the hybrid mode in relation to SDL. However, I believe each of the three groups, with the key contributors, are highly suitable for the incorporation of technology into the model. This receives further attention in the section on the role of technology in SDL (cf. § 4.3.6) as well as the section on mobile learning (cf. § 4.4)

In conclusion, this model provides valuable practical components to consider when planning to implement multimodal activities to develop the VL of students, simultaneously attempting to foster SDL. It is clear from the model that implementing SDL is a challenging endeavour where the contributions and collaboration of all role players are critical. It also transpired that SDL involves process but can also be regarded as a learning aim. One of the role players is the self-directed learner.

4.3.4 The self-directed student

In contrast to the traditional educator-centred approach to teaching and learning where the learner is a passive recipient of information, the learner engages in SDL and plays an active role in obtaining knowledge and skills (Fisher & Sugimoto 2006; Heikkila & Lonka, 2006). The characteristics of a self-directed learner, as defined by Guglielmino in her PhD thesis, still captures the essence after more than four decades:

> *[A] highly self-directed student is one who exhibits initiative, independence, and persistence in learning; one who accepts responsibility for his or her own learning and views problems as challenges, not obstacles; one who is capable of self-discipline and has a high degree of curiosity; one who has a strong desire to learn or change and is self-confident; one who is able to use basic study skills, organise his or her time and set an*

appropriate pace of learning, and to develop a plan for completing work; one who enjoys learning and has a tendency to be goal oriented. (Guglielmino, 1977, p. 73)

As indicated in Oswalt's SDL model (see figure 4-5), SDL cannot succeed without student attributes. Research by Dweck (2008) revealed the impact of personality characteristics and self-belief on SDL. After an extensive survey, Guglielmino (1977) proposed a list of characteristics of self-directed learners. She also referred to the inquisitive nature of young children to motivate her opinion that self-directedness is the natural way to learn (Guglielmino, 2008).

Students should be made aware of the following when one considers engaging them in SDL activities:

- the role of their knowledge, attitude and SDL skills (or lack thereof) (Guglielmino et al., 2004);
- the role of the lecturer, changes from being the source of information to facilitating the SDL process (Loyens et al., 2008);
- all students can successfully function within a self-directed environment, but they need to embrace the purpose and processes (Guglielmino et al., 2004);
- as indicated, the role of the educator changes in SDL.

4.3.5 The role of the educator in self-directed learning

Just like the role of the student changes with an SDL approach, the role of the educator also changes. According to Bosch (2017), in SDL, the educator becomes the facilitator and is not the authority supplying the needed information. Here, I again refer to Oswalt (2003) and the role he attributed to the educator. Educators should create the opportunities for students to become more self-directed by giving them a degree of control over their learning (Francom, 2010). They should also support students in their efforts to plan their work, perform the tasks and then evaluate their own learning process (Merriam et al., 2007). This process, however, should take place through specific teaching-learning strategies employed by the educator and does not mean to simply leave students to work on their own (Merriam et al., 2007). Hansen and Hansen (2015) mention teamwork skills, communication skills and interpersonal skills as the top requirements for the 21st-century workplace. Here, the role of the lecturer is to facilitate collaboration between students.

A third role player in SDL in the current educational setting that cannot be ignored, is technology. Here, the rapid development in technology as well as the recent forced move to the hybrid mode in an online environment that many educational institutions experienced due to COVID-19 have underscored it even more. The role of technology now receives brief attention.

4.3.6 The role of technology in self-directed learning

In the 21st century, the rapid development of ICTs plays a major role in the choice of teaching and learning strategies (Bosch, 2017; López et al., 2011). However, technology should enhance the quality of teaching and learning activities and not just be included for the sake of inclusion (Steyn et al., 2016). SDL with technology refers to the use of ICT in learning which empower students to take control of planning, applying and evaluating their own learning (Lee et al., 2014; Teo et al., 2010). In this regard, I once again refer to the SDL model by Oswalt (2003) to contextualise the role of technology within the model. This is just done briefly, as the section on mobile learning (cf. § 4.4) addresses this in more detail.

Within the learning situation, the affordance of modern mobile technology offers students the opportunity to take charge of their own learning, both inside and outside of the classroom (Gokcearslan, 2018). The abundance of information and the new role of the educator as facilitating learning instead of sharing information allows the learning process to continue outside the formal teaching and learning situation. In this regard, Corlett et al. (2005) mention that the present educational transition from mass education to more individualised learning requires skills associated with mobile technology. This has been proven a valid point during the move to the online environment during COVID-19. Technology also offers the possibility of communication and sharing of information (Zhong, 2013) as well as tools for collaboration like wikis and blogs (Moran et al., 2010).

As far as the learning component of SDL is concerned (Oswalt, 2003), the cognitive behaviour of students can develop when utilising mobile SDL skills (Sha et al., 2012). Several studies have also confirmed the influence of technology supported learning on the level of self-directedness (Jung, 2014; Kim et al., 2014; Lee et al., 2014). Rashid and Asghar (2016) also reported a positive relationship between technology use and SDL. Kirk (2012) claims that the level of SDL can serve as a predictor for technology integration. Pertaining to students' attributes in the SDL process, the attitude towards and belief about the value of technology on the part of the student play an important role in SDL with technology (Demir et al., 2014). As could be expected, the use of technology for SDL is also impacted by the SDL readiness of students (Khalid et al., 2020).

As argued by Bryan (2015), educational practices such as collaboration in learning, taking personal responsibility for learning, and the vast amount of information available make the use of digital technology in the educational environment non-negotiable.

4.3.7 Fostering self-directed learning

The fostering of life-long learning, together with taking responsibility for one's own learning and the increased ability to transfer acquired knowledge are all regarded as benefits of SDL (Dresel et al., 2015). Thus, fostering SDL is regarded as a critical objective in education to establish lifelong learners in the 21st century (Dynan et al., 2008; Lee & Teo, 2010; Voogt & Roblin, 2012).

Relevant learning approaches and creating a suitable learning environment offer opportunities to foster SDL. Multimodal cooperative learning in a technology supported environment can foster SDL abilities of students. Such an environment enables students to manage their own learning while being supported on a cognitive and emotional level while engaged in the learning process (Robertson, 2011). Problem-based learning is another possible approach. It approaches learning from a real-life context and employs inquiry in a task-based environment (Bell, 2010; Grant, 2011). According to Loyens et al. (2008), this approach aims to assist students on different levels: 1) constructing a comprehensive knowledgebase; 2) developing problem-solving skills; 3) learning to collaborate with others; 4) developing intrinsic motivation; and 5) fostering SDL skills.

Many other factors also contribute towards the fostering of SDL. Educators have been found to make an important contribution towards hindering or fostering SDL (Du Toit-Brits, 2019). Stanistreet (2019) refers to the value of support and interconnectedness in the pedagogical quest towards SDL, whereas the role of the learning environment in fostering SDL is also acknowledged by other scholars (Du-Toit-Brits, 2017; Hiemstra & Brockett, 2012; Knowles, 1996). Kolesovs and Melne (2017) argue that students are confident, motivated and determined when they feel safe in the teaching environment – all contributing towards SDL.

Francom (2010) formulated four principles for the fostering of SDL in formal educational contexts:

- Student readiness: The level of self-directed learning required in learning activities should be appropriate to student readiness.
- Pace: The process of moving towards self-directedness should be gradual.
- Knowledge and SDL skills: The process of obtaining the desired subject-related knowledge and the relevant self-directed learning skills should be handled together.
- Engagement: Students should practise SDL through engagement in learning tasks.

These will have to be considered when attempting to foster SDL through multimodal mobile VL activities.

4.3.8 Synthesis

In the section on multimodality (§ 4.1), I referred to the model for multimodal online learning as proposed by Picciano (§ 4.1.4). As mentioned in the discussion, although it had been

conceptualised for multimodal online activities, it can be adapted to also use in a hybrid mode. I perceive the model as indicating the steps in or components of an activity within the learning process. In this section, the model by Oswalt (§ 4.4) was identified as a possible approach to the fostering of SDL. Hence, I do not regard it as addressing the process of SDL; it rather focuses on how the aim of becoming self-directed can be reached. This is done by identifying the role players in the SDL process and what is required of each of them to create an environment conducive to fostering SDL. The two models can thus, in my view, complement each other – one providing the process, and the other one focusing on the different role players and the contributions of each to reach the aim of self-directed students.

SDL as process and learning aim is challenging to all role players. All role players are required to adapt their pre-conceived ideas, take risks and engage in different steps to succeed. Lecturers have to embrace their changing role and provide an environment conducive to SDL; students need a positive attitude and will to develop the skills needed to become self-directed. None of this happens overnight.

One important, if not the most important, aspect of being self-directed is that learning becomes a way of living – a way to not only to survive in society but to be able to adapt to new developments (Mahlaba, 2020). SDL is regarded as furnishing learners with skills needed outside the classroom walls (Gibbons, 2002). This means that even after finishing formal education, the self-directed person can keep on learning and improving. Self-directed learners are urgently needed in the 21st century, imploring institutions of HE to promote self-directedness in students (Du Toit-Brits 2019; Guglielmino 2013).

The next section is on mobile learning – the final of the three concepts addressed in this chapter.

4.4 MOBILE LEARNING

4.4.1 Contextual background

The 21st century is regarded as the digital era or mobile age, with an impact equal to the First and Second Industrial Revolutions (Traxler, 2009b; Sharples et al., 2010). Within the context of the 4IR, students will increasingly depend on different modalities of learning (Olivier, 2022). The use and functionality of mobile devices such as smartphones and tablets continue to be enhanced through increased network access possibilities and technical abilities (Ferran-Ferrer et al., 2014; Sönmez et al., 2018). In addition, Admiraal et al. (2009) refer to the current generation who do not know a life without ICTs: they interact with digital information every day, they are connected to each other, and often engage in several activities at the same time as interacting on their mobile devices. This development has sparked the global interest in the affordances of mobile devices in many fields. Since the end of the previous millennium, mobile technologies have been utilised

for teaching and learning purposes in developed and developing countries (Brown & Mbati, 2015; UNESCO, 2012a). This development creates the potential for new perspectives and substantial changes in educational practices (Kukulska-Hulme, 2009). Subsequently, mobile learning – now referred to as m-learning – has emerged as a new educational concept, becoming popular especially at HE institutions (Odede, 2021). The contextual factors of this study, namely that the research took place on a rural campus in South Africa, cannot be ignored with regard to mobile learning.

Already in 2015, a substantial group of world leaders committed themselves to a set of sustainable development goals (SDGs) to address matters related to developing countries (Addis Ababa Action Agenda, 2015)). SDG 4 (Quality Education) is relevant to this study, as this goal is to ensure inclusive and equitable education and to encourage lifelong learning for all (Kaliisa & Picard, 2019). Mobile technology could contribute towards this goal of inclusivity and equitable access, as the use of a mobile device surpasses age, gender, social status and ethnicity (Arrigo et al., 2013). This is discussed further in the subsection on mobile learning in HE (cf. § 4.4.3)

This is also true for the developing countries, even in the poorest region like Sub-Saharan Africa, where mobile ownership has increased by 130 million new users each year (Silver & Johnson, 2018).

4.4.2 Conceptual background

As with many new concepts, it is clear from the literature that scholars have still not come up with a universal definition for m-learning. Several definitions are provided in this section to facilitate an idea of what people believe m-learning is. Kukulska-Hulme (2009) mentions the ambiguity of the term “mobile” as a starting point – Does it refer to the idea of the learner who can move around or does it refer to mobile technology? Traxler (2009) argues that mobility should also incorporate the notion of time-shifting and boundary-crossing. Kukulska-Hulme et al. (2009) underline the ever-changing learning-environment made possible by the mobile phone:

> *…the mobile technology, while essential, is only one of the different types of technology and interaction employed. The learning experiences cross spatial, temporal and/or conceptual borders and involve interactions with fixed technologies as well as mobile devices. Weaving the interactions with mobile technology into the fabric of pedagogical interaction that develops around them becomes the focus of attention* (p. 20).

The English Oxford Living Dictionary (2017, online) defines something that is mobile as “able to move or be moved freely and easily”. Within a teaching and learning context, m-learning would

imply the use of information technology devices that are handheld (e.g., smart- or mobile phones and tablets) and where learning can take place in any location, in different timeframes, addressing different content areas (Sarrab et al., 2012).

According to Traxler (2009a), the initial definitions of m-learning were techno-centred, focusing on the technology and hardware and not on the learning experience. In his definition, Holden (2021) focuses on the way m-learning can empower, engage and motivate students – qualities which, according to him, would outlast the initial novelty of the gadget itself. Franklin (2011) simply defines m-learning as learning which takes place anywhere and anytime. Hwang and Chang (2011, p. 1024) define m-learning as a "form of e-learning that specifically uses mobile devices to integrate with ubiquitous computing technologies to deliver learning contents and support". The definition by Martin and Ertzberger (2013, p. 78) focuses on the "here and now" aspect of m-learning – the type of learning that happens when students can access information anytime, anywhere and that allows them to engage in authentic activities within the context of their learning.

M-learning is conceptualised as learning achieved with the support of mobile devices within authentic formal and informal learning contexts (Gikas & Grant, 2013:22). Four central constructs relevant to m-learning have since been included in most definitions, namely pedagogy, technological devices, context and social interaction (Crompton, 2014). More recently, m-learning has been defined as "educational interaction which takes place through mobile technology, and which enables students to access learning material anytime and anywhere they deem as convenient" (Crompton & Burke, 2018, p. 54). According to Moreira et al. (2018, p. 981), "mobile learning is a type of electronic learning, which is implemented through mobile technologies such as personal digital assistants (PDA), cell phones, audio players, and electronic books and others".

The concept is a constantly evolving phenomenon due to, amongst others, on the technical side better, faster and cheaper models of mobile devices and better accessibility and connectivity, whereas on the pedagogical side, the development of suitable teaching and learning approaches has also been receiving attention (Sönmez et al., 2018). M-technology offers the prospect to place learning in authentic environments outside the traditional formal setting. This could lead to higher levels of engagement and motivation (Admiraal et al., 2009).

Although initial research on the concept was mainly focused on developing a definition for this new teaching and learning concept, good progress has been made to facilitate the integration of m-learning into educational practices (Brown & Mbati, 2015). However, the potential of m-learning has barely been touched on and the possibilities, especially regarding open and distance (ODL) learning, seem infinite. In the times we live in, where face-to-face teaching and learning is being challenged by, amongst others, COVID-19 lockdown regulations and financial implications, m-

learning offers a viable opportunity. However, some misconceptions about the concept still persist.

4.4.2.1 Misconceptions about mobile learning

Popular misconceptions, as identified by Brown and Mbati (2015), which were relevant to the working definition of m-learning in this study, are tabulated below.

Table 4-3: M-learning misconceptions relevant to the study

MISCONCEPTION	REALITY
M-learning implies that you must be mobile or "moving" whilst learning.	The learner can be on the move (e.g., using public transport), but the learner can be static as well – the device is mobile and is with the student all the time.
M-learning refers only to learning with a mobile phone.	Any portable device can qualify as mobile learning, e.g., a laptop (Corbeil & Valdes-Corbeil, 2007, p. 52); Any hand-held device (Crescente & Lee, 2011; Traxler, 2007).
The device is the most important component of m-learning.	Technology enables m-learning; the aim of m-learning should be enhancing the teaching and learning experience (Brown & Mbati, 2015).
M-learning equals e-learning on a mobile device.	Mobile devices offer additional affordances such as synchronous and asynchronous collaborative communication (Parsons, 2014).
M-learning cannot be utilised in face-to-face class activities.	Many successful uses of m-learning to collect information, assess understanding and review learning material have been reported (Sharples et al., 2005).
When implementing m-learning, all course material should be done on a mobile device.	If desired, only some components and activities can be done on a mobile device – the value that it can add to the teaching and learning process is the essential aspect (Brown & Mbati, 2015).
M-learning utilises existing teaching and learning methodologies.	Teaching and learning activities need to be re-designed to fully utilise the affordances offered by m-learning (Parsons, 2014).

With regard to this study, I carefully looked at the various definitions, components of m-learning as well as the constant developing of the concept. I subsequently compiled the following definition, which incorporates my approach to VL as well as multimodality, to be used in this study:

Learning that takes place anytime and anywhere with the aid of a mobile device that can instantly access, process and produce a variety of multimodal, online, and educational resources.

When reflecting on the above subsection, the contribution by David Parsons (2014) seems to be a fitting summary:

> *To ensure that future m-learning systems meet their full potential, it is necessary that our understanding of m-learning encompasses all its unique characteristics, and that we recognise that any form of learning which takes place using a mobile device is m-learning, whether on the move or static, whether in formal or informal settings, whether working collaboratively or alone.* (p. 221)

4.4.3 Mobile learning in higher education in South Africa

Many believe that the increased use and infiltration of m-technologies can contribute towards making HE more inclusive and equitable through the use of mobile devices for learning (Kaliisa & Picard, 2019). Research studies highlight the reasons for this belief, namely the flexibility to provide cheaper but still high-quality learning opportunities for people who would not usually have access to HE, anywhere and anytime (Brown et al., 2016; Hornsby & Osman, 2014; Khalid & Pedersen, 2016; Lumadi, 2017; Zozie & Chawinga, 2018). The fostering of learner independence and pervasive access to learning materials are also mentioned as another reason for mobile learning (Becker et al., 2017; Handal et al., 2013). Kaliisa et al. (2019), as other researchers, regard mobile learning as at least an integral part of any future educational process, if not the future of learning in Africa.

Despite the perceived benefits of mobile learning in developing countries, there is little evidence of large-scale implementation of mobile learning in Africa. An aspect related to this reality, as mentioned by a number of scholars, is the notion that mobile learning and equity in education delivery must be driven by policy if a comprehensive change is to be expected (Aluko, 2017; Ghasia et al., 2018; Ilomäki et al., 2016). A look at possible barriers is therefore needed.

4.4.3.1 Barriers related to mobile learning in HE in the African context

The barriers related to m-learning were categorised according to resourcing, equity groups, epistemological and institutional barriers. The major elements of each of these categories relevant to this study are briefly discussed.

4.4.3.1.1 Resourcing barriers

Despite the substantial increase in mobile phone ownership across Africa as well as increased network capacities, like faster speed and lower costs, research shows that barriers related to resources are still highly relevant in the HE context (Kaliisa & Picard, 2019). Even on campus, both students and lecturers in poorer countries do not have constant access to mobile technology due to factors such as limited bandwidth, weak connections, and also electricity outages, or load shedding[3] (Ghasia et al., 2018; Gupta et al., 2017; Oyelere et al., 2016; Zozie & Chawinga, 2018). Financial challenges are also a barrier that leads to "digital exclusion" when money is not available to purchase a mobile device or data, and poor infrastructure in poorer areas prevents students from engaging in m-learning (Ololube et al., 2016; Tarus et al., 2015). Devices might also lack the needed functionality or students may not know how to use them for m-learning purposes (Brown et al., 2016; Hornsby & Osman, 2014; Ilomäki et al., 2016).

Another barrier in respect of resources is the lack of high-quality content. Open educational resources and massive open online courses (MOOCs) to provide interactive content and practical activities offer possible solutions (Hornsby & Osman, 2014; Ng'ambi et al., 2016). However, they are often expensive, do not regard the technical limitations within the relevant areas, and the content does not address the learning needs of students from equity groups (Aluko, 2017; Brown et al., 2016; Ghasia et al., 2018).

4.4.3.1.2 Equity group barriers

The resourcing barriers above are specifically related to the socio-economic position and environment of rural students (Aluko, 2017; Sanga et al., 2013; Zozie & Chawinga, 2018). Another group that would be expected to benefit from m-learning, is women. However, it seems not to be the case, and inequalities persevere, even in the online environment (Sanga et al., 2013).

4.4.3.1.3 Epistemological barriers

M-learning has also been shown to be affected by "epistemological access" (Ghasia et al., 2018; Glass et al., 2016; Hornsby & Osman, 2014). In this context, it refers to the inappropriateness of both the content and context of m-learning set against a specific socio-economic background (Glass et al., 2016). Digital competence is also regarded as a notable barrier in m-learning, where

[3] Within the context of the ongoing South African energy crisis, load shedding is an ongoing period of widespread national implementation of blackouts, mostly according to a schedule. This is applied when electricity supply is insufficient for the demand and a threat of destabilising the national power grid exists.

students use their devices for social interaction but are not comfortable using them for academic purposes (Ilomäki et al., 2016).

4.4.3.1.4 Institutional barriers

Research refers to local staff as a substantial contributor to institutional barriers to m-learning. Although research confirms a positive attitude towards the possibilities of m-learning among staff (Brown et al., 2016; Hornsby & Osman, 2014; Zozie & Chawinga, 2018), the lack of confidence and expertise of staff have a negative impact on the affordances of m-learning (Asamoah, 2017; Lumadi, 2017; Protsiv & Atkins, 2016). In addition, the perceived workload to produce quality digital resources also affects their attitude (Tarus et al., 2015).

The barriers above relate to the context of this study and portrays a relatively bleak picture. To slightly balance this out, I briefly refer to some positive attributes related to m-learning within the given context to conclude this section.

4.4.3.2 Affordances of m-learning for HE

4.4.3.2.1 The pervasiveness of mobile devices

Research conducted by Statistics South Africa (2016) found that 93.8% of households in South Africa have at least one mobile phone. The telecommunication infrastructure is well-developed in comparison to most other African countries (Kaliisa & Picard, 2017). Regarding device type, the mobile phone is reported to be the device most used in the African HE context.

4.4.3.2.2 Enhancing of student learning

Student learning may be enhanced through m-learning due to increased collaboration with other students and lecturers. This is enabled by the mobile affordances of immediate communication (MacCullum & Parsons, 2017). Parsons et al. (2016) identified five affordances of mobile learning that distinguish it from e-learning: portability, communication, interaction, outdoor environments and gathering of evidence and data. In addition, the benefit of downloading multimodal resources like voice notes can increase authentic learning (Asiimwe & Grönlund, 2015; Kriek, 2011; Witt et al., 2016). The exposure to m-learning in an HE environment offers the affordance of introducing students to digital and mobile literacies.

4.4.3.2.3 Preparation for the workplace

The use of m-learning in HE can positively contribute towards the seamless transition of students to the workplace, as well as the ability to cope with the complex and changed work environment

of the digital era and engage in lifelong learning (Littlejohn et al., 2012). This ability should be considered as essential for HE graduateness (Bosman & Strydom, 2016; Steur et al., 2012). Graduateness or graduate qualities refer to those special attributes beyond disciplinary knowledge university graduates should possess (Bozalek & Watters, 2014). In this regard, Ng (2013) refers to the challenge faced by HE institutions to guide students in the effective educational use of mobile devices to empower them to constantly adapt themselves by engaging in lifelong learning. According to Bosman and Snyman (2016), the development of mobile learning literacies should receive the same attention as academic writing as part of academic literacy. Ng (2013) motivates it as follows:

> *Being digitally [mobile] literate will prepare individuals to adapt to new and emerging technologies more easily and as mobile technologies are one of the fastest growing areas of technology, equipping individuals with m-learning literacy should enable them to pick up newly emerging semiotic systems and resources for communication as they arise and adapt to new mindsets and practices that come with this growth.* (p. 3)

4.4.4 Synthesis of this section

Neither the mobile device nor the concept of m-learning is going to disappear. Both devices and affordances constantly develop in the 4IR era we are experiencing. Especially within the context of this study, numerous challenges exist, as discussed in this section. However, if managed and addressed correctly, m-learning could contribute to literacy and offer opportunities to mitigate the current educational challenges. The power of being digitally literate does not only apply to the HE environment but is a competency that also empowers all people on different levels to become part of the knowledge community.

This study was concerned with developing the VL of students. One way of doing so is by using multimodal mobile activities that could contribute towards SDL. Therefore, the synergy between these three concepts is discussed next.

4.5 MULTIMODAL MOBILE SELF-DIRECTED LEARNING

Olivier (2020) uses a practical image to illustrate the relationship between SDL and multimodality: he considers SDL as both a process and a learning aim and regards multimodality as the vehicle or the environment. As regards the relationship between the two concepts, it is clear that they have to a great degree become interwoven. In this regard, Nouri (2019) comments as follows:

> *[T]he way university students make meaning and build knowledge during self-study have changed; technology makes available other semiotic resources for them than the text,*

thus transforming monomodal learning practices into multimodal learning practices. (p. 695)

The development of technology as well as the subsequent increase in online learning and the use of learning technologies confirm the role of the mobile device as the instrument (or vehicle) towards multimodal SDL.

In my discussion of VL (see chapter 3), two of the concepts identified as present throughout all the phases of the development of VL, are technology and the visual society we find ourselves in. The connection between multimodality and the mobile device is thus clear: research shows that the mobile phone is the device most popular with the current generation (Ozkan & Solmaz, 2015). In the 21st-century educational context, the mobile phone is used as instrument to access multimodal learning content (Nouri, 2019).

The visual society implies that we are surrounded with visuals and interact with them on different levels, often in an intuitive way. Possessing skills to assist in this process can be very valuable. This is not only relevant to a formal educational setting but also to the everyday interaction with the visual material around us (Lasquite, 2015). In chapter 6, the VLCS as required are organised and discussed within a framework for VL (§ 6.5).

I perceive the interaction between the three concepts – multimodality, SDL and mobile learning – in relation to these three competencies – accessing, processing, and producing multimodal material, in this case visual material – as follows:

Accessing visuals is often an unintentional process, as people (excluding people with visual impairment) involuntarily see and absorb everything around them. Accessing visual material in an academic context means that a person must decide in a self-directed way which visual material is needed for a specific purpose and where and how these can be found effectively. It is accessed using a digital device, often a mobile phone, because of its special affordances.

We are confronted with multimodal messages the whole day – we hear sounds, we touch objects, and we see things around us. The processing of visual material is of cardinal importance every day: a person needs the ability to make sense of what they see – whether in a textbook, a street sign, an advertisement, or information shared in an infographic or other graphics, to name but a few. To this end, to be able to interpret, analyse, contextualise and, very importantly, in the 21st century evaluate the reliability and accuracy of an image, are core competencies. Although some of these skills are taught, many are very much self-directed. In addition, the interpretation by each person is influenced by their multiple backgrounds, for example, social, educational, and cultural contexts.

In the 21st century, everybody can become co-creators of visual material through the available technology: most people are visual producers, whether through sending emojis, including visuals in academic assignment, advertising products on social media, or creating a flyer for an event. Often nobody taught them these skills in a formal educational setting, they just informed themselves on how to do so through being self-directed. Many of these "products" created by people at a social level are multimodal (Kress, 2010).

The aim of this very basic look at examples of how the three concepts interact in the enhancement of the VL of students was to demonstrate the possibility of using multimodal activities that can be administered on a mobile device to offer students the opportunity to develop their VL in a self-directed way.

4.6 SUMMARY AND CONCLUSION

This chapter discussed three concepts relevant to the way this study aimed to address VL. The contextual and conceptual background of each was explored, followed by aspects relevant to the context of this study, namely the HE environment in a developing environment. The sections had to be approached in a focused way, as the concepts were comprehensive, and it would have been impossible to cover all the components relevant to them.

Multimodality, SDL and mobile learning are each stand-alone concepts in their own right, being researched by scholars worldwide and applied in many settings. In addition, they complement each other well and could be applied together within the HE setting.

Now that the theoretical concepts have been discussed, the empirical phase of the study are unpacked. As indicated in chapter 1, this study used FraIM, as conceptualised by Plowright (2011). Four different data collection phases, using different methods and cases, contributed to the empirical phase. I decided to report on each data collection phase in a separate chapter. This enabled me to clearly attend to all the components of each phase and indicate the influence of the different datasets on the planning of the next phase and the integration of the evidence. Document analysis was the first method employed.

CHAPTER 5: RESEARCH DESIGN AND METHODOLOGY

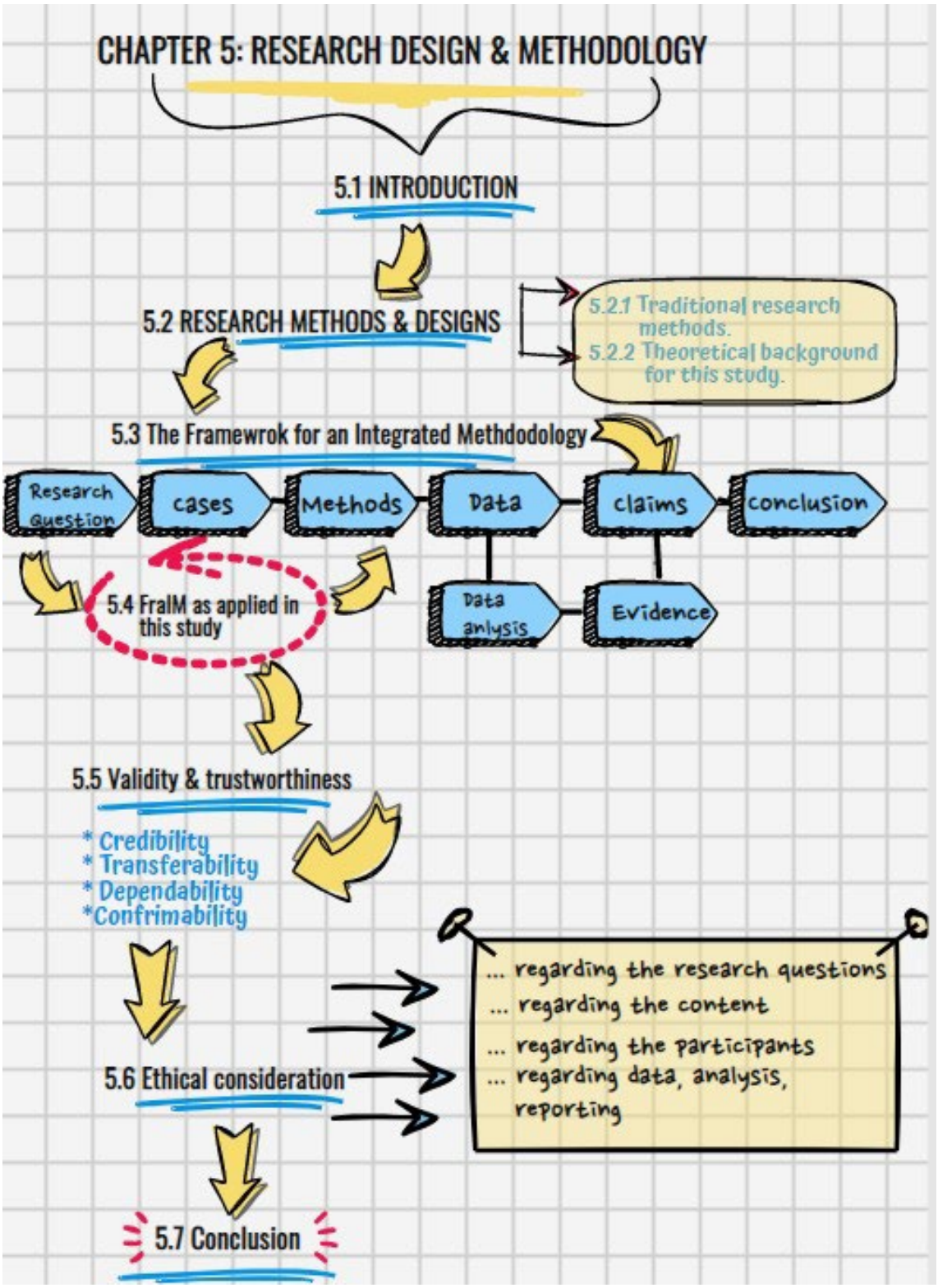


Figure 5-1: Mind map of chapter 5

5.1 INTRODUCTION

As indicated in the introductory chapter (chapter 1), FraIM, as conceptualised by Plowright (2011), was employed in this study. The aim of this chapter is to guide the reader through my thought processes when I had to plan my research. It starts with an overview of research methods that informed my decision to use FraIM. This is followed by a brief discussion of the different components of the design as employed in the study. The ethical considerations and measures that were employed to ensure the warrantability of all aspects of the research are also dealt with in this chapter.

5.2 RESEARCH METHODS AND DESIGN

5.2.1 Traditional research methods

A snapshot of the “paradigm wars” between advocates of qualitative designs, on the one hand, and quantitative research designs, on the other hand, serves as background to explain my line of thought when I had to consider a design for the present study. Through the reading I did on research designs, it became clear that the topic of research design has been under discussion for at least the last 50 years (Mackenzie & Knipe, 2006), at first only focused on the original quantitative and qualitative designs.

Quantitative research is mostly associated with a method used in research with the aim to test objective theories, prove facts, conduct statistical analysis, and predict relationships and variables (Du Plessis, 2015, p.147). In this case, the researcher works mainly deductively, as they have a clearly formulated hypothesis and know what type of data need to be collected. Data are presented in a numerical form, with reliability and validity of paramount importance (Creswell, 2013; Gorard, 2013).

Qualitative research, on the other hand, usually takes on an inductive logic, where the aim of the research is to develop theories and improve the understanding of human experiences and behaviour. Participants are a major source of information, and data are usually presented as a narrative (Babie & Mouton, 2001; Creswell, 2013).

When these traditional methods are followed, the choice of a research paradigm is regarded as the starting point for the research methodology. Paradigms are seen as a “lens” through which the researcher looks and are more formally defined as “the fundamental models or frames of reference we use to organise our observations and reasoning” (Babbie, 2006, p.31). They include ontology (how the world is understood), epistemology (how knowledge is acquired) as well as axiology (research values) (Creswell, 2013; Neumann, 2006).

Traditionally, two paradigms were considered: either the positivist paradigm (naturalism) or the anti-positivist paradigm (constructivism) (Eleander & Cronje, 2016). Scholars supporting only one research approach regarded these two paradigms as incompatible and complete opposites: the positivist paradigm (or naturalism) was critiqued for its position that all elements of life are measurable, excluding any possibility of individuality, subjective experience, or freedom of choice (Cohen et al., 2007). The anti-positivist or interpretive paradigm, also referred to as constructivism, on the other hand, was rejected by positivist scholars, as it strove to describe the world by understanding behaviour and action instead of measuring quantitatively (Cohen et al., 2007). Whichever paradigm the researcher chose would ultimately determine the research methodology. The figure below (figure 5-2) illustrates the different research components and their interrelatedness.

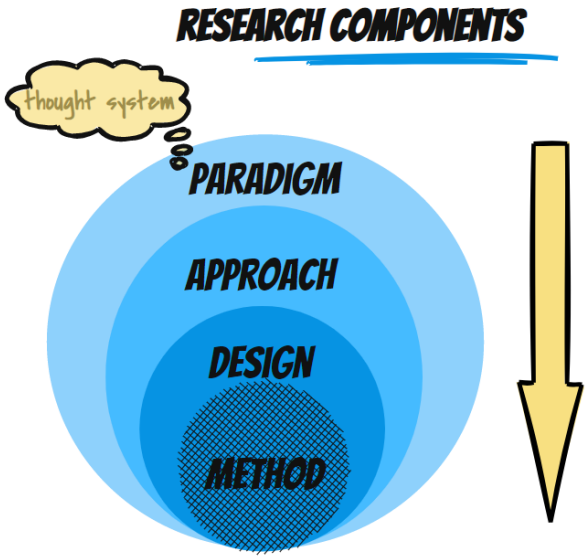


Figure 5-2: Interrelatedness of components of the research process (adapted from Nogetse, 2007)

The process is first envisioned on a philosophical level and then progresses towards the practice of deciding on an approach, a design and finally, a methodology.

It should not come as a surprise that the “paradigm war” between two polar opposites culminated in yet another design, which would become known as a mixed-methods design (Eleander & Cronje, 2016). A research method is regarded as “mixed” when a combination of at least one qualitative and quantitative component per research study is employed (Teddlie & Tashakkori, 2009). The mixed-methods research design has steadily gained status and is regarded as one of the fastest-growing areas in research methodology (Bergman, 2008).

Mixed-methods research is, of course, not without challenges: some of the objections mentioned by critics are challenges with regard to the amount of data collected in a numeric and textual format as well as the fact that the researcher must be familiar with both research methods (Creswell, 2013). Teddlie and Tashakkori (2009) mention methodological issues with regard to the merging of data concurrently or chronologically.

Despite these challenges, the use of a mixed-methods design when conducting research in the educational or social domain has steadily gained support: employing mixed methods is not only useful, but the idea of not binding oneself to one paradigm and its methodology is regarded as desirable (Eleander & Cronje, 2016). As a researcher, I can relate to the opinion of Teddlie and Tashakkori (2009), who regard mixed-methods research and, in the case of this study, FraIM, as a process and not a method. Tashakkori and Teddlie (2009) as well as Johnson and Onwuegbuzie (2004) argue that the positivist quantitative and the interpretivist qualitative paradigm should not exclude one another, and that the researcher should be guided by what would lead to the best answer to the research question in every stage of the study.

In the preparation for my study, I encountered several studies using the FraIM as the chosen framework (Botha, 2019; Du Plessis, 2015; Nel, 2019; Wittmann, 2021). These studies were all empirical studies within the educational frame. Researchers commented positively on the unique way of combining narrative and numerical data through different phases of the research process. This encouraged me to also use this framework.

5.2.2 Theoretical background to this study

A research paradigm anchors the research process, as it provides the framework according to which the research is conducted. It gives insight into the way researchers think, how they see the world as well as knowledge, their values, and the methodology they choose (Babbie & Mouton, 2001). As stated by Botha (2019), the quest for knowledge should be a systematic process where the research paradigm, the research approach and the research design form a coherent whole.

Regarding the philosophical perspective of FraIM, Plowright describes it as “holistic integrationalism” (Plowright, 2011, p. 186). This perspective is dependent on the pragmatic paradigm. Pragmatism implies that the research question determines the focus of the study and different methods can be followed to answer the research question. Furthermore, pragmatism contends that through our research, we can arrive at an understanding of the world and its characteristics. What we believe at a certain point in time can change or be revised as knowledge and understanding constantly transform because truth is regarded as “what works” (Plowright, 2011, p. 184). The primary goal of the research within this paradigm is not to prove a certain hypothesis but to support purposeful research with the aim of enlightening decisions and activities

that solve situated real-life problems (Plowright, 2011). This paradigm informed my decision to use an inductive approach. When using an inductive approach, the researcher moves from the specific to the general by making individual observations which can lead to the recognition of general patterns (Collins et al. 2007). The aim of this approach is to generate an understanding of the problem to look for possible solutions.

FraIM, which was employed as a research design, possesses the qualities of a pragmatic integrated methodology (Plowright, 2011). This implies that this study focused on purpose, namely, to find possible ways to enhance the VL of first-year students on a rural campus and that the study was guided by the research question and not by my own philosophical position before commencement of the research. I accept and support the notion that what worked during the time this study was conducted will change over time and that this is a limitation to this research. This is even more so regarding the core concepts of VL, multimodality, mobile learning, and self-directed learning, which change and develop as technology and connectivity improve and infiltrate our lives.

A brief discussion of the different components of FraIM follows.

5.3 THE FRAMEWORK FOR AN INTEGRATED METHODOLOGY (FraIM)

Plowright describes the concept of integrated methodology as a “new and innovative approach to conceptualising and thinking about mixed research methodology” (Plowright, 2011:2).

The generic structure of FraIM is illustrated in figure 5-3:

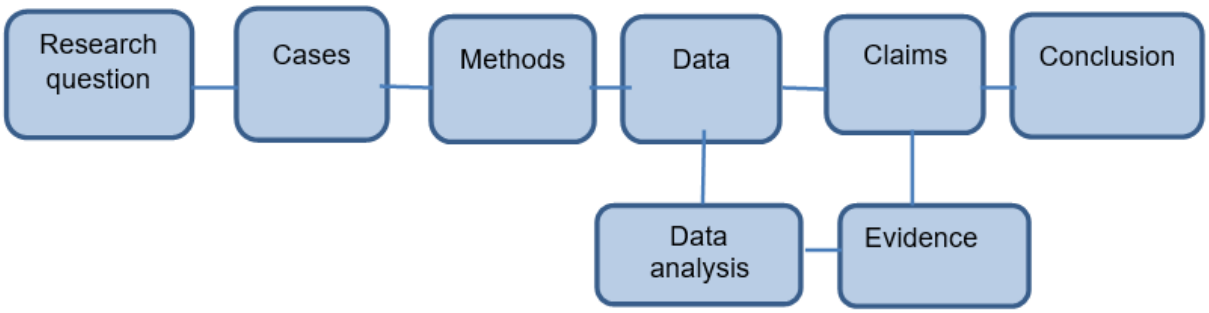


Figure 5-3: Framework for an integrated methodology (Plowright, 2001:11)

From this illustration, it should be clear that there are different mixed methods designs. The following points address the important alternatives offered by FraIM:

First, the alternative view on paradigms: Plowright argues that methodology determines the philosophy. According to this view, philosophies are theories, and theories support us in

understanding our decisions, perspectives and actions. This implies that the event or action comes first and that the chosen paradigm provides a theoretical framework that enables us to explain our decisions and assumptions (Plowright, 2011, p. 183). This view is also expressed by May and Williams (1996, p. 135), who argue that "[p]hilosophy might have the capacity to illuminate, but it hardly dictates".

The second major difference in the traditional mixed methods is that Plowright "rejects completely and emphatically the use of the terms and distinction between 'qualitative methods' and 'quantitative methods'" (2011, p. 3). He maintains that "… it is not just the 'Q-words' that are significant here. It is the underlying concepts and meanings, expressed through those words that channel our thoughts, actions and understandings" (Plowright, 2011, p. 4). He chooses to refer to "numerical" and "narrative" data. Within FraIM, "numerical data" refers to numbers and is concerned with procedures based on counting and/or measuring; "narrative" data, on the other hand, refers to words and other types of texts. This type of data is based on the use of language and draws on conventional codes. The meanings of data within FraIM are also, to some extent, linked to the subjectivity and interpretation of the researcher (Plowright, 2011).

Other important differences between FraIM and traditional mixed-methods research approaches should also be noted:

- FraIM can be used as a linear process, but an iterative process is also possible where the researcher moves back and forth between different stages as the study progresses and plans are adapted.
- The sources that provide the research activity's data are called "cases". Where these data sources are people, they can be referred to as participants.
- The approach used to manage the data sources is referred to as the data source management strategy and is influenced by three criteria: the number of cases; the degree of control that the researcher has; and the degree of naturalness of the cases or their grouping.
- The decisions regarding the data source strategy will influence decisions on sampling the cases to be included in the research process.
- FraIM considers three data collection methods, namely observation, asking questions and artefact analysis.

The following motivations, linked to the characteristics explained above, were key motivators in my decision to use FraIM as the research design:

- FraIM is suitable for educational research, which requires the integration of various research processes.

- As observations of the research problem precede theorisation, no pre-conceived philosophical position is needed to start the research. This leads to a more open-minded and flexible research process.
- As it is a framework, there is no fixed content, only a structure which can be filled with the information and data relevant to the specific study (Ibid.:7).
- The framework identifies the main elements of the process, and the links between the different elements are clearly visible (Ibid.:21).
- The research question stands central, and by systematically using empirical data, the question is answered (Ibid.:7).
- It offers a practical way of exploring and understanding current perspectives of the research question (Ibid: 181).

5.4 FraIM AS APPLIED IN THIS STUDY

A visual presentation of FraIM as applied in this study is provided in the figure below and serves as a guide to the different chapters in this thesis:

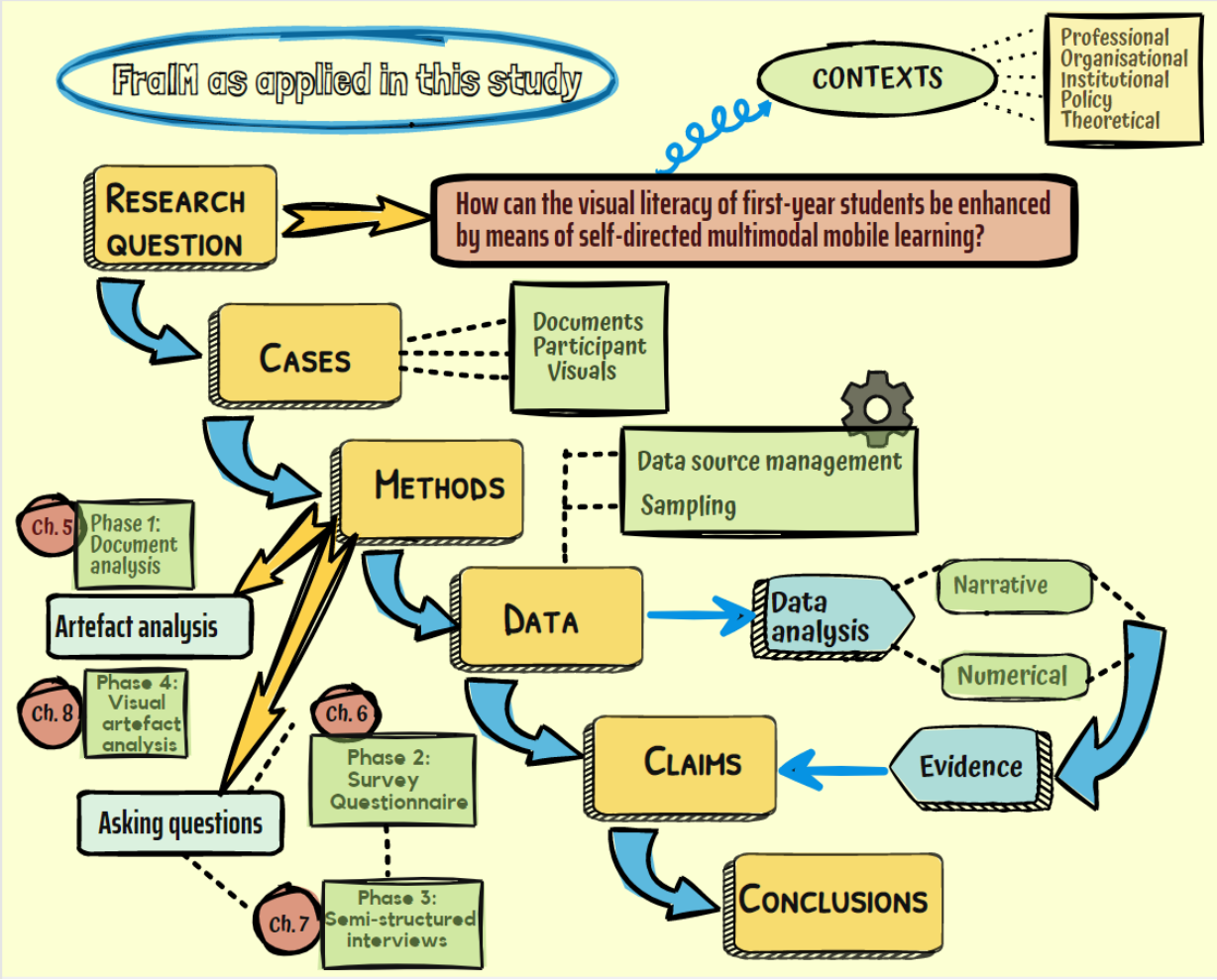


Figure 5-4: Plowright's FraIM structure as applied in this study (adapted from Plowright, 2011:9)

5.4.1 The research question

In FraIM, the research question stands central, and the researcher carries out research that "has a purpose, that is aimed at informing decisions and activities that impact on the world and that solve problems" (Plowright, 2011: 185). In addition, the research question lies within several contexts (cf. § 1.3), which all play a role in the approach to the problem. These guide the researcher towards choices as regards the cases, the methodology, data collection and data analysis, and are discussed in more detail in the next section.

The following main research question formed the starting point of the study design:

How can the visual literacy of first-year university students be enhanced by means of self-directed multimodal mobile learning?

To ensure a complete understanding of all the components of the research question, secondary research questions were formulated:

Secondary Research Question 1: What are the visual literacy competency standards (VLCS) needed by students in an academic multiliteracies environment?

Secondary Research Question 2: What visual literacies do rural first-year students bring with them to the university?

Secondary Research Question 3: What multimodal teaching and learning activities could be used to develop the visual literacy of students?

Secondary Research Question 4: How could multimodal mobile visual literacy activities contribute towards fostering SDL?

Secondary Research Question 5: What recommendations could be made with regards to the content, multimodal teaching and learning activities and fostering of SDL skills for a visual literacy component in the academic literacy course?

5.4.2 Cases

Cases represent the data sources of the study. These can be individuals, organisations, or even inanimate objects (Hammersley, 1992; Plowright, 2011). This term is used by Plowright rather than the conventional terminology, as "… 'cases' seems to capture the wide range and variety of data sources that are used in research" (Plowright, 2011, p.14). For this study, three types of cases were identified, namely inanimate objects in the form of documents and artefacts, as well

as individuals who would participate in the study. Data source management and sampling strategy had to be considered prior to case selection for each of the different phases of the study.

5.4.2.1 Data source management

As the name indicates, data source management refers to the approach that the researcher decides on to control and manage the sources of data. Both methodological and logistical issues should be taken into consideration. I decided on a survey approach for this study: it allowed me to collect data from different types of cases in different stages. In addition, where I would use participants as cases, the survey approach allowed for a large amount of data to be collected in a manageable way. The next consideration regarding cases involved sampling strategy.

5.4.2.2 Sampling strategy

Sampling refers to the selection of a sample from a larger group or population (Plowright, 2011). As I conducted this study in four phases, I needed four types of samples. Phase 1 entailed sampling a suitable number and quality of documents to inform me about examples of frameworks as well as the approach to VLC in HE in other countries. The planned data collection methods influenced the sampling strategy. The remaining three phases of the research, namely an online questionnaire (phase 2), semi-structured interviews (phase 3) and artefact analysis (phase 4) involved participants. The details for each phase are discussed in the relevant chapters. Once the cases and the selection method had been decided upon, the next step in FraIM was concerned with the data collection methods.

5.4.3 Methods of data collection

FraIM offers three basic data collection methods: asking questions, observations, and artefact analysis. These categories can also overlap during the research and need not be applied in a linear fashion (Plowright, 2011). FraIM enabled me to collect, differentiate between and integrate numerical and narrative data but without privileging one over the other. This possibility of combining different data collection methods and data types in an integrated fashion attracted me as an educational researcher, as the different phases could inform each other, opening up the possibility to adapt the research according to the findings of the other phases.

My decision on the data collection methods was determined by the research approach, the research question, as well as the aims and purpose of the study. In the initial planning of the study, I decided to include all three methods of data collection suggested by FraIM: document analysis (as a form of artefact analysis), two phases of asking questions and observation. However, due to COVID-19 protocols during the data collection stage of the research, the

observation phase was ruled out, as the regulations prohibited direct contact between the researcher and participants. After reconsideration, I decided to add an artefact analysis stage where participants would submit academic work containing visual elements.

Plowright (2011) advises that when planning the data collection methods, it is important to consider two criteria: the level of mediation, and the degree of structure involved in the specific method. The level of mediation enables the researcher to distinguish and compare the different data collection methods as to how "close" they are to the data with regard to time and space. Degree of structure, on the other hand, gives insight into how much control you (as the researcher) have in each data collection method. Deciding on interview questions beforehand would, for example, provide a researcher with a highly structured data collection method, whereas the submission of artefacts for which students did not receive prior instructions on content or method would imply a lower level of structure. Figure 5-5 portrays the degree of structure for the envisaged data collection methods on a continuum:

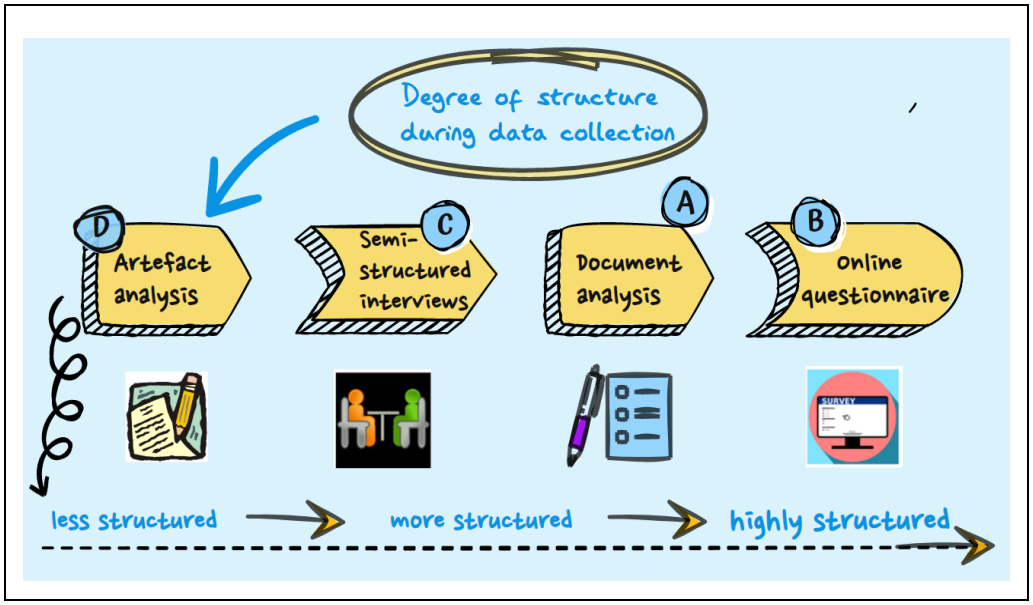


Figure 5-5: Degrees of the structure of data collection methods

Keeping the level of mediation and degree of structure in mind during the planning of my data collection methods assisted me in ensuring the integration of the different data collection methods, yet handling each as an individual phase in my quest to answer the research question and reach the aims and objectives of this study.

Table 5-1: Methods of data collection

Data collection method	Data source	Focus	Possible outcomes
Asking questions	Participants	Interrogation	Questionnaire results
			Interview transcripts
Artefact analysis	Academic work	Deconstruction	Analytical account of visual material used
	Curriculum description		Analytical account of concept mentioned

5.4.4 Data

The traditional way of referring to data is qualitative and quantitative. The traditional approach to research also made a huge issue of the differences between these two types of data. The analysis would also be done strictly according to the type of data: mathematical calculations and statistics would be used for quantitative data, and qualitative data would be handled in another suitable way.

As indicated earlier (§ 5.3), with FraIM, the two basic types of data are numerical and narrative data: numerical data involve everything containing numbers and narrative data words and everything else. Narrative data employ conventional codes of meaning using language and, as suggested by Plowright (2011), data expressed in words are more prone to the interpretations and subjectivity of the researcher. This was also the case in this study. Halfpenny (as cited by Plowright, 2011) believed that although there are obvious differences between the two types of data, the data as such are not essentially dissimilar. The data are approached from the premise that all data gathered is a result of the intervention of the researcher who wishes to understand a small bit of the world through the issue they are studying. Once the data have been gathered, the researcher then structures the data by organising it through different methods, for example, coding and transcribing. How the data are used is mainly determined by the research question as well as the aims and purpose of the research (Plowright, 2011).

5.4.5 Data analysis

The data analysis ultimately aims to provide answers to the main research question and the various secondary research questions. The content of each empirical chapter as well as the phases and relevant research questions of each are summarised in the table below:

Table 5-2: Detail on empirical chapters

Chapter	Cases	Phase	Purpose
Chapter 6	Documents Academic literacy VL frameworks	Phase 1 – Artefact analysis	In-depth analysis of VLC as perceived in different contexts and locations
SRQ 1: What are the visual literacy competency standards (VLCs) needed by students in an academic multiliteracies environment? SRQ 5: What recommendations could be made with regard to the content, multimodal teaching and learning activities and fostering of SDL skills for a visual literacy component in the academic literacy course?			
Chapter 7	Volunteer participants from the identified group	Phase 2 Asking questions; Survey in the form of an online questionnaire	Gathering information about VLC of first-year students through questions designed to evaluate different competencies and concept understanding arranged in relevant categories.
SRQ 2: What visual literacies do rural first-year students bring with them to the university? SRQ 5: What recommendations could be made with regard to the content, multimodal teaching and learning activities and fostering of SDL skills for a visual literacy component in the academic literacy course?			
Chapter 8	Volunteer participants from phase 2 who availed themselves.	Phase 3 – Asking questions Semi-structured interviews	To gain a deeper insight into the VLC, interest in development of VL as well as the potential of using mobile learning opportunities to enhance SDL.
SRQ 2: What visual literacies do rural first-year students bring with them to the university?			

SRQ 4: How could multimodal mobile visual literacy activities contribute towards fostering SDL?			
Chapter 9	All participants from Phase 3	Phase 4 – Artefact analysis of academic assignments with visual components	To evaluate the practical competencies and user patterns of participants with regard to visual material in comparison to what they claimed in the interviews.
SRQ 2: What visual literacies do rural first-year students bring with them to the university? SRQ 3: What multimodal mobile teaching and learning activities could be used to develop the visual literacy of students?			

The data analysis as well as the remaining two stages of FraIM, namely evidence and claims (traditionally referred to as results and findings), for each phase of the study are included in the relevant chapter. The two outstanding issues regarding this study in general are the research's validity and ethical considerations.

5.5 VALIDITY OR TRUSTWORTHINESS

The aim of research is to be able to make valid claims with regard to our data sources or cases. To arrive at valid claims, we need the best possible evidence, which, in turn, is derived from the data collected.

5.5.1 Trustworthiness of narrative data

Trustworthiness is of great importance where narrative data is concerned. It is even more important where a researcher uses a less conventional research paradigm and method, as is the case with this study using FraIM, which has a different outlook on integrating numerical and narrative data. This has led me as a mixed-methods researcher to ask myself questions like: How valid is my data? How valid and reliable is the collection of the students' experiences through the interview? How do I know if the participants are truthful in their replies to the questions put to them?

As far as qualitative research is concerned, a variety of contributions has been published to determine a list of criteria that would validate good qualitative research (e.g., Creswell, 2013; Lincoln, 1995; Lincoln & Gaba1985; Merriam, 2009). Within the more traditional research

paradigms, the trustworthiness of data is perceived through the criteria of validity, reliability and generalisability (Nieuwenhuis, 2007). In their highly acclaimed work *Naturalistic Inquiry*, Lincoln and Gaba (1985) attempt to assign new criteria to the term "trustworthiness" instead of the above-mentioned qualities. Despite some critique on their work (e.g., Hammersley & Atkinson, 2007; Silverman, 2006), their contribution has been widely accepted, their work cited all over the world and their criteria accepted by the larger qualitative research community (Loh, 2013).

The trustworthiness criteria, as shown in figure 5-6, serve to guide the researcher towards being aware of mitigating situations and procedures within their narrative research. In the case of this study, the data deals with the semi-structured interviews as well as the artefact analysis.

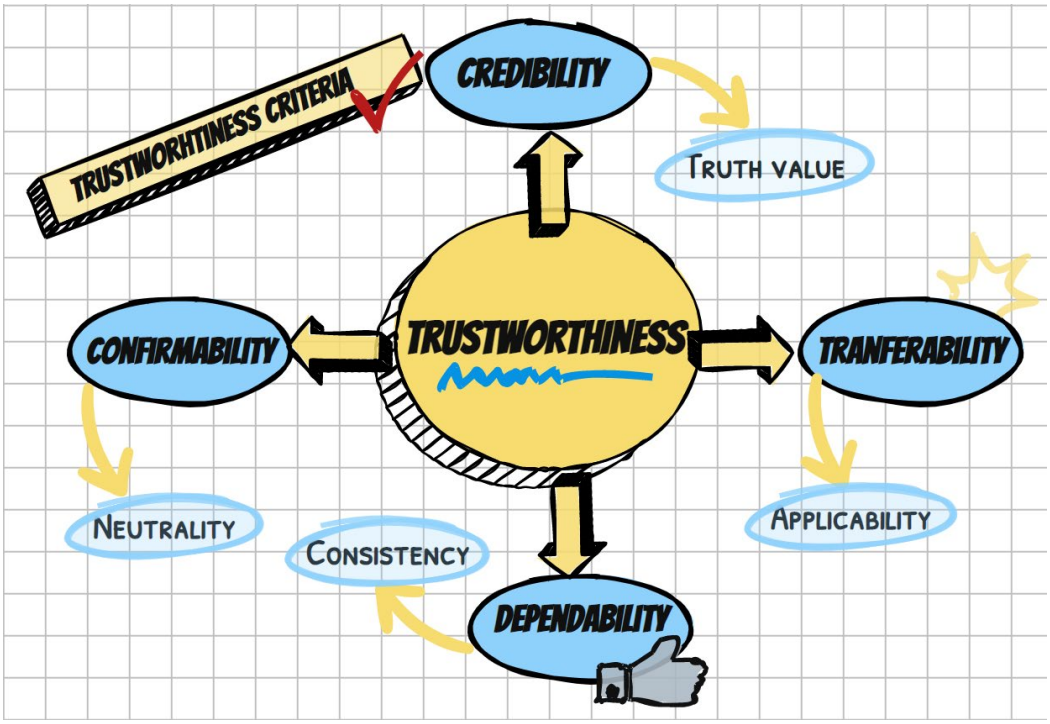


Figure 5-6: Lincoln and Guba's (1985) trustworthiness criteria

The different criteria are briefly discussed.

5.5.1.1 Credibility

Credibility has to do with the truth value of data, otherwise referred to as "internal validity". Guba (1981) mentions *factor patterning* as a challenge to credibility. This refers to the huge selection of interwoven factor patterns that the researcher is confronted with. Instead of separating these, the qualitative researcher opts to engage with these as a whole through a holistic approach to the phenomenon being researched (Guba, 1981).

This engagement of both the researcher and the participants over a long period of time could contribute to the researcher establishing structural coherence within the wide selection of data strands without actually taking them apart as if they existed separately.

Another action to avoid factor patterning applied in this study is triangulation, or as named in FraIM, data integration. Triangulation refers to the use of a variety of data sources and different methods to collect data (Ivankova et al., 2006). In this study, I collected data from four different data sets, contributing to referential adequacy.

5.5.1.2 Transferability

Transferability refers to the applicability of the data to situations external to where the research takes place and is therefore also referred to as generalisability (Guba, 1981).

An important aspect of the transferability of this study is that components of the study are linked to mobile learning, which implies technology-enhanced learning. During the past decade a definite shift has taken place towards the access to IT technologies amongst young people not only for personal and social use, but also in learning situations (Cox, 2013). This reality could contribute towards the relevance of the study in other HE settings where young people are involved, even though the situation remains fluent due to the many variables involved.

A possible complication with regard to transferability is non-comparability, which is linked to situational uniqueness. This study could be regarded as taking place at a unique place, namely a rural campus with a large population of students from disadvantaged backgrounds – socially, academically and financially. However, it should be kept in mind that this specific research is intended to support them once their VLC has been established. Also, this institution is not unique with regard to the challenges experienced, hence the findings will also be applicable to other similar institutions as well as first-year students in other settings. . This would further contribute towards the tertiary institution's ethics of care and inclusivity.

The sampling was purposive in the sense that it targeted a specific population, namely first-year students enrolled for academic literacy at the institution, but the maximum range of information with regard to the topic of VL could be gathered, as there was no faculty-based approach nor was the selection of students linked to any performance or criteria other than their status as first-year students. Transferability can also be enhanced by the "thickness" of descriptive data that are collected. In this study, data were collected from a variety of sources and FraIM enabled me to extract narrative data from numerical sources, like the questionnaire and on the other side, to also

obtain numerical data from a narrative source, for example, the numerical categorisation of information obtained from the artefacts I analysed.

5.5.1.3 Dependability

Dependability speaks to the consistency or the reliability of the data. Researchers following this "naturalistic approach" to research are often concerned with the *stability* of their data. However, according to Guba (1981), the seeming instabilities should be regarded against the background of the different realities tapped into as well as the iterative movement between different research instruments as the researcher develops deeper insight into the problem.

To curb possible data instability, I used overlapping methods in cases where two phases addressed the same matters. This technique of using methods "in tandem" helped me to compensate for the weakness of one method by relying on the strengths of another (Lincoln, 1995).

Another way to ensure the stability of the data is to keep an "audit trail" of the collected data: Every phase of the study was carefully monitored, and the data were captured in spreadsheets or ATLAS.ti™ documents before being coded. Interviews were recorded and transcribed. This means that the researcher could cross-check the data from the specific interview with the actual use of visuals in the artefact. All of these actions contributed to stability and dependability of the collected data.

5.5.1.4 Confirmability

The final of the four aspects that could influence the trustworthiness of narrative data, as defined by Lincoln and Guba (1985), is the aspect of confirmability. Confirmability speaks to neutrality and objectivity. An important recognition to this regard is that in the mixed-methods approach, this "neutrality" refers to the data and not the researcher: the researcher must look at the data objectively, but he or she is not inherently objective (Guba, 1981).

Triangulation or data integration, which has already been mentioned regarding credibility, is also of importance with regard to confirmability: the use of different methods and different sources of data enabled me to become aware of my own pre-conceived ideas on the topic and to focus on the results from the research and not my own ideas. One of the many rewards of research is the unexpected and exciting findings.

5.6 ETHICAL CONSIDERATIONS

Research ethics refer to what is right and wrong when conducting research. The various institutions where research is conducted determine acceptable norms and values (Mouton, 2013). According to Gravetter and Forzano (2009), ethical guidelines refer to two basic categories of ethical responsibility researchers should attend to, namely the participants of the study and the discipline itself, where the reporting should be done within the guidelines discussed in the previous section (§ 5.4.6)

This research was conducted in accordance with the ethical guidelines as stipulated by the tertiary institution where the research was conducted. This includes the entire research process – from the nature of the problem being investigated, the research question, the cases, the methods of data collection, the data analysis process, as well as the reporting of the data (Neuman, 2006). The following matters were considered:

5.6.1 Ethical considerations regarding the research questions

From the onset of the research, a clear explanation was provided regarding what the research was about. The primary research question, as well as the secondary questions, did not change during the study.

5.6.2 Ethical considerations regarding the content

The necessary ethical clearance was obtained from the EduRec ethical committee before the research commenced. (Ethical Clearance number: NWU- 0 1 2 6 7 - 2 0 - A 2). The necessary permission was also obtained from the NWU gatekeeper (Gate Keeper approval Number: NWU-01267-20-A2).

5.6.3 Ethical considerations regarding the participants

According to Plowright (2011, p.155), ethical considerations associated with the participants are: “informed consent, right of refusal to take part without penalty, right to withdraw without penalty, confidentiality and anonymity, deception and security and safety to prevent any emotional or physical harm”.

Measures put into place for the study were as follows:

- Respondents were informed about the nature of the study, and only students who provided written informed consent took part in the study.

- The questionnaire was administered online, and the consent form was part of the online document. Students could provide their e-mail addresses if they wanted to be part of the intervention phase.
- Although the students were required to include their student numbers in the questionnaire, the student's confidentiality and privacy were always respected, and the identity of students remained confidential.
- Participation in the study was voluntary and optional, and participation did not have an impact on any assessments or marks.
- Respondents had the option to withdraw from the study at any stage.

5.6.4 Ethical consideration regarding data, data analysis and reporting

Once the data had been collected, it was stored safely. This was done to enable the integrity and accuracy of the results. No results were excluded from the analysis. In addition, the researcher endeavoured to be always objective and to act with professional integrity and judgement.

5.7 SUMMARY AND CONCLUSION

This chapter aimed to provide an overview of the research's planning phase, including the decision about the method. The decision was made to follow a variation of the mixed-methods approach in the form of FraIM. Given the fact that the design might not be familiar to all, the different components or stages of the design were discussed in broad terms. The chapter also addressed validity and trustworthiness, as well as ethical considerations. It also explained how each phase of the data collection, analysis, evidence and claims are handled in a separate chapter. The first phase of the data collection was document analysis as described in chapter 6.

CHAPTER 6: EMPIRICAL RESEARCH PHASE 1: DOCUMENT ANALYSIS

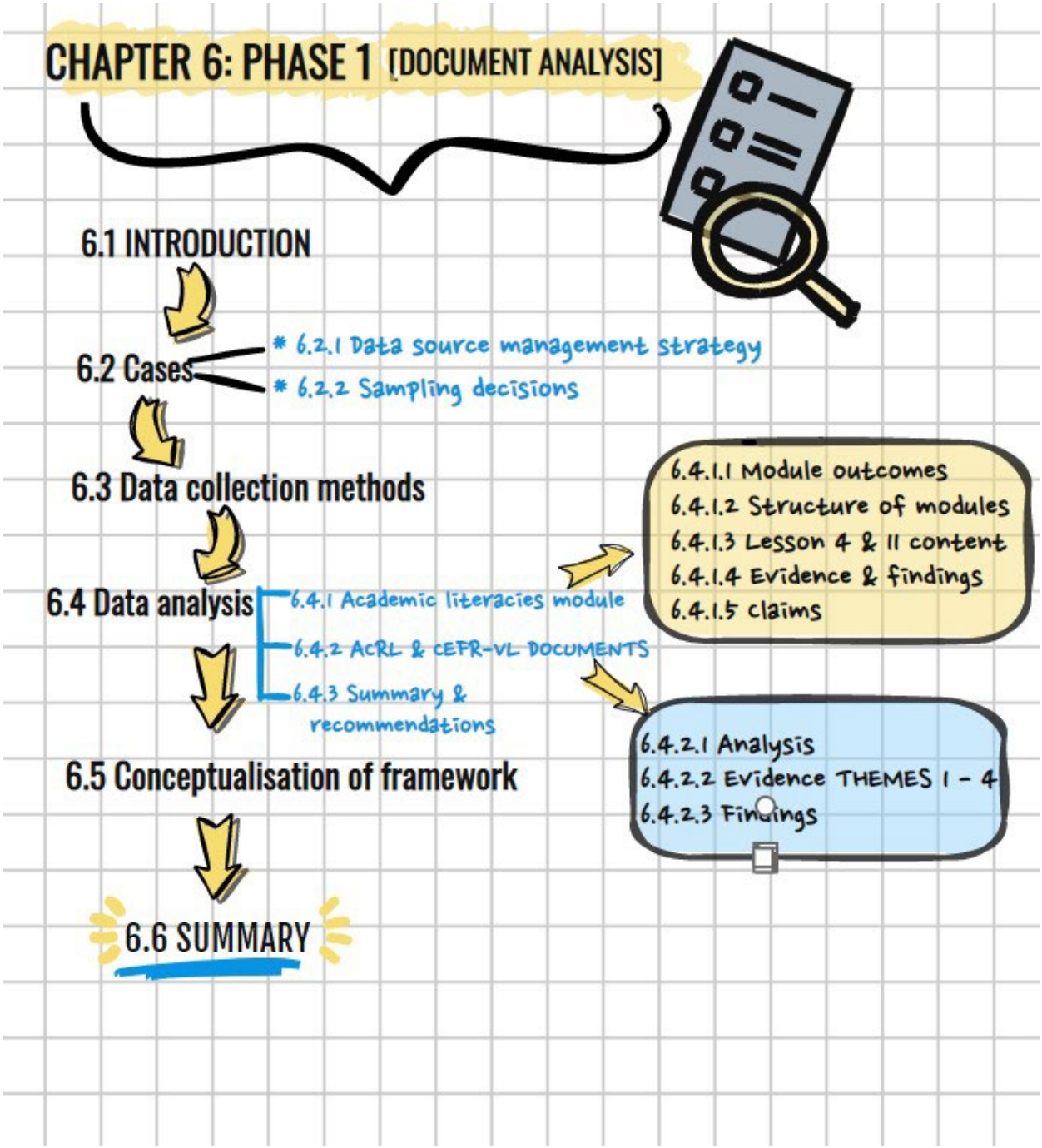


Figure 6-1: Mind map of chapter 6

6.1 INTRODUCTION

As explained in the introductory chapter of this thesis (§ 1.2), a mixed-methods approach based on Plowright's (2011) FraIM was followed for this research. The study was divided into four phases to distinguish between the different data sources as well as the different methodologies used in the different phases. This chapter reports on phase 1, namely the document analysis.

The aim of the phase 1 research activity was to use the selected artefacts (in the form of documents) as a basis for determining what visual literacy competencies (VLC) are regarded as important for students enrolled in an HE institution. It was anticipated that the data that emerge would assist me to address the following secondary research questions (table 6-1):

Table 6-1: Research questions guiding this phase of the study

Research question:	
Secondary research question 2:	What are the visual literacy competency standards (VLCS) needed by students in an academic multiliteracies environment?
Secondary research question 5:	What recommendations could be made with regard to the content, multimodal teaching and learning activities and fostering of SDL skills for a visual literacy component in the academic literacy course?

Using Plowright's FraIM structure, this chapter describes both the methodology and the results of the phase 1 research activity. First, the document analysis approach as the main data source management strategy for this phase of the study as well as the sampling decisions are outlined. This is then followed by the explanation of the data collection process and the procedure applied for the analysis. Third, the evidence that emerged from this part of the empirical investigation is presented. The process is concluded with a summary of the claims (main findings) from phase 1.

6.2 CASES FOR THIS PHASE OF THE STUDY

In this study, in accordance with FraIM (Plowright, 2011), the term "cases" rather than conventional terminology (e.g., "participants") was used to refer to the data sources, as "[t]he term 'cases' seems to capture the wide range and variety of data sources that are used in research" (p. 14). These can be individuals, organisations, or even inanimate objects (Hammersley, 1992; Plowright, 2011). This term by Plowright was used rather than the conventional terminology (e.g.,

"participants") as, for this phase of the study, the cases were inanimate, text-based artefacts in the form of documents.

6.2.1 Data source management strategy

An artefact analysis process was regarded as the most suitable data source management strategy for the first phase of the study. I considered the following methodological issues to inform my approach (Plowright, 2011).

A methodological issue relevant to document analysis involves depth and detail of collected data. The aim of this phase was to inform me on possible frameworks, the approaches and content of formal VL initiatives with regard to non-subject specific VL education in HE settings. The first step was, therefore, to establish the corpus, or the selected documents, for analysis (Flick, 2009) with which to work. Working through all the documents relevant to the literature reviews as described in chapters 2 and 3 of this study enabled me to make an informed decision about the documents that would address the aim.

The specific data sources that were identified to address this phase were as follows:

The NWU academic yearbook for Humanities (2022) and the Faculty rules for Academic Literacy in Section 1.3 of the document as well as the Academic Literacy Site in the learning management system (LMS).

Literature on "Visual Literacy": This was done through an extensive search on Google Scholar, EBSCOhost, and Eric. I also consulted the *Journal of Visual Literacy* as well as the website "Visual Literacy Today" on the World Wide Web, which offers "an ongoing conversation about visual literacy, a field of study and practice that explores how we see and interpret images, how we use visuals to convey meaning and what it means to be literate in a digital age" (Visual Literacy Today. n.d.). These were used as data sources. The content was divided into six main sections. One of these was the "Recommended Reads" section compiled by Dana Statton Thompson, which provided relevant data in the form of an extensive bibliography of VL publications, research, and articles from all over the world.

The motivation behind the selection of these sources are as follows:

1) Due to the pragmatic approach to the study, namely to identify a real-life problem and attempting to find possible solutions, it was necessary to access documents relevant to the situation being researched. This motivated my decision to interrogate the current context and content of the academic literacy course of which VL forms a part.

2) Only limited research on VL within the HE context is available within the South African context. There are also no locally based organisations I am aware of who focus on VL. This motivated my decision to turn to the perceived leading organisations within the international domain.

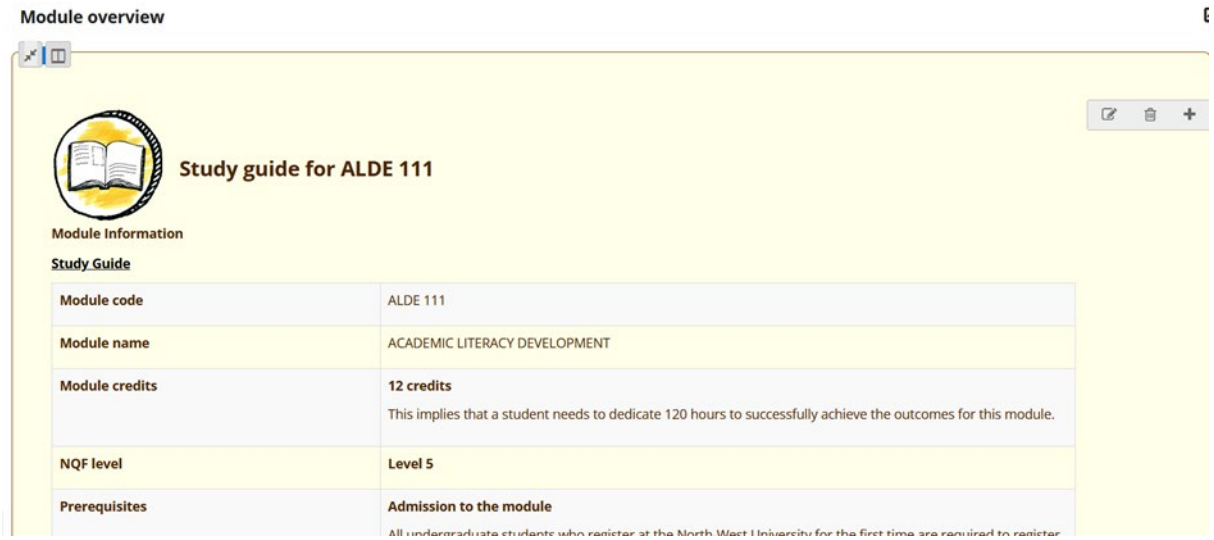
All VL sources could be accessed via the library platform of the university, or alternatively, hard copies could be requested through the library services. This search informed me on which documents were regarded as roadmaps for VL in HE.

6.2.2 Sampling decisions

The sampling strategy for this phase can be regarded as non-probability, purposive sampling, as a document with a specific theme – namely academic literacy at the NWU and VL – was selected from a wide range of documents, as mentioned in the data source management strategy section, keeping the aim of this phase in mind (§ 6.2.1). Two groups of documents were sampled:

GROUP 1: Documentation regarding the academic literacy module:

- the academic rules for the academic literacy module, Humanities Faculty, as stipulated in the NWU Academic Yearbook (NWU, 2022);
- the academic literacy module overview and study guides for both semesters as available in the LMS of the institution where the study was conducted (Nel et al., 2021), as portrayed in the screenshot below:



Screenshot 6-1: Landing page of academic literacy module and study guide (NWU, 2022)

GROUP 2: Documentation regarding formal approaches to VL:

Table 6-2: Documents on approaches to VL for analysis

ASSOCIATION	DOCUMENT
Association of College and Research Librarians (ACRL)	• Visual Literacy Competency Standards (VLCS) (2011) • Framework for Visual Literacy in HE (2016) • Companion Document of the ACRL Framework for Information Literacy for Higher Education – Visual Literacy (2022)
European Network for Visual Literacy (ENViL)	• Common Framework of Reference for Visual Literacy (CEFR-VL) (Wagner & Schönau, 2016) • Revised Common European Framework of Reference for Visual Competency (Schönau et al., 2021)

The rationale for sampling these documents as data sources is twofold:

In order to answer the research questions on the VLC of students within the research context as well as the possible inclusion of a VL component in the academic literacy development modules at the institution where the research was done, the current academic literacy module syllabus and content were analysed.

It was important to be familiar with the trends, approaches and content with regard to the attention of and attention to VL within HE in other contexts and locations. I sampled guiding documents from three different continents, namely the United States of America (USA), Europe, and Australia. In my literature search, I could not find similar documents within the context of South Africa or other developing countries that represent the context of this study. I also decided against the inclusion of The Visual Literacy White Paper as commissioned by Adobe Systems Pty Ltd in Australia (Bamford, 2003) in my document analysis, as it was published almost 20 years ago and provides a broad discussion without suggested frameworks or approaches. It did, however, form part of the literature review (§ 3.3.1;3.6.1).

6.3 DATA COLLECTION METHODS

The documents, as identified through the previous two phases of FraIM, were collected by electronically accessing and downloading them from the relevant internet locations and saving them in folders. They were stored on Google Drive for access at any stage.

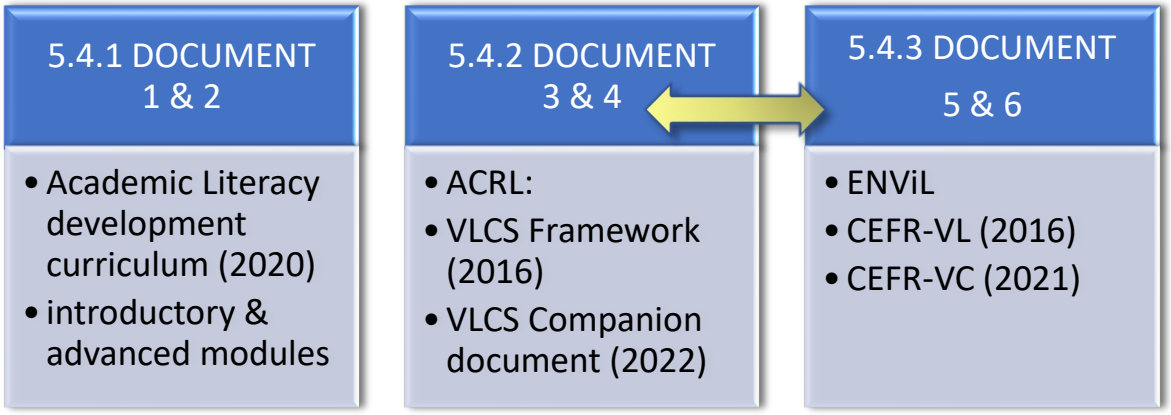
6.4 DATA ANALYSIS

Document analysis is an analytical method where narrative data originating from documents are used to gain an understanding of the trends and patterns of a specific phenomenon (Creswell & Plano Clark, 2007). The process involves the “de-construction” of the documents by skimming,

reading and interpreting the documents in a systematic and critical way (Bowen, 2009; Creswell, 2013; Plowright, 2011). The type of content analysis applied in this case is defined as “any technique for making inferences by objectively and systematically identifying specified characteristics of messages” (Holsti, 1969, p.14).

The final data set included six documents, which were analysed as sets. The ACRL and ENViL documents were analysed side by side in one table, as their function in their respective organisations is the same. In addition, the shared components as well as the differences between the frameworks as conceptualised in different parts of the world are easier recognised:

Table 6-3: Documents on approaches to VL for analysis



6.4.1 Academic literacy module document analysis: Method and evidence

The academic literacy module document analysis was done by deconstructing the relevant parts of the module. The aim was to inform me of the position of VL in the current academic literacy module.

6.4.1.1 Module outcomes

The aims of the modules, as set out in the study guides, were as follows:

Table 6-4: Academic literacy module outcomes

INTRODUCTORY academic literacy module	ADVANCED academic literacy module
On completion of this module students should be able to: • bridge the divide between secondary school and university education;	**The aim of this component of the advanced academic literacy module is to** assist students in acquiring and developing the necessary academic literacy abilities to

• access academic information effectively in order to understand academic texts; • process academic information successfully; and • produce academic information responsibly and appropriately.	function effectively in an academic environment. These include the ability to read and write accurately, conduct research, and render academically correct work.

As is clear from table 6-4, the focus of the introductory academic literacy module is on basic skills to assist students in their new academic context – the focus is on accessing, processing and producing academic information, as well as adapting to this new "level". The advanced module elaborates on acquiring advanced competencies in the two basic literacy skills: reading and writing, as well as research (can be seen as accessing and processing academic sources), as well as producing academic work. A more detailed look into the module structure determined the attention to the VL concept.

6.4.1.2 Structure of the modules

The introductory module has 12 lessons and the advanced module 11. The first lesson of each academic literacy module sets the tone for the content to follow: The introductory module pays attention to bridging the gap between school and university education, whereas the advanced module addresses becoming part of the academic community. The other lessons of both modules are structured according to three basic competencies, namely accessing, processing, and producing academic information. This is in line with Weideman's definition of academic literacy (§ 2.3.6), which specifically mentions that students must be able to "interpret, use and produce information presented in graphic or visual format" (Weideman, 2003: xi).

Addendum F provides an overview of the curriculum, outcomes and criteria of the academic literacy modules.

In each of these modules, one lesson refers to VL:

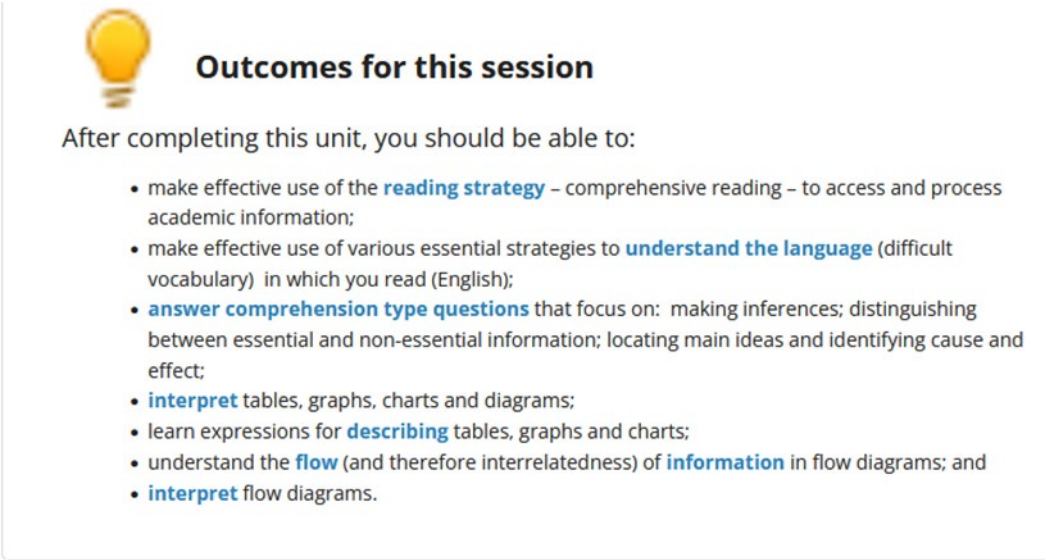
Table 6-5: Academic literacy module lessons which include references to visuals

MODULE	LESSON	TITLE
INTRODUCTORY MODULE	Lesson 4 (indicated as self-study)	Accessing information
ADVANCED MODULE	Lesson 11 (the last lesson of the module)	Visual information

The next step was to deconstruct the content of the two lessons, as indicated in table 6-5, with the aim of determining the outcomes of lessons, types of visuals, type of activities involving visuals as well as the verbs used to describe the activities.

6.4.1.3 Content of Lessons 4 and 11

Lesson 4 of the introductory academic literacy module is indicated as a revision module and is introduced as follows: "… to keep things interesting we will also take a look at graphic and visual information…" (Academic Literacy, 2021). The screenshot below indicates the outcomes:



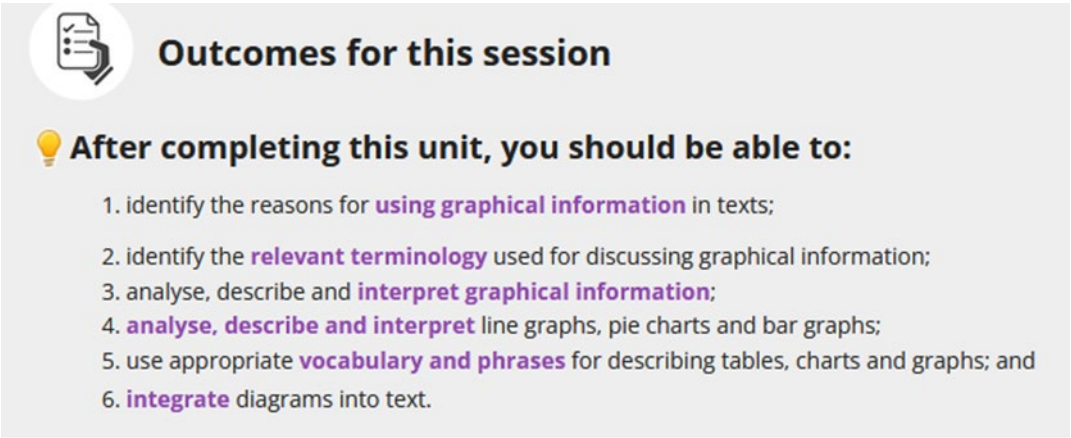
Outcomes for this session

After completing this unit, you should be able to:

- make effective use of the **reading strategy** – comprehensive reading – to access and process academic information;
- make effective use of various essential strategies to **understand the language** (difficult vocabulary) in which you read (English);
- **answer comprehension type questions** that focus on: making inferences; distinguishing between essential and non-essential information; locating main ideas and identifying cause and effect;
- **interpret** tables, graphs, charts and diagrams;
- learn expressions for **describing** tables, graphs and charts;
- understand the **flow** (and therefore interrelatedness) of **information** in flow diagrams; and
- **interpret** flow diagrams.

Screenshot 6-2: Outcomes for lesson 4 of the introductory academic literacies module (First page of academic literacy lesson 4 & Study Guide [NWU, 2022].)

In the advanced module, lesson 11 is dedicated to VL. It is the last lesson in the module and is introduced with a description of the advantages of using visuals in academic work as well as an instruction that it is a self-study module. The focus is still mainly on tables, charts and graphs, described as in screenshot 6.3 below:



Screenshot 6-3: Outcomes for lesson 11 of the advanced academic literacies module (First page of academic literacy lesson 11 & Study Guide [NWU, 2022].)

Table 6-6 provides a summary of the analysis of the two documents, referring to the organisation of the outcomes, the action words used to indicate what is required of students, as well as the type of visuals involved.

Table 6-6: Summary of the academic literacy module, lessons 4 (introductory module) and 11 (advanced module)

OUTCOME & COMPETENCY	INTRODUCTORY ACADEMIC LITERACY MODULE UNIT 4		ADVANCED ACADEMIC LITERACY MODULE UNIT 11	
	ACTION WORD	**TYPE OF VISUAL**	**ACTION WORD**	**TYPE OF VISUAL**
ACCESS **LO 1** **LO 2** **LO 4**	•**Learn** (expressions)	Tables Graphs charts	• **identify** (x2)	Graphic Information
	•**Interpret** (x2)	Tables graphs (flow) charts		
PROCESS **LO 3** **LO 5**	• **describe, understand**	Flow diagram	•**analyse, describe, interpret**	Line graphs bar graphs pie charts
			• **integrate**	diagrams
			•**use** (vocabulary)	Tables charts graphs
PRODUCE				

Outcomes and competencies (column 1): In the introductory module, visual information receives attention in three of the five learning outcomes at the "access" level. Regarding "processing", two learning outcomes are relevant. No outcome is connected to "producing". In the advanced module, "processing" is the major competency, whereas "accessing" is only concerned with identifying reasons for and terminology of visual information. This indicates a natural progression of the abilities required of students. The third academic literacy module competency, namely "producing", is not recognised with regard to visual information in either of the modules.

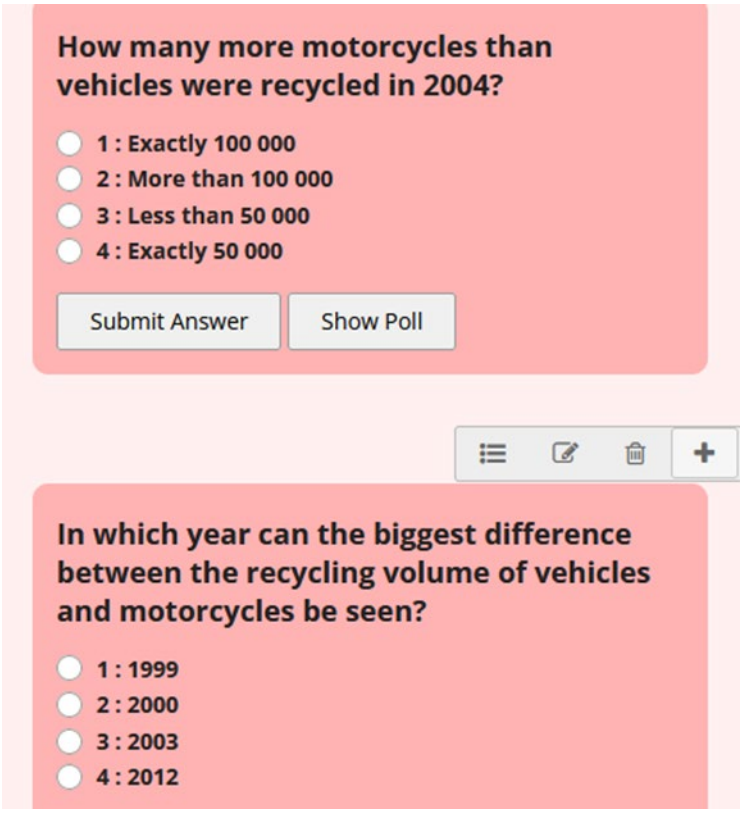
Action words (column 2 & 4): The required action words gave an indication of the competencies associated with the different learning outcomes. This, in turn, served as pointers towards appropriate types of teaching and learning activities. In addition, the action words could also offer the possibility of practically measuring or assessing the abilities of students.

Type of visuals (column 3 & 5): As can be seen in the table, these are exclusively visuals involving numbers and comparisons associated with scientific and mathematical reporting of figures. In the advanced module, the type of visuals remains the same (e.g., graphs, but different types are added, e.g., line graphs, bar graphs).

6.4.1.4 Evidence and findings

The evidence gathered through the above analysis has led the researcher to the following claims regarding the VL content in the academic literacy module modules:

- The attention given to visual information is extremely limited – just one study unit in each module. This translates into two out of 24 weeks, or 8.3% of the content.
- The module outcomes of academic literacy do not include or refer to the term "visual literacy" – no reference is made to VL as a specific kind of literacy, only visual information.
- In the introductory module, the types of visuals to which students are introduced are limited to graphic information. Reference is made to illustrations in the advanced module, but no further attention is given to such types of visual material. This creates the impression that visual information is mostly relevant within a scientific context.
- The exercises deal with one component only, namely processing the information contained in visuals such as graphs and charts. This processing is on the level of reading information from the provided graphic presentation, as is indicated in the screenshot example from the academic literacy module unit that addresses VL in the LMS:



Screenshot 6-4: Example of visual literacy exercise in the LMS

The other two components, namely accessing and producing, received limited to no attention. Important aspects in this regard would be for accessing – where to find relevant graphs, and where to find the reference of a visual source obtained for academic assignments – as well as producing – how to insert a graph into your work as well as how to produce your own graph.

No ethical guidelines to accessing, processing and editing visual material used in academic assignments are mentioned.

6.4.1.5 Claims regarding academic literacy modules

The structure of the academic literacy modules was identified as progressing from the access of information to processing, and finally production, where students constructed their own academic work. As far as attention to visuals or VL is concerned, the current academic literacy modules in the research setting offer limited exposure to VL in an academic context. This is contrasted by the literature on VL that highlights a focus on the fact that VL needs to be learnt (Avgerinou & Pettersson, 2011; Brumberger, 2019). This lack of attention is relevant to the time allocation, types of visuals, as well as the opportunity for interaction in the form of exercises and practical exposure.

6.4.2 ACRL documents (documents 3 & 4) as well as CEFR-VL and CEFR-VC documents (documents 5 & 6)

The ACRL VLCS documents (2014, 2022) from the USA and the ENViL documents (2016;2021) from Europe were analysed in the same way. The rationale for this was that on both continents, an original document was succeeded by an updated document, which implied that on both continents, scholars and researchers had determined that some aspects of the original approach or frameworks had to be adapted or re-envisaged. Thus, the document analysis not only informed as regards the frameworks of the different educational settings but also revealed the developments with regard to the teaching of VL.

6.4.2.1 Analysis

The analysis of the two sets of documents (those from the USA and those from Europe) were first conducted separately, following the same steps for each set. It was important to ensure the credibility and trustworthiness of the analysis (Saldaña, 2011) and, therefore, the process consisted of four steps. These steps ensured repetition, and re-involvement with the same data in different processes provided sufficient external validity.

STEP 1: The document sets were read attentively, and notes were made during this process in order to get an in-depth understanding of the relevant content and context.

STEP 2: Inductive coding was used to organise the relative content and identify categories or themes. The coding is referred to as an inductive process, as the codes were extracted from the data and not pre-imposed from literature (Saldaña, 2011). The computer-aided qualitative analysis program ATLAS.ti™ version 22 was used.

STEP 3: The selected codes were organised into mind maps to structure and visualise the growing understanding of the aims, frameworks, content and activities relevant to the current approaches to VL in HE.

STEP 4: Tables were designed to combine and categorise the evidence collected from the two document sets. In this way, the approaches followed by the two frameworks could be compared for similarities and differences, and informed decisions could be made on emerging themes. These tables have been included on the following four pages (table 6-7 & table 6-8):

Table 6-7: Summary of original VLCS (2011) and CEFR-VL (2016) documents

	AMERICAN College Research Librarians VLCS	European Network for Visual Literacy (ENViL) CEFR-VL
DATE	2011	2016 EUROPEAN Framework of Reference for VL (CEFR-VL) published.
DEVELOPMENT	Members of VL Task Force form collaborative partnership with other role players, e.g., American Librarians	Experts in national & regional curricula 60 researchers from nine countries
CONTEXT	United States of America	Europe
WHAT IS PROVIDED?	Intellectual **Framework** to facilitate VL development	**Framework** / **model** to cover diverse European context **Rubrics** for assessment and self-assessment of VL
MOTIVATION	Visually orientated society requires capable engagement of students	Discrepancy between importance of VL and marginalized position of VL in education. To be a fully developed person and responsible citizen, you must be visually literate.
AIM	To provide TOOLS for educators for VL development in education. To provide STANDARDS outlining students learning outcomes around INTERDISCIPLINARY visual literacy.	To advise, not standardise. To provide a REFERENCE DOCUMENT. To provide a TOOL / INSTRUMENT for development of curricula, lesson plans, assignments and assessment instruments for visual literacy competencies of learners.
PURPOSE		Brings together competencies from 37 curricula in 22 European countries. Defines what it means to be a fully visually literate European citizen. Stimulate exchange of ideas on purpose & content of VL in relevant domains.
LEVEL	Higher Education	Secondary Education

RELEVANT / KEY DISCIPLINES	Interdisciplinary	General education All school subjects involved in the visual domain (However, some individuals [e.g., Blaikie, 2019] review it as a document for art education)
OUTCOMES	OBSERVABLE outcomes which can be TAUGHT and ASSESSED	VL as term to broaden domain to include all kinds of visuals COMPETENCE MODEL – basis for assignments, curricula, assessments Definitions of 16 sub-competencies Address domains and situations relevant to visually literate citizens
VL DEFINITION	VL individual in HE environment is both a critical consumer and competent contributor of visual media. Seven abilities listed	VL = group of ACQUIRED COMPETENCIES for the PRODUCTION and RECEPTION of images and REFLECTION on the process
KEY DETERMINERS/ BASIC ASSUMPTIONS	VL must be TAUGHT VL should be integrated into the curriculum VL is interdisciplinary	COMPETENCY ORIENTATED APPROACH VL COMPETENCY = knowledge, skills & attitudes VL COMPETENCY is embedded in general education: connected to personal-, social- and methodological competencies and domains.
FORMAT	Seven STANDARDS each containing two – four PERFORMANCE INDICATORS The performance indicators are subdivided into five – eight LEARNING OUTCOMES	Two main DIMENSIONS (producing & responding) broken down into 16 SUB-COMPETENCIES

APPLICATION	Dependent on needs: Full implementation of all Standards OR individual standards as stand-alone tools Not discipline specific	**Scales & levels** for each sub-competency can help determine performance of student.

Table 6-8: Summary of Companion document to VLCS (2022) and revised CEFR-VC (2021)

	Companion document to ACRL Framework	Revised CEFR-VC by ENViL
DATE	2019–2021 (approved 2022)	Published 2021
AIM	To create a flexible document to re-envision 2011 document. To provide an expanded understanding. To encourage VL in curricula.	To present a new, more practical and transparent model of the 16 sub-competencies.
MOTIVATION	Changing landscape of visual communication and visual information	To acknowledge dynamic character of VL competencies. transparent model.

ASSUMPTIONS / CONSIDERATIONS	Document companion to ACRL VLCS; NOT STAND-ALONE • VL requires lifelong and continuous engagement • VL is multidisciplinary • VL definitions can differ among disciplines		Reorganisation of model: • Reformulation to include different verbs together with "…competency TO…" • Sub-competencies formulated in terms of VL • Changed structure – developed 2 models (one each for PRODUCING and RESPONDING) • Framework re-named to CEFR – VC to recognise the area the Framework covers, namely visual competence. Intended for general education, not professional visual competence
		SUB-DOMAIN: PRODUCING	SUB-DOMAIN: RESPONDING
		Five sub-competencies: •To generate visual ideas •To do visual research •To make images •To present one's visual work •To evaluate one's visual work	Eleven sub-competencies grouped into four sub-competencies according to order of process:

THEMES	THEME 1: PARTICIPATE in CHANGING information landscape • Role of technology • Digital landscape • Culture of participation in online communities • Multimodality of information • Economic value and interest of visuals	SUB-COMPETENCY 1: TO LOOK AT IMAGES with an open mind: Perceiving and empathising: intellectual & emotional connection with visual material
	THEME 2: PERCEIVE Visuals and COMMUNICATION • Integral part, not add-on • Visuals transmit and build knowledge • Produce, use and remix of visuals to create message • Visuals not neutral	SUB-COMPETENCY 2: TO RESEARCH IMAGES Analyse Describe Interpret Context central – social, political, economic, cultural
	THEME 3: PRACTICE Visual CRITICALITY • Critical evaluation skills when engaging with visuals • Critical of own and other biases • Discerning – awareness of manipulation • Ethical visual practices	SUB-COMPETENCY 3: TO EVALUATE IMAGES Relevance Success Power Judging and valuing criteria: ethical, political, legal, economic, cultural Individual or social understanding and value

	THEME 4: PURSUE (culture of) social justice • Social justice is a process • Visually literate individuals can contribute to social justice • Appreciate visuals form other cultures • Foster empathy • Takes continuous effort & education	SUB-COMPETENCY 4: TO REPORT ABOUT VISUALS Communicate Present Use Sharing in a MULTIMODAL fashion – builds, shares knowledge Can also be INTERNAL – forming and INFORMED opinion Response to visual within CONTEXT (historical or contemporary)

6.4.2.2 Evidence

The discussion of the evidence that follows provides an overview of the specific themes that emerged from the documents that were analysed.

Theme 1: Outcome produced by designated task teams

The outcome of both the initial task teams is referred to as frameworks for the development of VL. According to ACRL, the aim of their framework (VLCS) is to provide tools and standards for this development in an interdisciplinary HE environment. ENViL also refers to their framework (CEFR-VL) as a reference document aimed at advising rather that standardising. It also provides rubrics for assessment within a general secondary education setting, with a strong link to specifically art education. As regards the second documents, the aim of the VLCS companion document is to provide a more flexible approach to encourage the adoption of VL in the curricula through an expanded understanding of the concept. The revised CEFR-VL is a new, stand-alone document aiming to offer a more practical and transparent approach to educators.

Theme 2: Motivation for the creation of these frameworks

Both initial frameworks were motivated by the visual society and the need for students to engage with visuals to develop into fully responsible citizens (§ 3.3.4.3). In this regard, the CEVR-VL notes the discrepancy between the importance of visuals in our world and the neglected position it has in education, as reflected in the literature by Kedra (2018). These motivations are expanded in the second set of documents with reference to the changing landscape of both visual communication and visual information, also referred to as "…the dynamic character of VL…" (Schönau, 2021; Rigutto, 2017).

Theme 3: Key determinants of frameworks towards VL

Regarding the approach of the VLCS, three codes were identified from the two documents. The VCRL takes the stance that VL should be taught and that it requires lifelong and continuous engagement. Connected to these ideas, it suggests that VL should be incorporated into the curriculum (Blummer, 2015). Secondly, they acknowledged VL as being interdisciplinary (the original document) and adapted it to multidisciplinary in the companion document of 2022. This implies that different disciplines do not try to find a singular approach towards VL; rather, VL is acknowledged as playing unique roles in each individual discipline. Finally, the companion document (American Library Association, 2022) acknowledges that the VL definition can differ among disciplines. This is a noteworthy addition, considering the role the matter of a uniform definition has played in the history of VL (§ 3.4.1).

As far as ENViL is concerned, “competency” is a key determinant, as it indicates that it follows a competency orientated approach. Visual competency within the framework is defined as comprising three components, namely knowledge, skills and attitudes. Furthermore, it reconfirms that VL is embedded in general education and is closely associated with other competencies of an individual, namely personal, social and cultural domains. This was an important determinant of the design of this study, in which context is regarded as an important consideration within research (Plowright, 2011).

The revised CEFR-VL introduces some key changes concerning the use of the term “competency” in the original framework. First, it acknowledges the need for the inclusion of verbs in the formulation of competencies (e.g., “… the competency *to identify / to access*…”) (ENViL, 2021) as well as the need for sub-competencies. Second, it changes the structure of the framework by developing two separate models for addressing VL – one for *producing* and one for *responding* to visuals. Third, they pertinently indicate that their framework is intended for use in general education, not professional visual competence needed in specialised disciplines, like photography or graphic design. Finally, they decided on a name change for the framework, now referring to it as the CEFR – **VC**, (visual competency has replaced visual literacy) in recognition of the fact they consider the framework to cover visual *competence*.

The above determinants served to inform the format of the frameworks.

THEME 4: FORMAT OF THE FRAMEWORKS

The initial VLCS framework was organised according to *seven standards*, each enhanced by two to four *performance indicators*. In turn, the performance indicators were subdivided into five to eight *learning outcomes.* When applied, two suggestions are made: first, full implementation of all standards are not necessary and individual standards and learning outcomes can be used as standalone tools, depending on the needs of the educator; second, these standards are not discipline specific and can be applied to any discipline deemed fit.

The companion document of 2022 did not replace or change any of the above; rather, it identified four *themes* to expand the approach to VL as a reaction to the dynamic nature of VL. The first theme refers to the changing information digital landscape, enhanced through the role of technology. This has led to multimodal forms of information and a culture of participation where the economy is also a vital role player. The second theme relates to the notion of visual communication as complete standalone source to build knowledge, not acting as a mere add-on anymore. The third theme can be seen as a spin-off of the first two, namely the need to practise criticality when engaging with visuals. Here, manipulation and ethical visual practices stand

central. The fourth and final theme is integrated with all the others and addresses the culture of social justice that visually literate individuals can pursue. This, however, is also regarded as an ongoing process and not a once-off engagement.

The first version of the CEFR-VL produced a much less-structured format: *Producing* and *responding* to visuals were identified as the two main dimensions and broken down into 16 sub-competencies. On a practical level, scales and levels for the sub-competencies were added to assist in the evaluation of students or self-evaluation. The revised version, now called the CEFR-VC, acknowledged the need for a more practical approach, resulting in the division of the initial two dimensions into sub-competencies. The original 11 sub-competencies of *responding* were re-envisaged as four sub-competencies, which can be regarded as central themes or approaches: the first refers to looking at images with an open mind; the second entails the research of images to, among others, determining the context of an image, which should stand central; the third sub-competency is concerned with the evaluation of images – once again, social issues such as power, relevance and ethical, political, and social judgements stand central. The final sub-competency has not yet been referred to, namely reporting about visuals. Direct reference is made to multimodal sharing with others, as well as the importance of informed opinions about visuals within the context of visuals (e.g., historical, political, and cultural).

6.4.2.3 Claims (Findings)

The European documents stem from a much wider base of contributions from countries (n=27) and curriculums (n=37), whereas the American documents were compiled in one country by faculty librarians and other role players involved in the teaching of VL. Another difference is the contexts where the VLCS have been designed for HE and the CEVR-VL/VC for secondary education. However, both follow a multidisciplinary approach towards VL.

As far as similarities are concerned, there are quite a few:

- The product produced by the task teams in both cases was a framework aimed at offering practical tools and standards to apply in educational settings. ENViL, however, clearly indicated that their aim was to advise, not standardise, and this approach was echoed in the companion document of the ACRL, proclaiming a more flexible approach.
- Competencies form the core of both frameworks, to such an extent that ENViL included the word in their name change of their framework to the CEVR-VC.
- Furthermore, both groups acknowledge the changing visual information landscape with its dynamic character, driven by technology. This also motivated the publication of updated documents.

- Both acknowledge the contrast of the visually driven society and the lack of educational attention to VL, as well as the fact that a fully developed, responsible person needs to be visually literate.
- Both groups acknowledge the fact that acquiring VL is a lifelong engagement which should be initiated through education, resulting in self-directed learning.

Differences include the following:

- The CEVR-VC has an added focus on assessment and self-assessment, providing scales and levels to determine the competency levels of students.
- The CEVR-VC added a sub-domain focusing on reflecting and reporting on one's engagement with visuals. This is not reflected in the VLCS.
- The structure of the VLCS provides a detailed layout of individual learning outcomes, whereas the CEVR-VC, even after converting to a more practical approach, is not as detailed.
- The VLCS clearly states that a partial implementation of the framework, focusing on a few aspects at a time, is possible and suggested.

6.4.3 Summary and recommendations drawing on the document analysis

This chapter reported on the methodology and results of Phase 1 of this study. First, the selection of document analysis as the first phase of the data source management strategy as well as the sampling decisions were outlined. Second, the data collection and analysis procedures were explained. Third, a discussion of the evidence and claims that became evident from this part of the empirical investigation was provided. The main findings can be summarised as follows:

The first aim of this phase was to determine the VL standards needed by students in an academic multiliteracies environment (SRQ 1). The evidence from the documents analysed confirms that we live in a world that is driven and controlled by a dynamic visual culture where people are not only consumers but also producers. This reality suggests that students need a range of competencies to function in this multimodal environment. To acquire these competencies and become visually literate citizens, students need to be taught and guided, as becoming visually literate entails a process of exposure and awareness, requiring life-long engagement. Emphasis is placed on the need for criticality, the contextual relevance, and the pursuit of social justice when engaging with visuals.

The second aim was to determine recommendations regarding the implementation of a VL component into the existing academic literacy course (SRQ 5). The evidence from the academic

literacy module analysis revealed a very limited attention to VL. It did, however, have a well-designed structure according to which the content was organised. When considering these findings in conjunction with the insights gathered from the VLCS and CEFR-VC documents, the frameworks presented in the documents could provide a starting point for developing a VL component suitable for the context of this study as part of the exiting academic literacy module.

The consideration to apply the suggested VLCS of the ACRL while incorporating some aspects of ENViL CEVR-VC into a new model or framework to approach VL from a fresh angle, as well as its suitability for the professional and organisational context of this study, can be motivated as follows:

- First, both follow a practical, competency orientated approach.
- Second, the VLCS provides seven clear competency standards, each with its own performance indicators and learning outcomes that are compatible with the working definition of VL for this study. These correspond broadly to those of the CEVR-VC, with their added focus on reflecting and responding to visual material.
- Third, the competencies are relatively straightforward, which seems appropriate for the first tentative steps towards addressing the VL competencies within the rural setting of this study.
- Fourth, of equal importance for a new endeavour is the fact that individual performance indicators and learning outcomes of any of the seven competencies may be applied in full or only partially, depending on the learning goals or needs.
- Fifth, the standards also need not be attended to in a linear structure, offering the freedom of addressing standards when relevant to the teaching and learning context and content as well as applying a variation in the modes of instruction for different competencies.

6.5 CONCEPTUALISATION OF FRAMEWORK

The seven competency standards or the VLCS have been incorporated under the three outcomes of the academic literacy module, namely accessing, processing, and producing. The legal and ethical issues, represented by standard 7, were deemed as applicable and important to all competencies:

Table 6-9: VLCS (ACRL, 2011) integrated with academic literacy module outcomes

ACADEMIC LITERACY	COMPETENCY 1: ACCESS	COMPETENCY 2: PROCESS	COMPETENCY 3: PRODUCE

MODULE OUTCOMES:			
ACRL VLCS STANDARDS			
Standard 1	Determine the nature and extent of visual material needed		
Standard 2	Find and access needed images and visual media		
Standard 3		Interpret and analyse the meanings of images and visual media	
Standard 4		Evaluate images and their sources	
Standard 5			Use images and visual media effectively
Standard 6			Design and create meaningful images and visual media
Standard 7	Follows ethical guidelines when accessing visual material	Understand the ethical, legal, social, and economic issues surrounding the use of images and visual materials	Follows ethical guidelines when using visual material; cites sources in projects and presentations

The figure below presents a visual synthesis of the possible framework of VL competencies for South African university students in a multimodal academic literacy context. To ensure that the components of the new framework are easy to remember for students who are introduced to VL, the acronym “APPLE” was developed, using the first letter of each competency, namely **a**ccessing, **p**rocessing, **p**roducing, as well as “l” for **l**egal and “e” for **e**thical consideration.

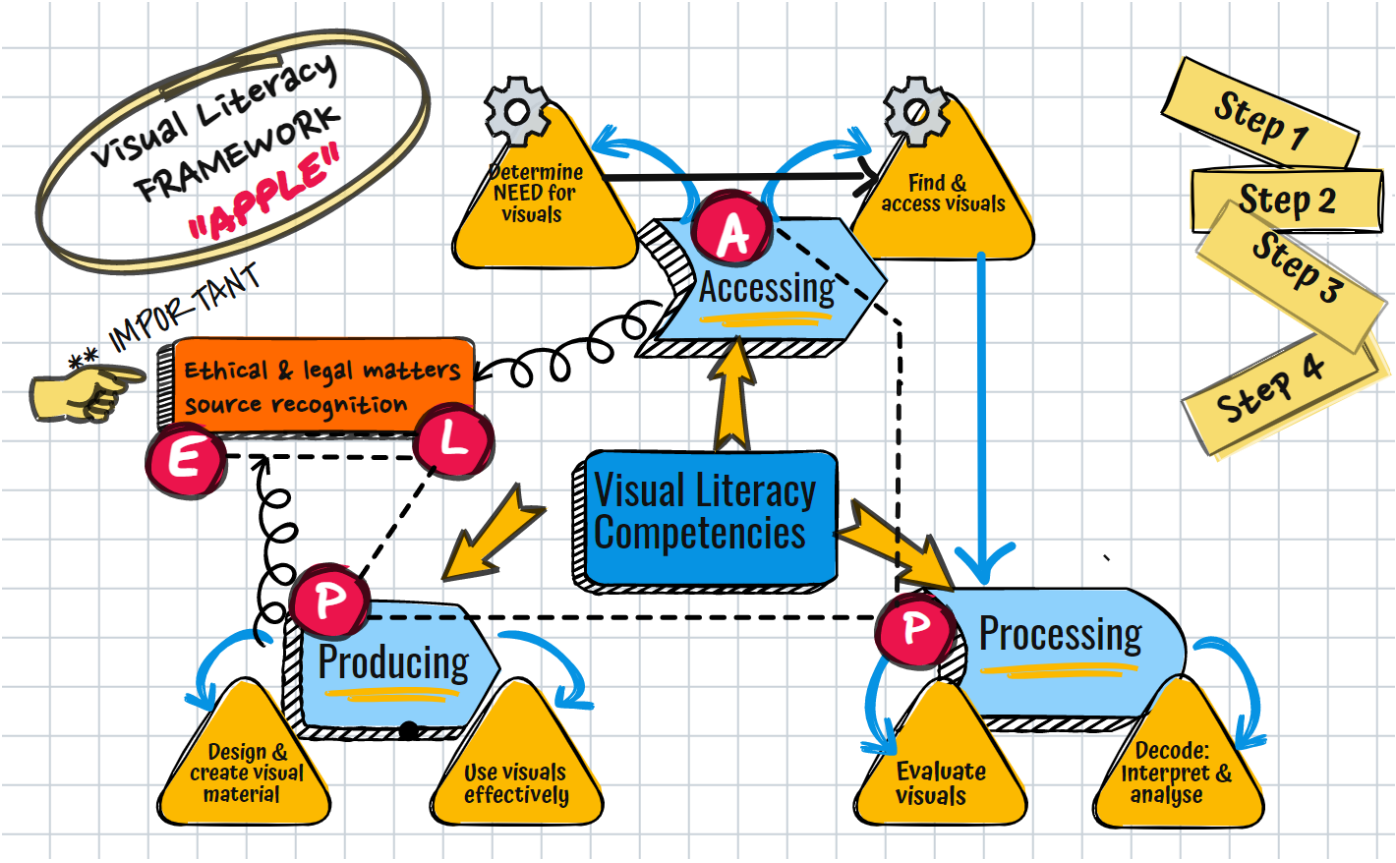


Figure 6-2: "APPLE" Framework of VL competencies for South African university students in a multimodal academic literacy context

In addition, the four themes identified by the ACRL (2022) towards the development of visually literate citizens were synthesised into another acronym, also to simplify the themes:

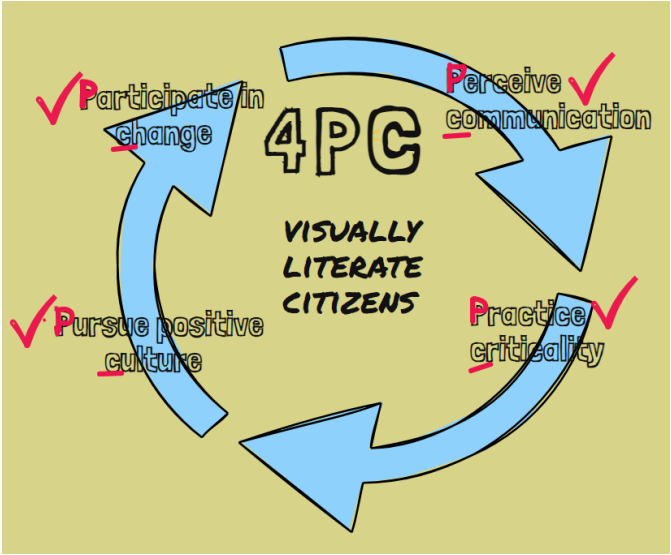


Figure 6-3: "4PC" acronym for the VL framework

6.6 SUMMARY AND CONCLUSION

The first of four data analysis phases were discussed in this chapter, namely the document analysis. The integration of the findings led to the conceptualisation of a possible framework to address VL needs within the context of this study. In addition, the insight into the visual competencies required by students in the visual age, which were gained through the document analysis, was used to conceptualise the next phase of the study, namely "asking questions". This phase, entailing a questionnaire, is attended to in chapter 7.

CHAPTER 7: EMPIRICAL RESEARCH PHASE 2: QUESTIONNAIRE

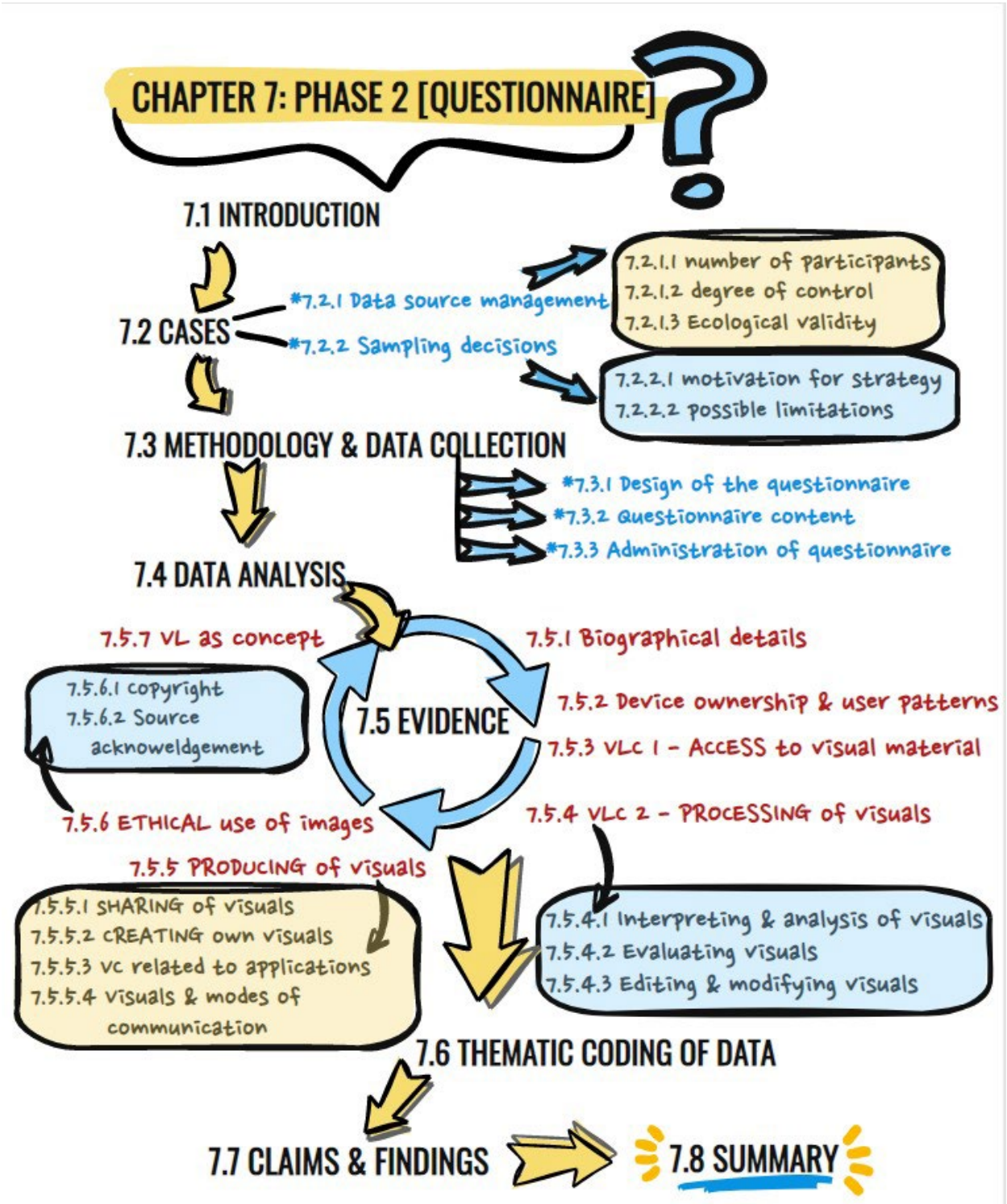


Figure 7-1: Mind map of chapter 7

7.1 INTRODUCTION

In phase 1 of this study (see chapter 6), relevant documents were analysed to determine the approach and content of existing frameworks for addressing VL. The data were coded into themes, and the results from the different source documents were integrated. Following the integration of this information, I designed a tentative framework, outlining the competencies, standards and skills relevant to the context of this study. The components of this framework (see figure 6-2) were used to inform the development of phase 2. The decision was made to use the data collection method of asking questions in phase 2 of this study. More specifically, a decision was made to design a survey in the form of an online questionnaire (cf. § 5.4.3).

The aim of the phase 2 of the research activity was twofold: first, to determine the user and ownership patterns of the cases regarding mobile devices; second, to form a better understanding of the knowledge, awareness and abilities of the cases regarding the different VL competencies, as identified in phase 1. Consequently, phase 2 of the research study was guided by the following research questions:

Table 7-1: Secondary research questions relevant to phase 2 of the study

Research question:	
Secondary Research Question 1:	What are the visual literacy competency standards (VLCS) students bring with them to the university?
Secondary Research Question 3:	What multimodal mobile visual literacy activities could be used to develop the visual literacy of students?
Secondary Research Question 5:	What recommendations could be made with regard to the content, multimodal teaching and learning activities and fostering of SDL skills for a visual literacy component in the academic literacy course?

In this chapter, the adapted version of Plowright's FraIM (see figure 1-2) serves as guideline to describe both the methodology as well as the results of Phase 2. First, the selection of the cases for this phase and the components relevant to this process are discussed, followed by an interrogation of t the methodological processes related to the creation and administration of the questionnaire. Third, the data collection and analysis strategies are explained. This is followed by

evidence of the perceived VL competencies of the cases. Finally, discussions of the data, guided by the research questions for this phase of the study, are presented.

7.2 CASES FOR THIS PHASE OF THE STUDY

The proposed cases (hereafter referred to as “participants”) were first-year students enrolled for the academic literacy development module in English at the university where the study was conducted (n=3570). The two components relevant to the participants are the data source management strategy as well as the sampling strategy for this specific phase of the study.

7.2.1 Data source management strategy

During phase 2, I wanted to collect information on the VL competencies of students entering HE from as large as possible group of qualifying participants. Therefore, I decided on a survey approach, which is “… a nonexperimental research method based on questionnaires”, collecting information from a specific group of people for the purpose of generalising the results to a larger population (Johnson & Christensen, 2014:675). The following aspects of the survey approach, as suggested by Plowright (2011), were considered regarding the management of the data source: first, the number of participants involved in the research; second, the degree of control the researcher would have; and third, the degree of naturalness or ecological validity of the data source during the administration of the survey.

7.2.1.1 Number of participants

The 3 570 possible participants, representing the number of first-year students enrolled for the academic literacy module, were regarded as a large number. Large sample sizes that can be handled economically and efficiently as well as precise enough estimates to still identify small differences and results that can be generalised to a target population are some of the advantages of the survey method (Babbie & Mouton, 2001). The actual number of participants generated during the sampling process (§ 7.2.2) and who participated in this phase of the research was 1 432.

7.2.1.2 Degree of control

As researcher, I was able to use an existing group, namely all the first-year students who were enrolled for the academic literacy module. This implied a low degree of control with regard to the choice of participants. The degree of control was further also low, as I could not control the number of cases who would respond to the request to complete the questionnaire. However, I had a high degree of control in the questioning process, as the questionnaire was developed by myself with the specific context in mind.

7.2.1.3 Ecological validity or naturalness

The final consideration regarding the data source management strategies for this phase of the study was ecological validity or naturalness of the research location. According to Cohen et.al. (2007), high ecological validity is obtained when the research gives an accurate picture of the reality of situations in their natural setting. Owing to COVID-19 regulations, no personal interaction between myself (as researcher) and the participants was allowed. However, I was able to utilise the LMS of the university to reach the participants through the online mode. This was not regarded as negative or unnatural, as students were well accustomed to this mode, since the majority of modules were conducted online due to COVID-19 protocols. In addition, most participants were from a generation comfortable with online activities (Culp-Roche et al., 2020). Research by Lee (2007) and Oprea and Stan (2012) even suggests that collecting data online might, in certain cases, have greater ecological validity. Barratt (2012) contends that online data collection might be the most relevant for adolescents.

7.2.2 Sampling decisions

Sampling refers to the selection of a sample from a larger group or population (Plowright, 2011). Participants for this phase of the study were selected using a non-probability sampling strategy that generated a convenience sample, which is an example of a purposive sample (Kemper et al., 2003). According to Cohen et al. (2007, p. 102), “the selectivity which is built into a non-probability sample derives from the researcher targeting a particular group, in the full knowledge that it does not represent the wider population; it simply represents itself”. Furthermore, the sampling strategy for this study can also be regarded as convenience sampling – a sampling method where a group of subjects is selected based on being easily accessible and available (Collins et al., 2007; Mitchell & Jolley, 2013; Patton, 2015). This sampling strategy rendered 1 432 first-year participants.

7.2.2.1 Motivation for this sampling strategy

- All first-year students on the rural campus of a selected South African university where the study was conducted must enrol for an academic literacy module, making them easily accessible and available.
- According to the LMS of the institution, 3 570 first-year students were enrolled on the specific campus and were, therefore, potential participants. This sampling strategy could render data from a substantial number of cases.
- All the above-mentioned cases were active in the LMS of the institution, implying that communication with them would be convenient and uncomplicated.

- Visual literacy, the research topic of this study, forms part of academic literacy module, making the topic of research relevant to the selected cases, enhancing the possibility that they would be willing to participate (Collins et al., 2007).

7.2.2.2 Possible limitations of this sampling strategy

Time was identified as a potential limitation of the sampling strategy. The reasons are as follows:

- The selected cases were students enrolled in a one-year course; the data had to be collected within the time frame of one academic year. The academic year only starts in February and already ends in November.
- The students were first-year students, meaning they first had to settle in before they could take part in research. There are also about two months where students cannot engage in extra activities due to mid- and end-of-year exams.
- The influence of COVID-19 protocols on the data collection methods had to be considered, adding some more time restraints.
- The research was part of a PhD with a prescribed timeline that had to be adhered to.
- Once the data source management and sampling strategy had been clarified, the detail with regard to the method of data collection could be attended to.
- To curb all of the above, a timeline was designed to fit into the research phases within the available timeframe.

7.3 METHODOLOGY AND DATA COLLECTION FOR THIS PHASE OF THE STUDY

The methodology that was followed during the phase 2 survey approach involved administering an online questionnaire. The following served as motivation for the choice of a questionnaire as the data collection tool for this phase of the study:

- The questionnaire offered a convenient way of collecting data from a larger size of the population compared to interviews (Fink & Kosecoff, 1998; Plowright, 2011).
- The content of the questionnaire questions could be informed by and specifically tailored through the insight gained from phase 1 of this study when documents containing frameworks were analysed.
- The results of questionnaire could be integrated with data collected through other data source management strategies during other phases of the study.
- Questionnaires offer a data collection method that can be administered via paper or online (Manfreda et al., 2002). As explained in the data source management section (§ 7.2.1.3), research took place during the COVID-19 pandemic when contact classes at academic

institutions had been suspended and all teaching took place online. An online questionnaire was, therefore, the logical choice for this study.

Once it had been decided that an online questionnaire would be administered in this phase of the study, several aspects had to be attended to first, decisions on the instrument had to be made and second, the logistics of the administration of the questionnaire had to be planned.

7.3.1 Design of the questionnaire

An important decision that had to be made was whether to use an existing questionnaire or design a new one. Existing examples of VL questionnaires, aimed at determining the VL of students, found in the literature were perused (Arslan & Nalinci, 2014; Brumberger, 2011; Garcia-Sanchez et al., 2019; Groenendijk et al., 2018). Important insight into content and approach was gained during this process. However, the unique context of the study encouraged me to design my own questionnaire. Common problems in questionnaire design – such as the length of the instrument, unclear or pointless questions, as well as the lack of alignment of questions with the research questions and aims, as identified by Cohen et al. (2007) – were kept in mind during the design process. The questionnaire items were developed based on the following:

- The insight gained from existing VL questionnaires;
- The experience of the researcher in teaching languages to secondary school pupils and academic literacy, of which VL is a component, to students;
- The extensive literature review of the ever-evolving field of VL;
- The document analysis done on the Visual Literacy Competency Standards for Higher Education, published by the Association of College and Research Librarians (VLCS, 2016), as well as the Common European Framework of Reference for Visual Competency (European Network for Visual Literacy (ENViL, 2016).

7.3.2 Questionnaire content

The final questionnaire (Addendum C) consisted of 84 items. These items were subdivided into seven sections to ensure a focused approach to the data that could potentially have been gathered in each section.

The first section collected data on demographic details as well as device access and usage. The remaining sections were informed by the results of phase 1 (see chapter 6) of this study and structured according to the VL competencies framework “APPLE” (§ 6.4.3), as conceptualised after the document analysis. A decision was made not to include questions with reference to the “4 PC” component (§ 6.4.3) in the questionnaire, since this would have resulted in an even longer questionnaire. Moreover, these themes from the companion document of the ACRL (ACRL,

2022), which I refer to as the "4 PC" components (see figure 6-2), were regarded as of a more advanced nature than the basic competencies which were deemed suitable for a questionnaire aiming to determine the VLCS present when students from a specific context enter HE.

After the questionnaire had been developed, it was evaluated by three scholars from other institutions involved in the field to ensure face validity. It was also evaluated by the statistical services of the NWU to ensure that it would render information suitable for analysis. This process was followed to ensure warrantable claims and outcomes. "Warrantability" is the term used in FraIM to refer to validity (Plowright, 2011:136) and was considered in all research phases. This approach confirms the stance of FraIM that research is a process with different steps and not a once-off event. The broad constructs of the seven categories as well as the specific constructs and the measurement scale of each item of the final questionnaire are presented in table 7-2:

Table 7-2: Constructs in questionnaire

Broad construct	Question number	Specific construct	Measurement scale
Biographical details	2	age	nominal
	3	gender	nominal
	4 – 6	Languages	nominal
	7	Environment grown up in	nominal
Device ownership Device user patterns	8 – 12	Type of device(s) owned	Yes / no
	13 – 18	Usage for study purposes	Ordinal
	19 – 24	Usage for social / relaxation purposes	Ordinal
	25-26	Mode of reliance for navigation instructions	nominal
VLC 1 ACCESSING visual content			
VLCS 1: Need for visuals	27 – 29	Academic use of visuals – suitability and frequency of use	Ordinal
VLCS 2: Finding & accessing visuals	34 – 41	Sources of visuals for academic and social use	Ordinal
VLC 2 PROCESSING of visuals			
VLCS 3: Interpret and analyse	42	Search strategies	Ordinal
	43 – 46	Knowledge of visuals in academic context	Nominal – multiple choice
	47 – 51	Knowledge of everyday visuals	Nominal – multiple choice
	52 – 54	Visuals associated with emotion	Nominal – multiple choice
	55	Visuals with esthetical meaning	Yes / no
	56 – 57	Visuals with historical meaning	Nominal – multiple choice
	58	Knowledge of visual design criteria	Nominal

VLCS 4: Evaluation of images	59 – 62	Manipulation of visuals in different contexts	Ordinal
VLC 3 PRODUCING OF VISUALS			
VLCS 5: Effective use of images	63 – 66	Sharing images from different platforms	Ordinal
	67 – 71	Modes used for communication	Ordinal
VLCS 6: Creation of images	32	Images for academic use	Ordinal
	33	Images for private social use	Ordinal
	72 – 73	Editing and modification of visuals	Ordinal
	74 – 78	Competencies in different applications	Ordinal
VLCS 7: Ethical use of images			
	30 – 31	Knowledge of copyrighted visual content	Yes / no
	79 – 80	Ethical use of images	Ordinal
	81	Acknowledgement of source	Yes / no
Visual literacy as concept	82	Knowledge of concept	Yes / no
	83	Own perceived competence	Ordinal
	84 – 85	Desire and availability to learn more	Yes / No

There were no open-ended questions in the questionnaire. Two types of data were gathered through the questionnaire: first, biographical data; and second, “yes” or “no” responses to questions on, for example, device type and device ownership.

As far as most questions were concerned, the possible responses were generated through four-point Likert-scale questions. The word “scale” is important with FraIM, as it indicates a progression of the data through different levels (Plowright, 2011). The four-point scale was selected to eliminate the possibility of participants who feel unsure always choosing the neutral middle option. The derivatives were chosen to be suitable to the question, but the sequence of (1) indicating the weakest ability and (4) indicating the best ability remained consistent throughout. These scales are shown in table 7-3:

Table 7-3: Four-point scale used to gather ordinal data

1	**almost never**	**2**	**seldom**	**3**	**often**	**4**	**almost always**
1	**Not at all**	**2**	**In some cases**	**3**	**mostly**	**4**	**definitely**
1	**Need a lot of assistance**	**2**	**Need some assistance**	**3**	**Need little assistance**	**4**	**Need almost no assistance**

However, these scales do not provide true *numerical* information but rather a descriptive way of comparing experiences, attitude, habits, or skills of participants. Thus, this type of data can be dealt with as narrative data and can also be analysed as such to, for example, indicate progression. This will become clear in the data analysis section of this chapter. Once the structure and content of the questionnaire had been finalised, the planning of the administration was attended to.

7.3.3 Administration of questionnaire

The decision was made to administer the questionnaire online. It was designed and created on Google Forms™ – a free online-based survey tool. I opted for an online questionnaire because of the following practical advantages of such an approach:

- the COVID-19 protocols at the time of the empirical phase did not allow for large groups to come together in lecture halls. In fact, students were not even on campus at the time. An online questionnaire was thus the only practical way to administer the questionnaire;
- cost implications, as online questionnaires are more cost-effective than printed questionnaires;
- participants were able to complete the questionnaire in their own time;
- participants did not incur high data costs, as the questionnaire was embedded in the LMS of the institution;
- the electronic submission saved time in respect of data analysis, as numerical responses could be exported to MS Excel™ for analysis purposes.

The final survey was made available through a link in the LMS to all relevant participants (§ 7.2). These students received an announcement, informing them of the research and inviting them to participate. They could complete the survey at any time they found suitable. No questions were compulsory, and students were free to quit at any time. The survey was available for one month during the second semester of 2021 (1 August – 2 September 2021) and students were sent a brief reminder every week.

The response rate to the survey was 35.7%, (n = 1 432). In this regard, literature confirms that the response rate for large populations is often a challenge (Nayak & Narayan,2019), and Alreck and Settle (2004) mention the acceptable response rate for large surveys is between 5 and 10%.

7.4 DATA ANALYSIS

The questionnaire was submitted to the Statistical Consultation Services of the relevant institute prior to its administration. Follow-up discussions with the statisticians led to the decision to only report descriptive statistics. This decision was motivated by the availability and capacities of applications like Excel as well as ATLAS.ti™, which offered me an array of possible data analysis approaches. As a social researcher using FraIM, I prefer to approach data from a pragmatic paradigm; trying to understand the research problem as experienced by the participants and determining what works rather than working with numerical statistics. In this case, the integrated methodology "… treats all methods – and data – as being equally acceptable and their use is determined predominantly by the research question and the aims and purpose of the research." (Plowright, 2011, p. 121). Regarding the questionnaire, it implied that data did not need to be analysed through statistical procedures only and that the "numerical" data collected through the closed questions could also be treated as "narratives" and categorised and coded, depending on the aim of the research questions. A description and explanation of the numerical data from the survey could then be done in a written account. According to Barthes (as cited in Plowright, 2011), the words then "anchor" the findings. This approach informed the following decision:

The data collected through the online questionnaire were downloaded to a MS Excel spreadsheet for a first stage of analysis. For this process, the data were categorised according to the seven sections which were decided upon after phase 1, as set out in table 7-4:

Table 7-4: Questionnaire sections

Section	Content	Number Of Questions
1	Biographical details	6
2	Device ownership & user patterns	18
3	VLC 1 ACCESSING visual content	11
4	VLC 2 PROCESSING of visuals	21
5	VLC 3 PRODUCING OF VISUALS	19
6	VLCS 7: Ethical use of images	5

7	Visual literacy as concept	4
	Total	84

A second cycle of analysis was then employed: the evidence gathered through the data analysis of the seven categories was revisited, and through indicative qualitative (in this case, narrative) analysis (Saldaña, 2011), I made use of coding to identify themes. By employing two cycles of data analysis, credibility and trustworthiness could be ensured.

7.5 EVIDENCE

7.5.1 Biographical details

Biographical and demographic information of the participants revealed information with regard to the context of the study and focused on the age, gender, language profile and the environment participants came from.

Table 7-5: Biographical details of participants

Biographical detail					
Age	**≤18**	**19-21**	**22-24**	**≥ 24**	invalid
	143 (0.9%)	**880 (69.8%)**	**290 (20.3%)**	**113 (7.9%)**	**6 (0.3%)**
Gender				 not revealed	
		863 (60.2%)	**559 (39%)**	12 (0.8%)	

As far as the age of participants is concerned, the majority (n=880) fell into the 19–21 age category, which is the standard age of students who enrol at a university for the first time. The

fact that 290 participants (20.3%) were between 22–24 is an indication of students who enter HE at a slightly later stage. This may be a result of challenges experienced at different levels. Almost 8% (n=113) of participants were older than 24, with the oldest 50 years of age. This was also interesting given the fact that this academic literacy module the participants are enrolled for was for full-time students. Regarding the gender of participants, the majority (n=863) of participants were female. This reflects the enrolment patterns of this specific group of students – more females registered for the first year.

Figure 7-2 below indicates the language profile of the respondents:

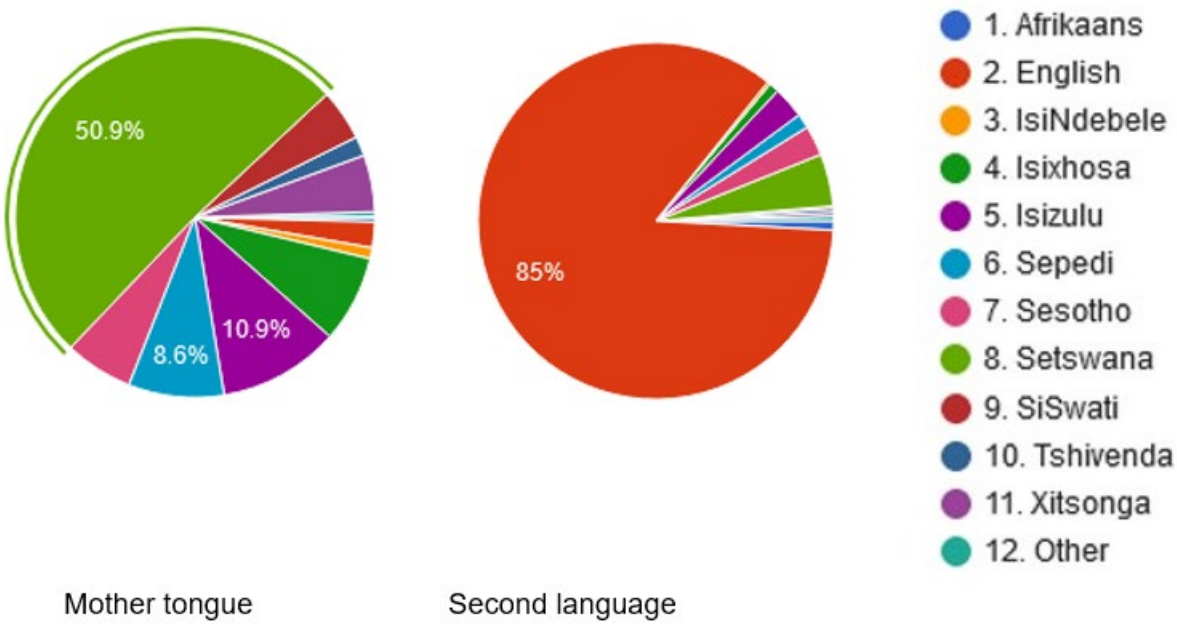


Figure 7-2: Language profile of the participants

As regards languages, the majority of students, 50.9% (n= 730), indicated that Setswana was their mother tongue. This is not surprising, as Setswana is regarded as the most pervasive language (63.4%) in the North West Province of South Africa (Alexander, 2021) where the research was conducted. A variety of other indigenous languages were also indicated, varying between 10.9% (n=156) for IsiZulu, and 0.4% (n=6) for Afrikaans. The indication of 12 languages as “mother tongue” – which in this context is defined as the language you grew up with and have been speaking since childhood – gives a true reflection of multilingualism in South Africa, and more specifically, at the institution under study (Olivier, 2014; Verhoef & Venter, 2008).

When it came to the language most used after their mother tongue, results were very clear: 85% (n=1 217) respondents indicated that this language was English. This was expected, as the

language of instruction at the HE institution on this specific campus is English. The small percentage of participants indicating English as their mother tongue (2.3%; n=33) confirms the fact that the majority of students study in a language which is not their mother tongue. This leads to added challenges with regard to literacy in general (§ 2.3.4.3).

As far as proficiency in a third language is concerned, figure 7-3 shows the spread between the 12 languages is more varied, with English once again featuring prominently at 25.2% (n=341), followed by isiZulu 18.3% (n=248), Sesotho 18.2% (n=246), and Setswana 11.1% (n=150).

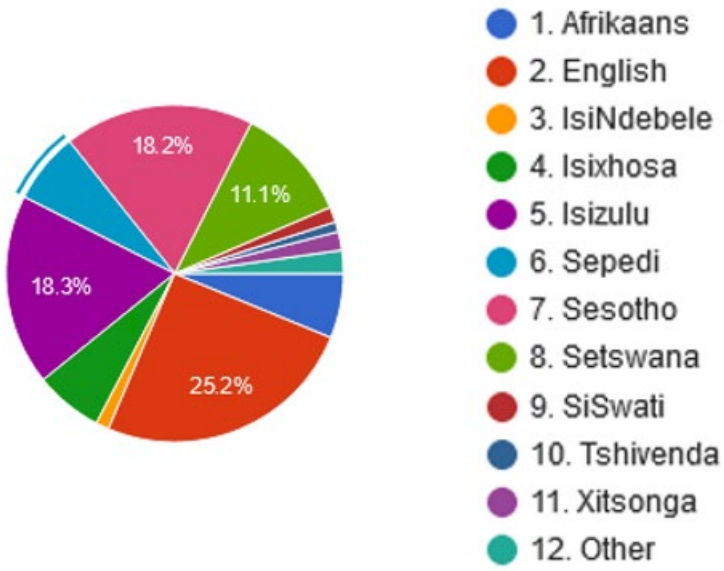


Figure 7-3: Third language of participants

Figure 7-4 shows the demographic data from the questionnaire, which addressed the home environment in which the respondents grew up:

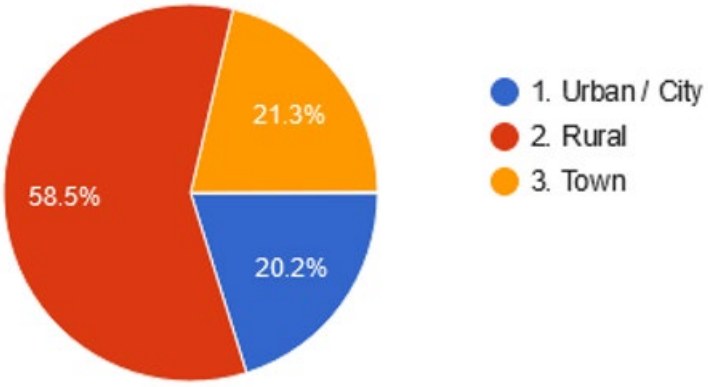


Figure 7-4: Home environment of participants

According to this questionnaire item, only 20.2% (n=289) of the participants grew up in an urban environment. This provides important context about the non-urban environment of almost 80% of the participants. This might play a role in the exposure respondents had to visual material as well as their understanding of the processes involved when engaging with visual material (Billmayer, 2016).

7.5.2 Section 2: Device ownership and user patterns

This section attends to the type of devices participants had access to as well as the functions they used them for. I regard this information as important in multimodal and mobile contexts, as reflected in secondary research questions three to five. Results of device ownership among participants were as follows:

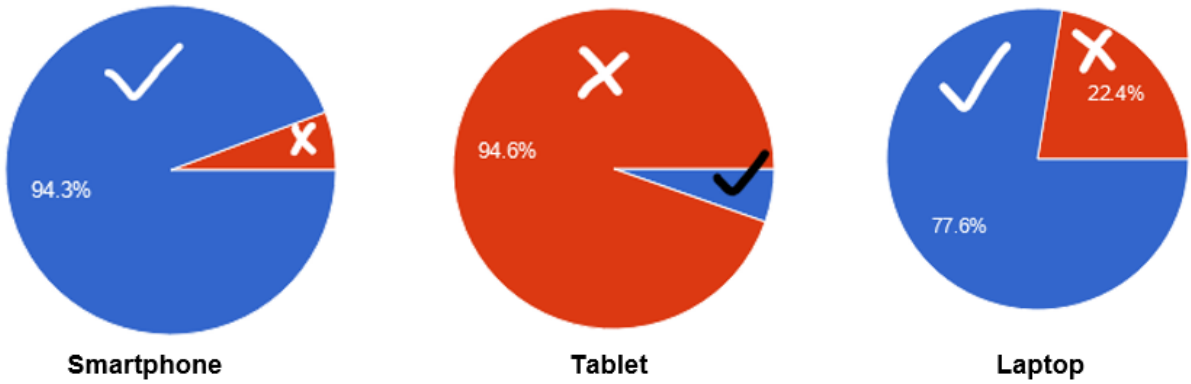
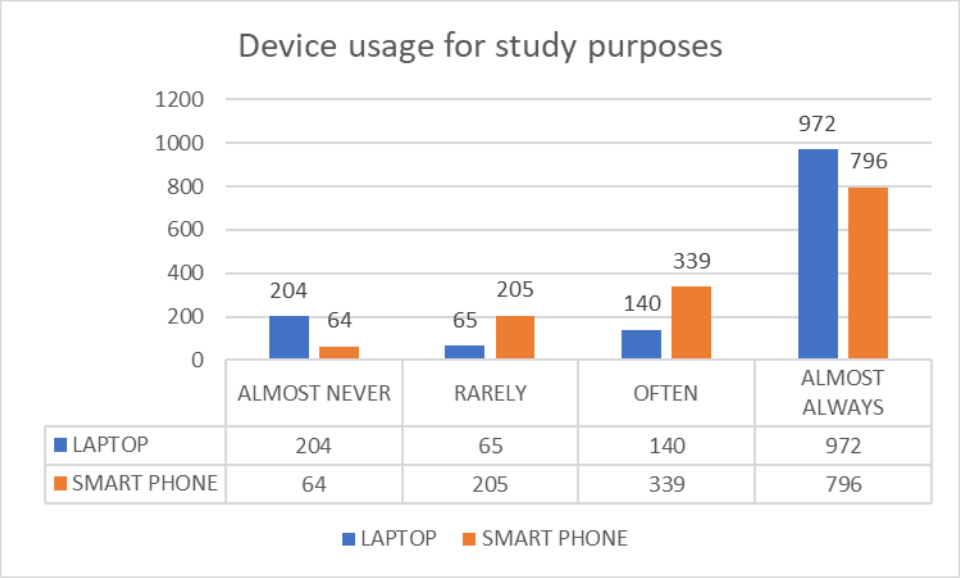


Figure 7-5: Device ownership among participants

The number of responses in all three cases was equal to the number of participants, namely 1 432, which indicates substantial data. In this case, 94.3% (n=1 350) of participants indicated that they did own a smartphone; by contrast, 94.6% (n=1 355) of participants indicated that they did not own a tablet. This result should be an indication that tablets were not prevalent amongst the research cases, but that smartphones were commonly owned. I, therefore, decided that further results pertaining to tablet use would not be of major importance in this study. Concerning laptops, 77.6% (n= 1 111) indicated that they did own a laptop.

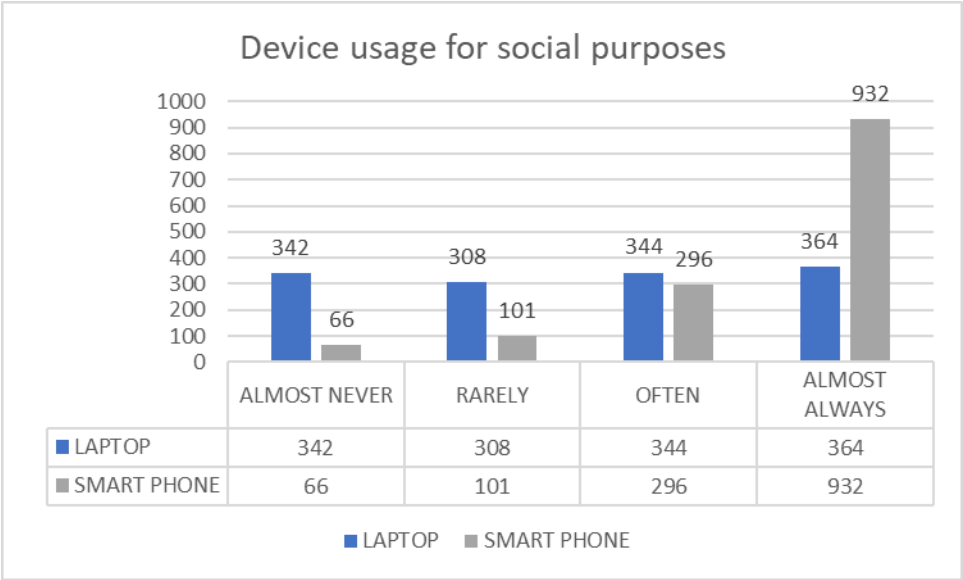
The next four questions of the questionnaire aimed to determine device use within an academic study context. The devices which proved the most utilised were laptops owned by participants, as well as those shared with other family members, as well as smartphones. Within the “mobile” context of this study, the laptop and smartphone statistics were insightful:



Graph 7-1: Laptop and smartphone usage for study or academic purposes

The results revealed that 77.6% (n=1 111) of participants indicated that they owned a laptop, and figure 7-5 indicates that 972 (70.4%) participants used their laptops for study purposes. This translates into most laptop owners using them for study purposes. Regarding smartphone use in academic contexts, only 56.7% (n=796) of participants indicated that they “almost always” used their devices for studying. This was not expected, as 94.3% (n=1350) of participants owned a smartphone, so it could not be a device-access problem. However, if the total number of participants – as indicated in the last two columns (“often” & “almost always”) – of each device is calculated, the academic use of both types of devices is almost equal, with the smartphone slightly ahead – 1 112 participants indicated using their laptops and 1 135 using their mobile phones.

The next questions aimed to collect the same kind of device-usage data, only this time it was linked to the social use of devices instead of academic use. The results are shown in graph 7-2:



Graph 7-2: Laptop and smartphone use for social purposes

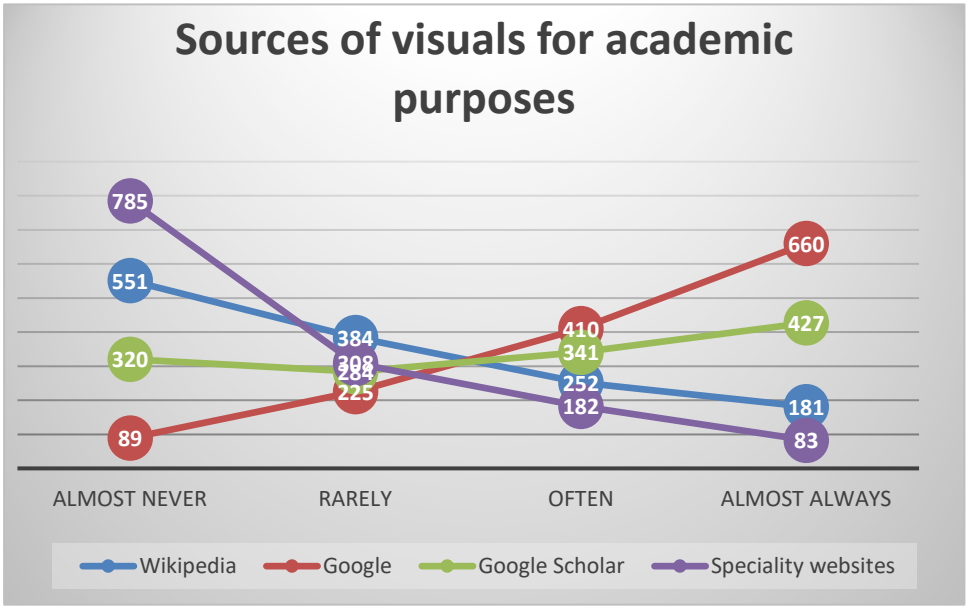
This comparison between academic and social use of mobile devices revealed interesting new information: Initially, mobile phones were mainly used for social interaction purposes, with earlier research suggested that personal devices were not suitable for academic purposes (Traxler, 2010). However, this has changed with the rapid development of innovative technology (Dias & Victor, 2017). Mobile learning acceptance, also defined as the attitude towards using technology for learning, has also shown growth over the past decade (Mittal et al., 2017; Thomas et al., 2014). The potential of effective teaching and learning using mobile technologies is acknowledged more and more (Abidin & Tho, 2018; Lepp et al., 2015; Sanga et al., 2016). In addition, COVID-19 and the adaptions HE institutions as well as students had to make for online teaching have changed the landscape of mobile technology in education forever (Oguntuase & Bakare, 2022; Zaidi et al., 2021).

The substantial popularity of mobile phones for social and communication activities compared to laptops was expected. As indicated by Schrock (2015), mobile media offers communicative affordances, such as portability, availability, multimedia and locatability. In addition, the “constantly on” connection offered by mobile media was already recognised as a shift from other media at the beginning of the millennium (Katz & Aakhus, 2001). These functions cannot be provided so effortlessly by laptops.

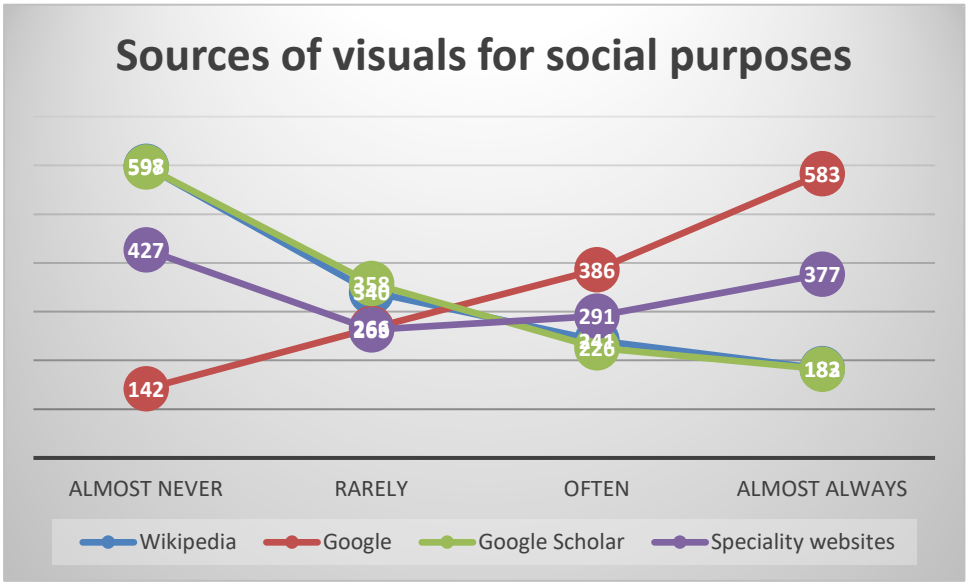
I anticipated that I would probe further device ownership and usage in the planned phase 3 of this study, involving semi-structured interviews. The next section deals with the first VLC, namely accessing visual material.

7.5.3 Section 3: VLC 1 - ACCESSING visual material

Information relevant to accessing visuals first focused on the source of visuals in respect of what platforms participants used to find visuals. Graph 7-3 shows the data with regard to the platforms participants used to find visuals for academic purposes, and graph 7-4 shows the same data, but for social and private use:



Graph 7-3: Visual sources for academic use



Graph 7-4: Visual sources for social use

The evidence from the data revealed Google as the most frequently used source to find visuals for both academic and social purposes. Both graphs show a constant upward curve from “almost never”, with the lowest number, to “almost always”, with the highest number of responses. The

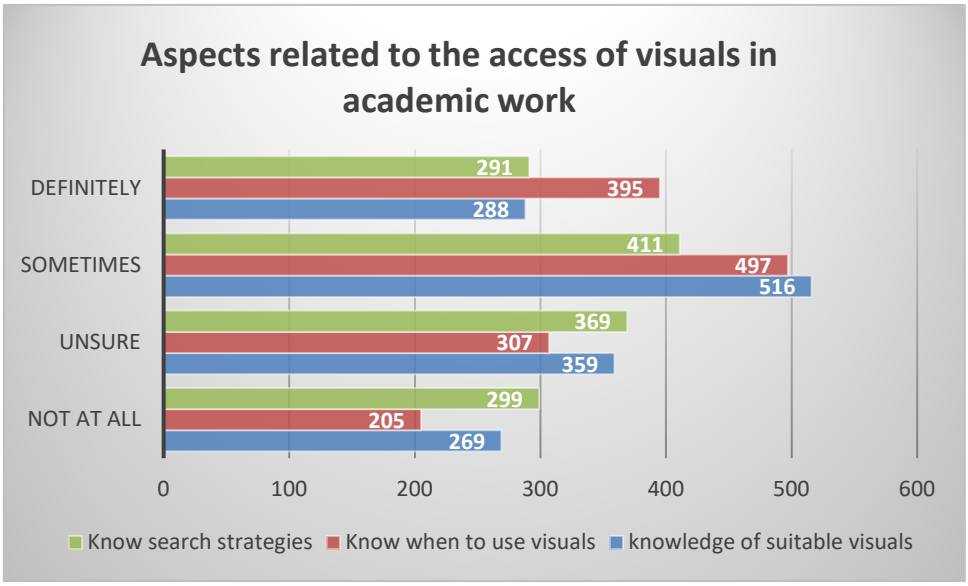
use of Google to find visuals was not unexpected. As indicated by Davies (2021), users need not to be introduced to this engine, as it has over 86% of the search market share. The phrase “Google it” has become a well-known reply when information on anything is needed and has been added to the “Urban dictionary” (Urban Dictionary, n.d.). Studies reveal the following behaviour by students: they initiate their image searches through Google Image or Web, and they conduct brief enquiries and seldom check the sites from which the images originate (Bridges & Edmunson-Morton, 2011; Yoon, 2011; Choi, 2010).

In the case of both academic and social visual searches, Wikipedia follows the same tendency, with the evidence showing a constant downward direction with a small number of participants at “almost always”, indicating that it was not a popular source for visuals. The data on the use of Google Scholar to find visuals rendered opposite evidence for academic and social use: while the use of Google Scholar to find visuals for academic purposes showed a steady increase towards “almost always”, the use to find visuals for social use was a steady downward curve which ended at only 13.4% (n=182) of participants who indicatied regular use. In the case of “speciality” websites (e.g., Flickr, Instagram, Pixsy) the results for the two contexts were different: These sites were almost never used for academic purposes by a large component of the participants, where as the use for social purposes is more evenly divided, indicating that it is rather used as source for visuals in the social domain.

This is not surprising, as Google Scholar is regarded as the “academic” version of Google, offering many affordances, like free access to scholarly literature in all forms and a broad area of research topics (Zientek et al., 2018). Campuzano et al. *(*2017) consider it as a way of promoting research through social media, while Harzing (2017) states that Google Scholar could be considered an alternative to Web of Science.

The evidence on the “speciality” websites shows that only 6.1% (n=83) of participants used them to access visuals for academic purposes, whereas four times more participants, namely 27.8% (377), indicated that they almost always used them to find visuals for social purposes.

The remaining questions pertaining to access of visual material gathered evidence on the knowledge of participants on what is considered appropriate visuals for academic assignments and when visuals should be used in assignments. The final data for this section is concerned with the awareness of search strategies when looking for visuals to use. Graph 7-5 provides a condensed view of the above data:



Graph 7-5: Aspects relevant to the accessing visuals

A substantial percentage, namely 73.2% (n=1 027), of participants indicated that they had been required to use visual material in academic assignments. In a study by Choi (2010), 60% of the participants stated that they had conducted image searches for academic tasks. Within the context of the current study, insofar as knowing what kind of visuals are suitable for academic assignments, only 20.1% (n=288) of participants indicated that they definitely knew and only 28.1% (n=395) indicated that they knew when visual material could enhance their academic work. This points to needed access competencies that participants did not have. In addition, the data shows that only 21.2% (n=291) of participants regarded themselves familiar with search strategies to find suitable visual material for academic assignments. An interesting observation is that, regarding search strategies and suitable visuals, the number of responses was almost the same for the “definitely” and “not at all” options.

7.5.4 Section 4: VLC 2 - PROCESSING of visuals

In the context of the questionnaire, processing of visuals refers to the ability to interpret, analyse, evaluate and edit visuals. The evidence on these different abilities, as produced by the data, is discussed in the next sub-sections.

7.5.4.1 Interpreting and analysing visuals

A selection of four types of visuals in the form of icons, signs and photos within the academic, every day, social and historic context was given to participants to recognise. The rationale behind this difficult task of deciding on visuals from the millions available was driven by the aim to use images from the environment participants interacted in:

- the everyday images were found on campus;
- the academic images were from university information websites;
- an attempt was made to select universal icons with regard to emotions students were bound to experience.
- the choice of pictures was based on recognition and reality.

In most cases, five possible answers were given to choose from. One of these options was “I do not know”. In a few cases, a “yes” or “no” answer was appropriate. The tables below provide an overview of the evidence gathered from the data:

Table 7-6: “Academic” symbols

	ACADEMIC' symbols			
				
	percentage of responses			
	**29.8**	**92.1**	**46.3**	**97.9**
	31.2	6.5	**23.6**	0
	39	1.4	**30.1**	2.1

The copyright image was deemed important within the context of the study, as knowledge on ethical use of images is important. Section 7.5.6 provides more evidence on this. However, the percentages that emerged from this question seem to indicate that the majority of participants may have been underinformed about copyright and other ethical issues relevant to the use of images. They performed much better when identifying the “download” and “graduation” icons, with respectively 92% (n=1 295) and 82.5% (n= 1 159) of students being correct.

Table 7-7: Visuals from the everyday environment of participants

	EVERYDAY ENVIRONMENT				
					
	percentage of repsonses				
	68.1	55.2	64.8	90.8	**37.8**
	13.2	30.4	19.3	6.1	**31**
	**18.7**	14.4	15.9	3.1	**31.2**

Except for the "radiation" icon, the evidence derived from the data indicates that a high percentage of participants could recognise and identify visuals they encountered regularly. A possible explanation for this could be that the visuals spoke more to their everyday environment than the "academic" icons as well as the fact that they had only been actively exposed to the academic visuals since they started their tertiary education.

Table 7-8: Universal icons and pictures

	UNIVERSAL			PICTURES		
				VAN GOGH	WW2	PROTEST
	percentage of responses					
	95	**83.2**	**27.8**	36.1	17.8	**88.9**
	5	16.8	46.2		23.3	7.2
			26	**63.9**	**58.9**	3.9

The evidence provided by the data concerning universal symbols related to emotion indicates that, like in the case of the everyday images in table 7-5, the majority of participants were knowledgeable in as far as the meanings were concerned.

The item on the colour associated with jealousy (the green circle) deserves some attention. The circle below indicates the responses received:

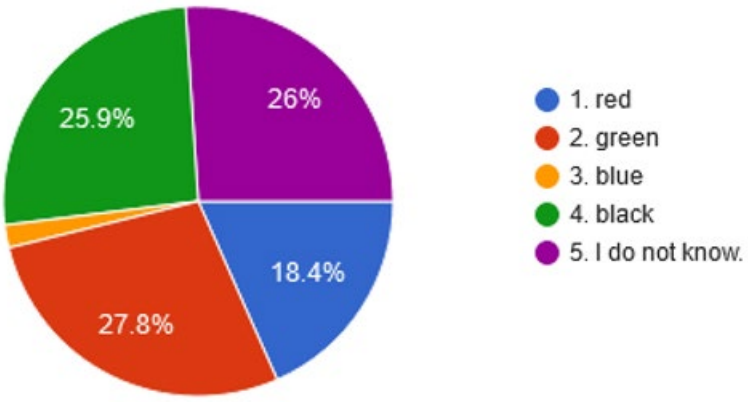


Figure 7-6: Responses on colour used to portray emotions

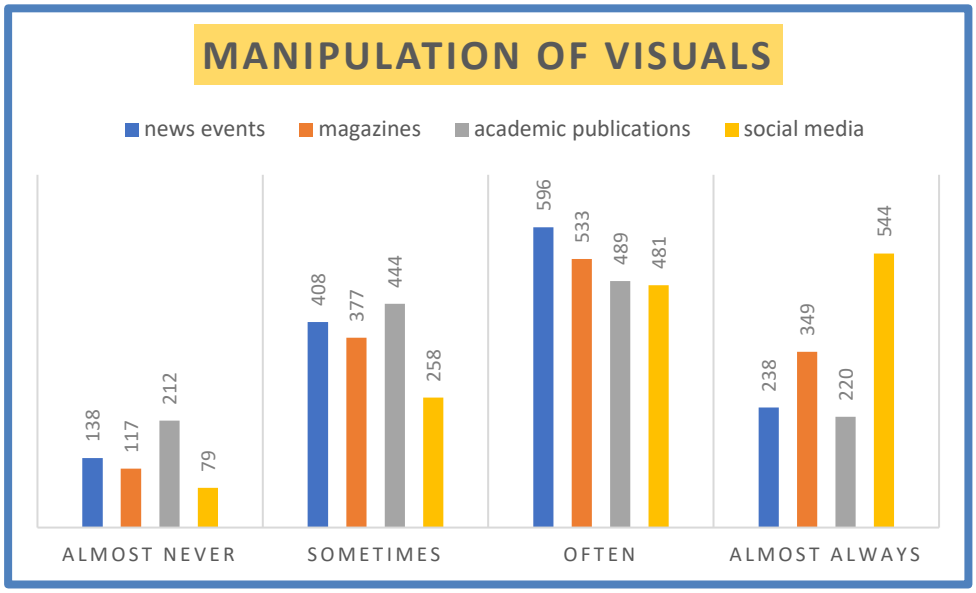
Participants' answers portrayed a relatively equal division between all the possible colours and "do not know", except for the colour blue, indicated by only 1.9% (n=27) of participants. The use and meaning of colour are relevant to the multicultural context of the study, as colour plays a vital role in everyday interactions with visuals as well as in specialised fields like art and design. Kress and Van Leeuwen (2002) refer to colour as a semiotic mode upon itself, whereas Van Leeuwen (2011) argues that social and cultural contexts play a vital role in the meaning-making of colours, arguments backed by social semiotics.

With regard to the photos, the evidence is clear that the exposure to, time frame as well as the topic matter of the image influenced the ability to recognise and place it correctly: the context of the protest photo was correctly identified by 88.9% (n=1 248) of participants. In contrast, only 17.8% (n=247) of participants could contextualise the WW2 photo, and only 36.1% (n=508) of participants could recognise one of the most famous paintings, "Starry Night", by Vincent van Gogh, even though it has been used in advertisements, in prints on everyday goods and featured in a famous song. This speaks to the needed approach towards VL as a life skill, reaching far beyond academic borders and enabling critical thinking as well as value judgements and effective use of visual representations (Felten, 2008; Kedra, 2018).

7.5.4.2 Evaluating visuals

The aim of these items in the questionnaire was to gain insight into the perceived ability of participants to evaluate sources of visuals with regard to the manipulation of visual material. The sources were once again chosen with the reality of participants in mind – newspapers, magazines,

academic publications, and social media platforms. The evidence from the data is depicted in graph 7-6:



Graph 7-6: Perceived manipulation of visuals in different sources

The evidence from the data shows the same trend in three of the four cases, namely a rising curve from “almost never” to “often”, and then a decline towards “almost always”. The sources represented in this trend are newspapers, magazines and academic publications. This is an unexpected result for academic publications – it was presumed that participants would have more confidence in the integrity of these publications, unless, of course, they assumed that manipulating need not be regarded as a problem. The evidence for social media was, as expected, an upline curve all the way, with 75.2% (n=1 025) of participants indicating manipulation of visuals happening “often” or “almost always”. Only 5.8% (n=79) of participants indicated that they believed this happens almost never.

Manipulation of images is relevant to this study, which aimed to enhance the VL of students, as it is something students are confronted with in all spheres of life. In addition, in today’s digital world, the technical tools to manipulate images are, as Lazard et al. (2020, p. 17) so fittingly phrase it, “… in the hands of millions of smart-phone and social media users”. The same authors maintain that “[d]igital manipulation [of photos] in advertising is ubiquitous in today’s media environment” (Lazard et al., 2020, p. 15), whereas Schwartz (2018) asserts that these manipulation techniques have also infiltrated videos. Brumberger (2011) makes two important observations in this regard, namely that today’s young people are no better than previous generations when it comes to interpreting and processing images and have a low level of awareness and capability to detect manipulation and alterations. This despite their assumed ability to deal with digital media. An interesting finding in a study by Choi (2010) was that

participants identified reliability as a critical factor when they had to decide on the usefulness of an image for academic use. This is thus a reality that needs to be addressed regarding the processing of visuals.

7.5.4.3 Editing and modifying visual material

The final competency included in the processing of visuals is the ability to edit or modify visual material. The evidence is attended to in figure 7.7:

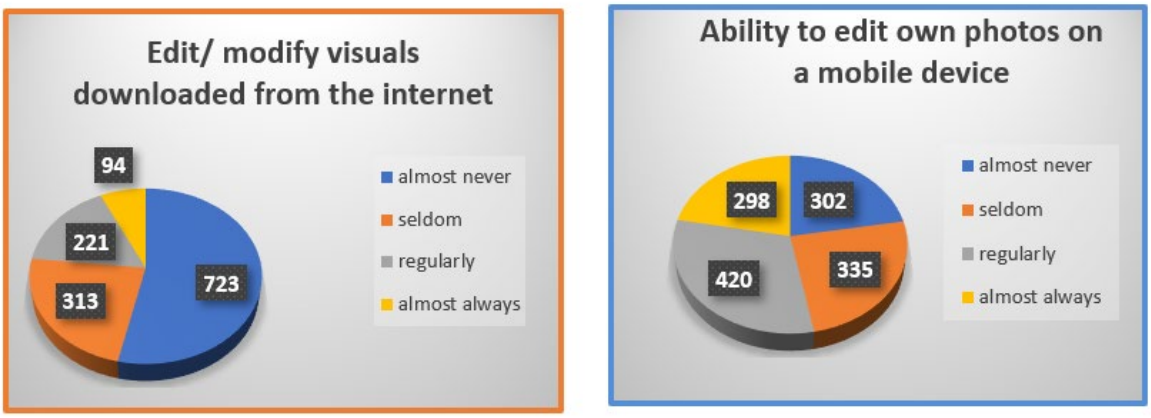


Figure 7-7: Ability to edit different types of visuals

The ability to edit own photos on a mobile phone differed significantly compared to editing visuals from the Internet. This could have been predicted, as in addition to the variety of apps that can be downloaded, the majority of smartphones have built-in software to edit photos and images . The perceived inability of students to perform basic editing (e.g., cropping images) may influence the use of visual material in academic assignments and was also be re-addressed during phase three of the study, where the opportunity for more in-depth answers was possible. In addition, the legality of modifying visuals would also need to be attended to.

7.5.5 Section 5: VLC 3 PRODUCING of visuals

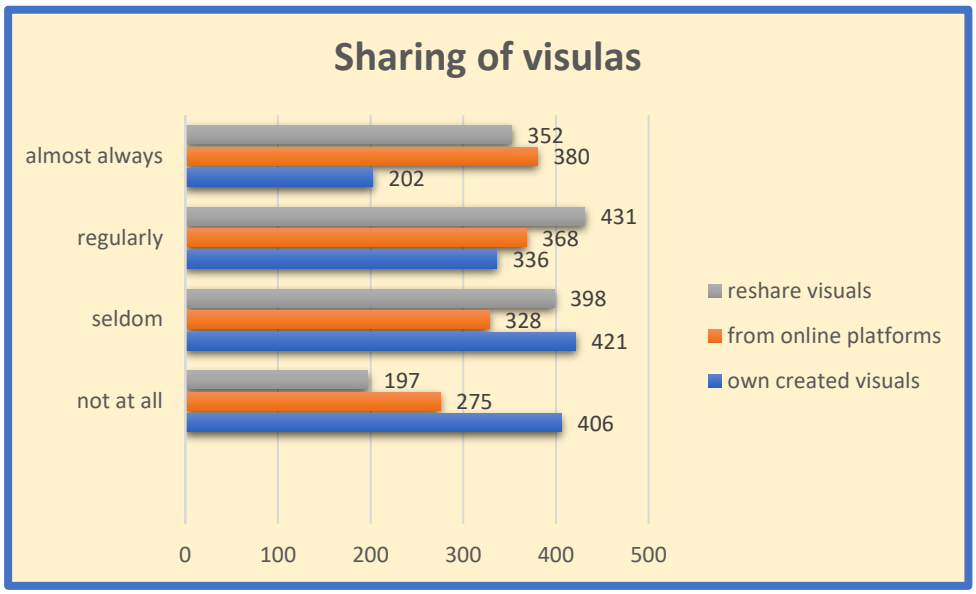
The items addressing the abilities of the participants to produce visuals were, first, the use and sharing of images and, second, the ability to create their own images. Third, the visuals competencies relevant to different applications were evaluated. A final item on the mode of communication was included. This was added to collect information to address the multimodal approach as referred to in sub-questions 3 and 4 (cf. graph 7-9).

7.5.5.1 Use and sharing of visuals

The data revealed that a substantial number of participants (n=884), or 65%, were confident that they could insert visual material from an outside source into an academic assignment. This was

also focused on in more detail during phase 3, when the participants could describe the process so I could evaluate whether they really knew what to do in practice.

The evidence on sharing of visuals, as shown in graph 7.7, was obtained from data relevant to the use of social platforms. Social media and platform usages were brought into the questionnaire were deemed relevant, as I considered it important to also have insight into the use of visuals in a context where students were constantly engaged.

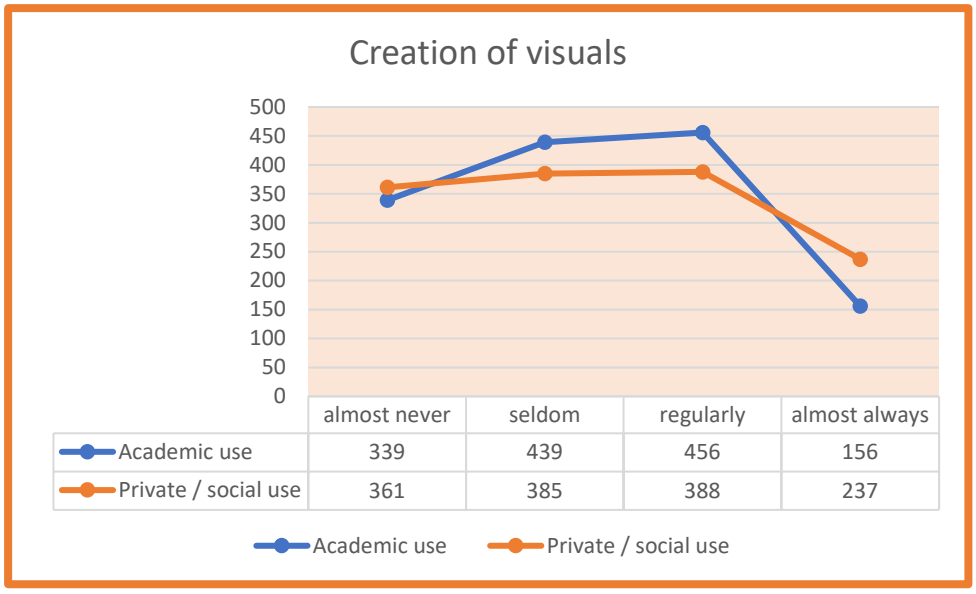


Graph 7-7: Frequency of sharing visuals socially

Sharing images originating from other platforms seemed popular with more than half of all participants, indicating involvement in these activities: 55.3% (n=748). No trends on the resharing of received visuals can be determined, as the evidence is distributed among all four indicators. The evidence indicates that only 14.8% (n=202) shared visuals created by themselves. The issue of creating images is dealt with next.

7.5.5.2 Creating own visual material

The evidence from the data gathered on the creation of visuals are portrayed in graph 7-8:



Graph 7-8: Creation of visuals for academic and social use

The trend for both academic and social use was the same – in both cases, there was a steep decline towards "almost always" creating own images. This comes as a surprise, as it was expected that creating one's own visuals would be substantially more popular for use on social media. In reality, there was only a 6.1% difference. This may point to a lack of skills relevant to producing visual material.

7.5.5.3 Visual competencies related to visually orientated applications

Within the academic context, the practical skills related to applications used for academic assignments or presentation, such as the variety of Microsoft applications (e.g., MS Word, MS Excel and MS PowerPoint) as well as the creation of videos and infographics, can contribute towards the standard of assignments and academic success. The evidence derived from the data revealed the following:

Only 22.7% (n=308) participants indicated that they needed almost no assistance to design slides for an MS PowerPoint presentation, with another 31% (420) indicating that they needed moderate assistance. As far as the skills to embed visual material into a presentation, the majority, namely 54.8% (n=739), participants indicated that they needed a lot of assistance to master this task, with only 17.9% (n=227) indicating they could do this without support.

The evidence pertaining to spreadsheets, graphs and tables indicates that a lack of skills existed: 57.8% (n=779) of the participants indicated that they needed a lot of assistance to complete such tasks. Only 16.8% (n=227) participants indicated that they could create such visuals independently.

The evidence on the ability to create mobile videos for academic purposes came as no surprise, with 57.2% (n=717) of participants indicating that they could complete such a task without assistance. This, again, points to familiarity with the mobile phone due to their constant interaction with it.

Infographics: The evidence, revealed by the pie graph below, clearly indicates that the majority of students were not equipped with the necessary skills to use an infographic, as the red and blue sections represent 875 participants (64.7%). Only 8.6% (n=116) indicated that they had used an infographic previously.

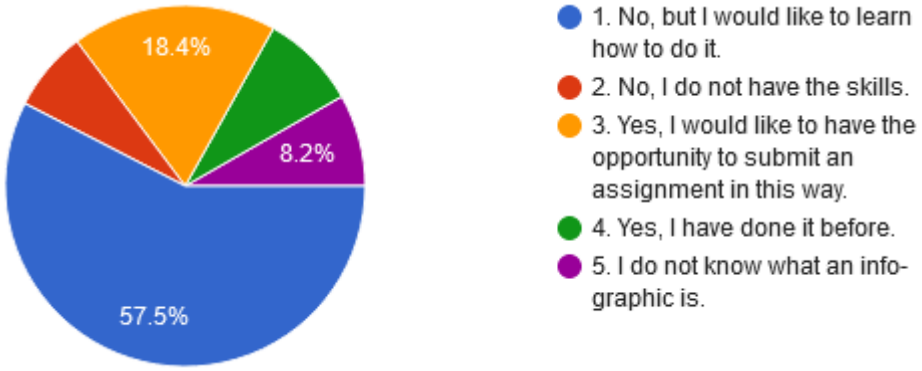
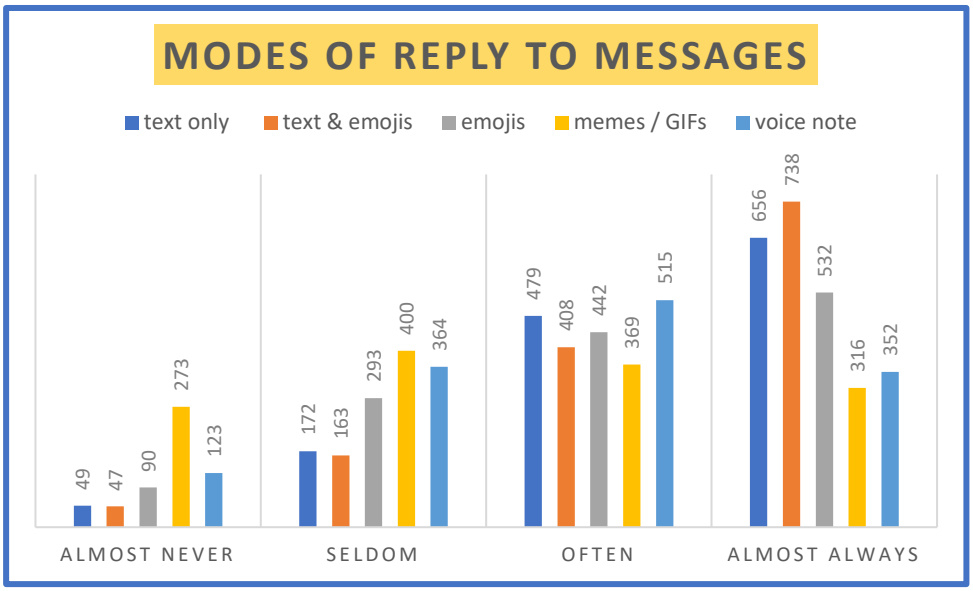


Figure 7-8: Infographic competencies

Visuals form a huge component of infographics and are, therefore, relevant to this study on VL. In this regard, a review of published work on infographics revealed that giving HE students the opportunity to create infographics, improved digital, visual and information literacy capabilities, supported creativity, communication and collaboration and developed critical thinking. In addition, students could develop skills relevant to future careers (Jaleniauskiene & Kasperiuniene, 2022).

7.5.5.4 Visuals and modes of communication

This final section on the producing of visuals focuses on the modes and visuals used in everyday communication (see graph 7.9):



Graph 7-9: Type of multimodal replies to mobile messages

The evidence from the data reveals that text messages with emoji or text message only were the most popular ways to communicate. The sole use of text was unexpected. Emojis only were also quite prevalent, but the use of memes and GIFs were the least frequent. Possible reasons for this may be data costs when accessing and downloading these moving images. As far as voice notes are concerned, it remains popular, as it can be done while walking, as one does not need to type or press buttons.

7.5.6 Section 7: VLCS 7: Ethical use of images

The ease with which information can be accessed and downloaded through information technologies creates opportunities for students to plagiarise and not acknowledge the source of their information, leading to behaviour without academic integrity (Honing & Bedi, 2012; Owens & White, 2013). Students are expected to attribute and cite visuals they used in their academic work if they did not create it themselves (Foxe, 2022). However, do they do so? This section of the questionnaire intended to provide data on this.

7.5.6.1 Copyright

The items in this regard collected data on if the participants knew when an image was copyright protected as well as if they knew where to find visual material that was not copyright protected. Figure 7-9 shows the evidence:

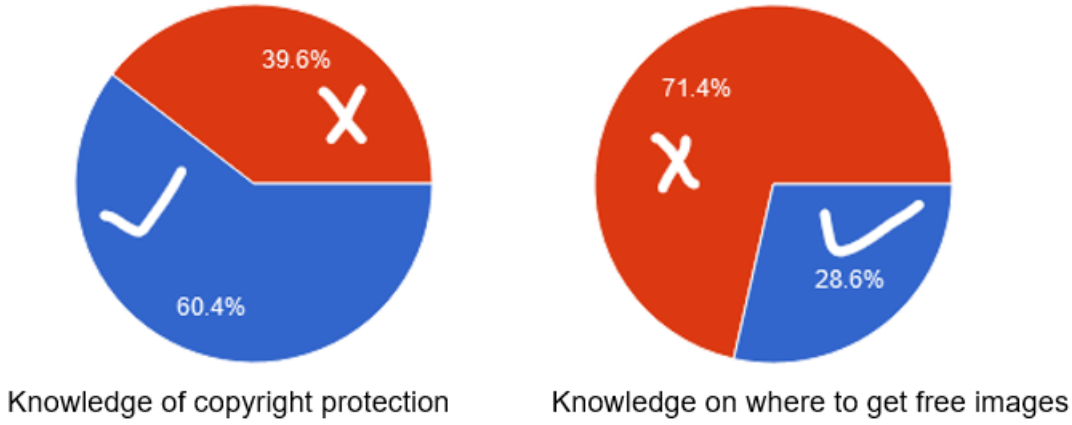


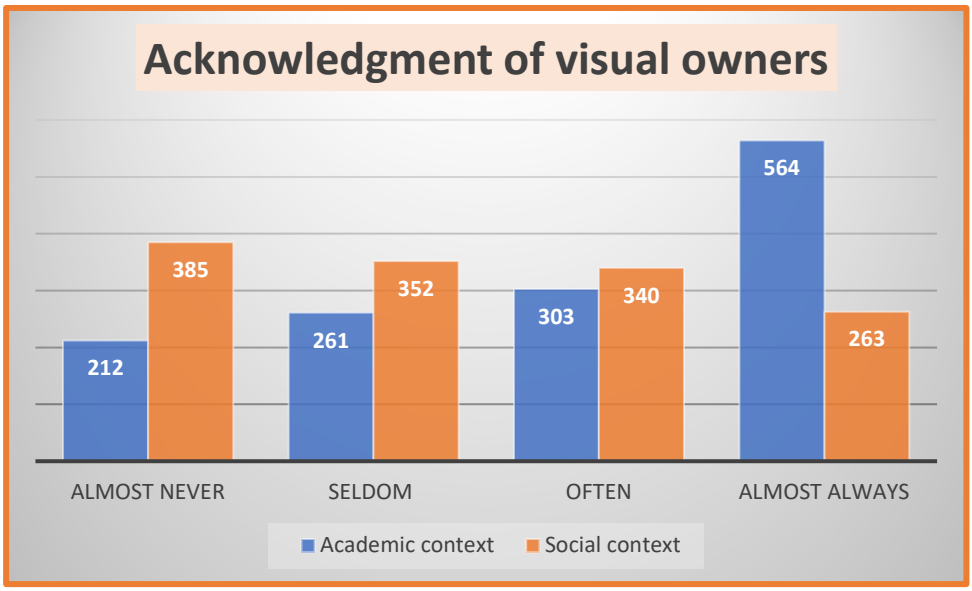
Figure 7-9: Copyright issues

A substantial percentage, namely 60.4% (n=846), of participants indicated that they knew when a visual was copyright protected. In contrast, only 71.4% (n=1001) indicated that they knew where to find non-copyright-protected visuals. The fact that they were largely aware of copyright on visuals is a good sign; however, it was also important to determine whether they would actually acknowledge the source of the owner of visuals. That was the focus of the next questions.

7.5.6.2 Acknowledging "owners / creators" of visual material

The data collected on the knowledge of participants on how to reference visual sources, revealed no huge difference in competency: 52.8% (n=719) of participants reacted positively, whereas 47.2% (n=643) indicated that they did not know how to reference visuals. A note was once again made that this was an aspect that could be addressed in a next phase of the study to gain more insight on their practical application of their perceived knowledge.

The data on acknowledging sources was separated according to academic and social use of images, as it was expected that there would be a difference in behaviour. Graph 7-10 shows the results:



Graph 7-10: Acknowledgement of visual sources

The tendency to reference visual sources shows a constant upward curve in academic context, reaching a high in the “almost always” category, with 42.1% (n=564) of participants indicating that they almost always referenced visuals in academic contexts. The inclination is exactly the opposite for the referencing of visuals in a social context, with 55% (n=736) participants indicating that they seldom or never referenced visuals used in social contexts. This is not surprising, as the guidelines and control when using visuals in social contexts were not often addressed or known to the average consumer. As indicated above, looking at examples from academic work would indicate whether acknowledgement is actually done.

The final items of the questionnaire were on VL as concept.

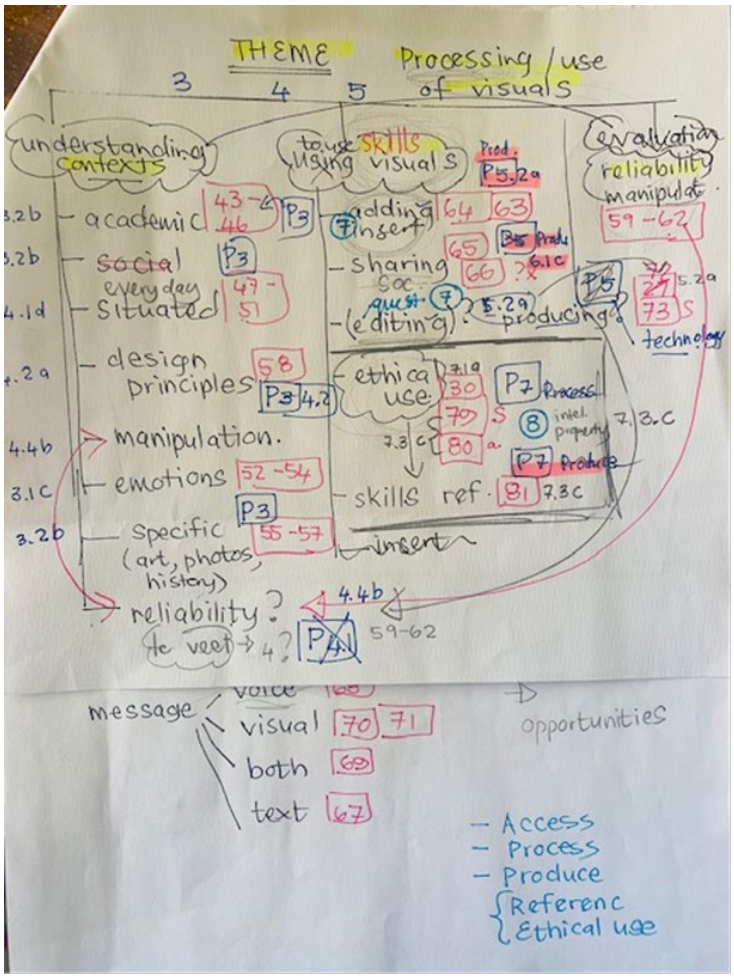
7.5.7 Section 7: Visual literacy as concept

The first item gathered evidence on the term itself: 81.3% (n=1 141) of participants indicated that they were familiar with the term. The item on whether they regarded themselves as visually literate was deemed as interesting, as it provided evidence of their perceptions, which was later evaluated during a semi-structured interview. The evidence leaned towards a positive outcome, with 26.8% (n=373) of participants indicating that they were “definitely” visually literate, and an additional 43.5% (n=606) indicating that they were visually literate to a great degree.

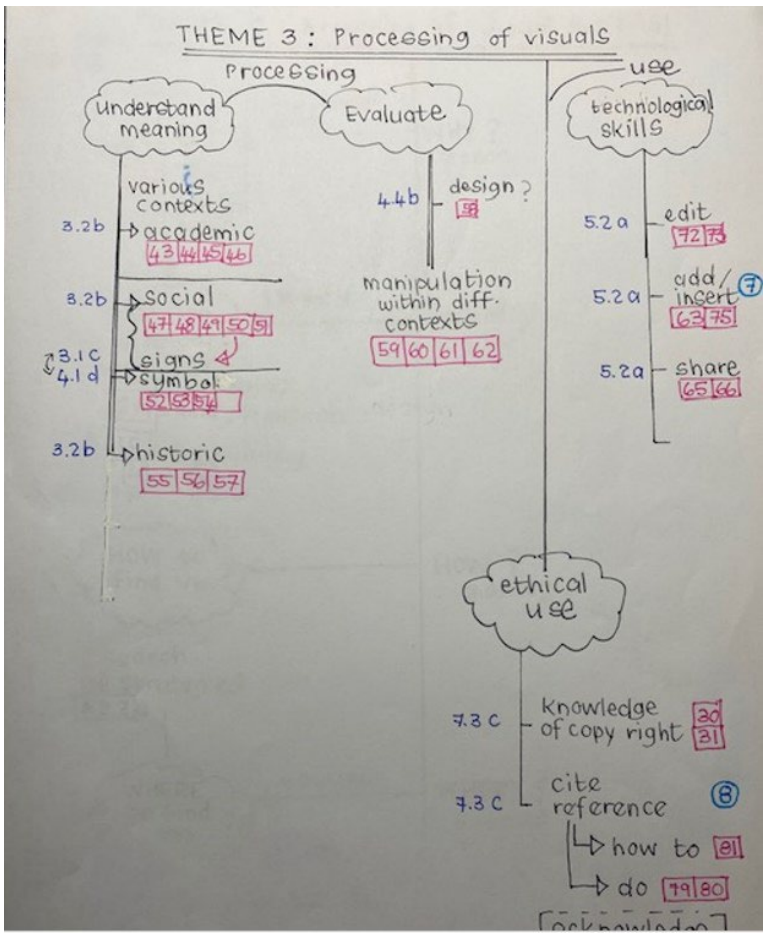
The reaction received to the item determining their interest in the concept of VL was encouraging, with 94% (n=1 302) of participants reacting positively. Of the participants, 856 (59.8%) also indicated that they would be available for further participation in this study.

7.6 THEMATIC CODING OF DATA

Through the analysis as described above, aspects were revealed about which I acquired more information in order to reach the purpose of the study. A next phase, consisting of semi-structured interviews rendered me that opportunity. In preparation for this phase, the evidence gathered through the first cycle of data analysis of phase 2 was revisited and a second cycle, this time through a qualitative (in this case, narrative) analysis (Saldaña, 2011), made use of coding to identify themes. This was an inductive process, as these codes were identified from the analysed data and not compelled by the literature. This process was, amongst others, done through hand-written analysis to assist me in determining the relationship between the gathered data. Screenshot 7.1 shows the initial process, and screenshot 7.2 a more final example of the process:



Screenshot 7-1: Example of initial mind map analysis of data



Screenshot 7-2: Example of mind map of ordered and categorised data

The ATLAS.ti™ version 22 application was also used after some time had elapsed to serve as a control of the first categorising of the data. The following themes emerged:

Table 7-9: Themes emerging from phase 2 (Questionnaire)

	THEMES
1	Profile of participants
2	Device user patterns in relation to visual material
3	Accessing visuals – opportunities and challenges
4	Interpretation of visuals
5	Own visual material – usage patterns and abilities.
6	Ethical awareness and practice relating to visuals

The first theme emerged through information on not only age and gender but also relevant data on language proficiency and the environmental context of participants. Theme 2 emerged from the comparative data on social and academic use of mobile devices. Theme 3 was identified through the information gathered on visual sources as well as the need for visuals within an academic context and the challenges experienced by participants. Theme 4 emerged through the responses on a series of visuals participants had to interpret and process with the aim of identifying skills and abilities in various contexts. Theme 5 emerged through the feedback given by participants on their patterns of sharing visuals to communicate as well as utilising visually orientated applications in academic assignments. Theme 7 transpired through the feedback received on copyright and acknowledging of visual material. The final theme emerged through the information on the perceived knowledge of the concept of VL.

7.7 CLAIMS AND FINDINGS

The first aim of this chapter, as explained in the introduction (see § 7.1), was to determine the user and ownership patterns of the cases regarding mobile devices. This was done against the background of the contextual factors of language and background. Most participants were not mother-tongue English speakers; however, it was the language of instruction at the HE institution at the time of the study. As is clear from the literature (see § 1.2.2 & 2.3.1.3), this might prove to be a barrier to literacy skills, which is also relevant to VL (cf. Baker et al., 2019; Chetty & Pather, 2015; Smit, 2017). The data also revealed that the participants came from rural backgrounds, which, as indicated in chapter 2 (see § 2.3.1), may lead to literacy challenges. In addition, this could influence the context of their exposure to visual elements, as is relevant to research sub-question (SRQ) 1 on the VL students bring with them. A large body of research exists on the positive influence of the use of visual aids in education (Ferreira, 2011; Gallagher, 2015; Moore, 2015). However, the role of these types of visual elements within the rural context will have to be determined.

The relevance of mobile devices was motivated by secondary research question 3, which suggests the use of mobile devices in activities to develop the VL of students. Earlier in this thesis (cf. chapter 4), the affordances, challenges and potential of mobile technologies in learning as confirmed by the literature was discussed. In addition, recent literature points to increased reliance on the Internet and smart devices as one of the effects of COVID-19 (Saadeh et al., 2021).

The second aim was to form a better understanding of the knowledge, awareness and abilities of the participants regarding the different VL competencies, as identified in phase 1 during the document analysis and conceptualised in the VL framework within the academic literacy context of this study (cf. § 6.5). The third, fourth and fifth themes that emerged from the data analysis relate to this aim. The question concerned with the VL competencies students bring with them when entering HE (as addressed in SRQ 2) revealed that some level of skills did exist in the different competencies as identified during phase 1. The claims on accessing visuals were inconclusive in terms of student awareness on the need for visuals as well as search strategies. This was also the case for the processing and level of understanding of visuals from different contexts. As regards producing of visuals, the findings revealed that the producing of own visuals was the competency participants were the least sure about.

The findings revealed that participants in this study seemed to regard the academic use of visuals as just an extension of the familiar social use of visuals they engage in every day. The reality that students are exposed to visuals through technology is clear from the literature: Already in 2012, an article by NASBE (2012) referred to the fact that the students of today cannot be separated from technology. Exposure to visuals through technology has increased due to the blending of digital technologies with visual tools, resulting in the so-called *visual shift*, where text is replaced with visuals and media utilises showing rather than telling (Walter, 2012). Delello and McWhorter (2014) confirm the merging of social and visual media, resulting in the Visual Web. As far as visuals and education are concerned, the Visual Teaching Alliance refers to the results of educational research which estimates that 65% of students are visual learners (Gangwer, 2012). Within a South African context, Nel and Nel (2013) contend that the largest group of learners in a classroom is generally visual learners. The relevance of visuals within both a social and an academic context is thus clear. Another surprising claim is related to the creation of own visuals, as participants revealed that the trend is almost the same for academic and social use.

Ethical awareness, as revealed in theme 6, is relevant to all three SRQs in this chapter. Claims made include awareness of copyright on visual material and the need to acknowledge the creators in an academic context but not in a social context. The final theme addressed the concept of VL, and findings are relevant to the main research question. A high percentage of participants claimed they were familiar with the term and perceived themselves as visually literate. It was positive to find that so many participants were interested in learning more about VL.

7.8 SUMMARY AND CONCLUSION

This chapter reported on the methodology and results of phase 2 of this study. All the relevant considerations on the data source management strategies for the survey approach, as well as

the sampling decisions, were outlined. This was followed by a clarification of the methodological processes of creating and administering the questionnaire. The data collection and analysis strategies were then accounted for. The evidence was organised through suitable data analysis processes, culminating in thematic coding. Finally, the claims related to the research questions were presented.

The overall conclusion on the VLC of students, as addressed in SRQ 2, was that the claims and findings were varied, presumably due to different pre-tertiary contexts and student diversity, as addressed in terms of literacy in general in chapter 2 (cf. § 2.3.1.2). This served as a reminder that expecting to receive more aligned or uniform findings was just as improbable as designing a one-size-fits-all approach to address all aspects of VL.

SRQ 3 was aimed at addressing the multimodal mobile VL activities that could be used to develop the VL of students, whereas SRQ 5 was aimed at making recommendations about three matters, namely content, multimodal teaching and learning activities and fostering of SDL skills for a VL component in the academic literacy course. The findings of this phase enabled me, as researcher, to reach the following conclusions on the relevant research questions:

- More in-depth information on all three competencies – namely accessing, processing and producing of visuals – would enhance the outcome of the research.
- The use of applications to create visual material for academic assignments must receive additional attention to determine the reasons for lack of use as well as skills in this regard.
- The legal and ethical competencies when using visuals in academic and social contexts need to be addressed in more detail to learn more about the perception and skills participants have, as the findings in this phase were varied.
- The preliminary findings suggest that all VLCS as suggested in the VL framework (cf. figure 5-1) would need to be included in a possible VL component within the existing academic literacies module.
- Mobile ownership and user patterns confirm that the affordances of mobile devices make it a viable option as “vehicle” for self-directed multimodal activities on VL despite the existing challenges (cf. § 4.4).
- Participants were already familiar with and engaged in everyday multimodal activities on their mobile devices, which made it suitable for academic use as well.
- More detail was needed on the what the participants understood under the term and why or why not they regarded themselves as visually literate. This could inform the need for the content of a VL component within the academic literacies course.

- A positive aspect in view of both SRQ 3 and 5 is that students seemed to be motivated to learn more about VL and develop their skills. This could assist the fostering of self-directed learning.

In conclusion, this phase offered valuable insight regarding the relevant research questions. In addition, the findings and claims enabled me to reach certain conclusions. These assisted me in decisions on the content and structure of the next phase of the empirical research. This third phase entailed semi-structured interviews aimed at accessing content-rich information through personal conversations with participants. This process is described in chapter 8.

CHAPTER 8: EMPIRICAL RESEARCH PHASE 3: SEMI-STRUCTURED INTERVIEWS

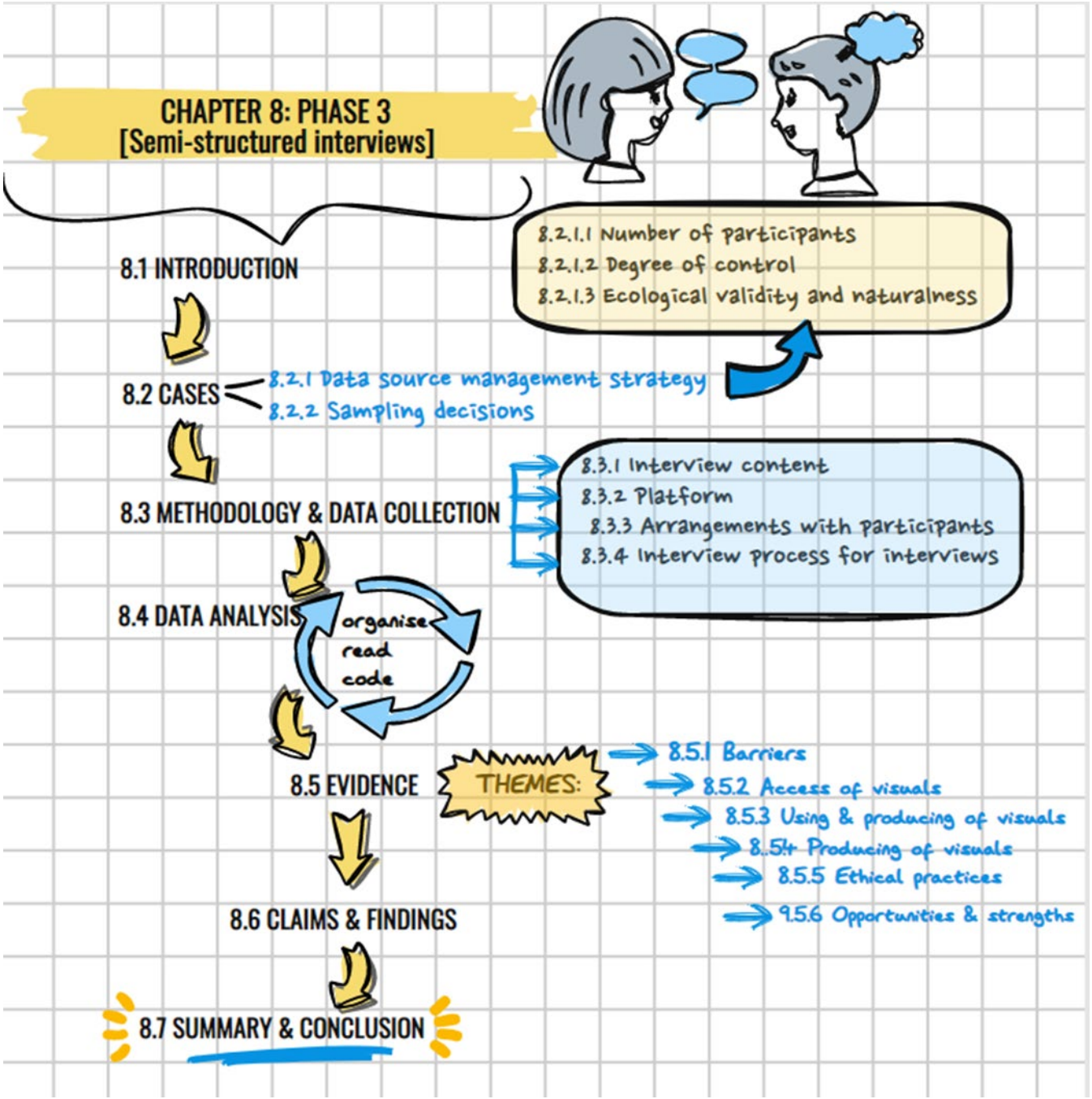


Figure 8-1: Mind map of chapter 8

8.1 INTRODUCTION

Phase 1 of this study comprised of a document analysis which culminated in the design of a framework, outlining the competencies, standards and skills relevant to VL of students at a HE Institution. The components of this framework (see figure 6-2) served as information source for phase 2, in which a survey design was employed. Since the data collected as part of phase 2 consisted only of evidence extracted from closed-type items, a number of issues were identified from which additional information led to a deeper understanding of the research topic. The aim of phase 3 was, therefore, to clarify certain aspects of the evidence that emerged from phase 2 by getting a deeper insight into the responses of participants. Phase 3 of the study was guided by the following secondary research questions:

Table 8-1: Secondary research questions relevant to phase 3 of the study

Research questions:	
Secondary Research Question 1:	What are the visual literacy competency standards (VLCS) students bring with them to the university.
Secondary Research Question 4:	How could the multimodal mobile visual literacy activities contribute towards fostering SDL?
Secondary Research Question 5:	What recommendations could be made with regard to the content, multimodal teaching and learning activities and fostering of SDL skills for a visual literacy component in the academic literacy course?

In line with the previous two phases, Plowright's basic FraIM structure (see figure 1-2) was also used as roadmap for phase 3 of the study to outline the methodology and results of this research activity. First, the data source management strategy and sampling decision are explained. This is followed by an explanation of the method of data collection. The next section explains the data analysis strategies and finally, the evidence that emerged from this phase is provided.

8.2 CASES FOR THIS PHASE OF THE STUDY

The method to generate data and evidence in phase 3 was once again asking questions. To make informed decisions, factors related to data source management and sampling were considered.

8.2.1 Data source management strategy

For phase 3, I collected data from cases who had taken part in phase 2 of the study. The data source management strategy, as suggested by Plowright (2011) and implemented in phases 1 and 2 of this study, was also considered for this stage. First, the number of participants and second, the degree of control I had as well as the degree of naturalness or ecological validity of the data source during the proposed semi-structured interviews were used.

8.2.1.1 Number of participants

The number of participants who completed the questionnaire were 1 432. Of this number, 856 participants indicated that they were interested to learn more about VL. This group was regarded as possible participants in phase 3. However, only 760 provided valid e-mail addresses – participants had either not supplied them, or the addresses were wrong due to typing errors and characters omitted. This translated into 53% of the original participants being regarded as possible cases for the semi-structured interviews conducted in phase 3. After the sampling for this phase was done (§ 8.2.2), 17 participants remained for this phase.

8.2.1.2 Degree of control

The possible participants for this phase of the study also participated in phase 2. I made the decision not to invite specific students for the semi-structured interviews according to their answers in the questionnaire, as this could have led to low ecological validity. This meant a low degree of control, as I could neither control who would respond to the invitation to take part in a semi-structured interview nor the number of participants. I would have had a moderate degree of control in the interview process, as I would have pre-determined the questions according to the evidence from phase 2, but I could not predict whether the open-ended responses could have led to additional conversations or that the order of the questions would remain the same.

8.2.1.3 Ecological validity and naturalness

As was the case with phase 2 of the study, COVID-19 regulations prohibited face-to-face interaction. Therefore, online interviews through the Zoom meeting platform were anticipated. The invitations to participate were facilitated through individual e-mails to the interested cases. It was determined that online interviews in this study would not be detrimental to ecological validity, as several studies found that Web-based data collection methods had substantial advantages, such as cost saving, ease of data transcription, and having access to participants (Campos et al., 2011; James & Busher, 2009). Regarding the participants, Cleary and Walter (2011) found that adolescents were comfortable with text-based online communication, while Mason and Ide (2014)

argued that this specific age group are familiar and comfortable with technologies used for online communication, allowing for the online environment to be considered as natural. Horsfall et al. (2010) indicated that building rapport during an online interview was easier, as possible issues related to power between interviewer and adolescent were mitigated. This could be relevant to first-year students and the lecturer or interviewer. Finally, findings by Shapka et al. (2016) indicate that although online interviews take longer and yield fewer words, the quality of the data is not affected when compared to face-to-face interviews.

8.2.2 Sampling decisions

The first sampling decision that was made with regard to this phase of the study was to offer the participants who participated in the questionnaire in phase 2 the opportunity to indicate their interest in participating in an online interview during a follow-up phase. The second sampling decision was that recruitment would be used. Recruitment involves providing information to the potential participants and generating their interest (Patel et al., 2003). The two main goals of recruitment are aimed at recruiting a) a sample that adequately represents the target population and b) a sufficient number of participants to meet the sample size of the study (Hulley et al., 2001). In the case of this study, potential participants were independently recruited through an option in the questionnaire where they could indicate if they would be interested in participating in further research on the topic of VL.

An e-mail, inviting the 760 interested participants to take part in the next phase, was sent out three times in two weeks. This sampling strategy rendered seventeen (n=17) responses. When using semi-structured interviews to gather data, a balance must be found between the number of semi-structured interviews possible within the time constraints applicable to the study (§ 8.2.2.2) and the point at which data saturation is reached (Malterud et al., 2016). A decision was made to start with the 17 interviews and to monitor if and when data saturation was reached. In the case no data saturation was reached, invitations were again sent out to recruit more participants. The possible participants who had reacted positively to the invitation e-mail received a message through the “message” tool in the LMS to acknowledge that the researcher would contact them with final arrangements. Attention could now be paid to the planning of the data collection.

8.3 METHODOLOGY AND DATA COLLECTION FOR THIS PHASE OF THE STUDY

The methodology used to gather data in phase 3 of this study comprised of asking questions in individual semi-structured interviews. The purpose of the semi-structured interview was to gain a deeper insight into the evidence obtained in phase 2 (the closed-item questionnaire). Four aspects related to the data collection method had to be attended to, namely: first, planning the

interview content; second, deciding on the most suitable online platform; third, communicating the arrangements with the participants; and finally, the interview process.

8.3.1 Interview content

Semi-structured interviews are open-ended and enable participants to explain their views and react to questions in their own way. The interview questions were formulated based on the findings of phase 1 (§ 6.4.2.3) as well as the themes that emerged from the analysis of phase 2, namely the questionnaire (cf. table 7-8). To assist me in the process, I made notes during the data analysis of both phases, documenting specific aspects relevant to the research questions and aim of the study, which needed more in-depth attention. In addition, the conclusions reached after the data analysis and findings of the previous phase supported this process. The interview questions were submitted to the NWU Faculty of Education Research Ethics Committee (EduREC) in September 2021 and were approved. Table 8-2 below provides the interview questions as well as the relation to phases 1 and 2 of the study.

Table 8-2: Interview questions

	Question	Reason	Relevant to
1	What do you think "visual literacy'' means?	*Phase 2, Theme 7: The majority of participants indicated that they were familiar with the concept. *To determine how they explained the concept in their own words.	Conceptual clarification; Visual Literacy definition
2	What role does your cultural background and environment play in your visual literacy?	* Phase 2: Follow-up question Section 1 (item 4-7). *Phase 1 ACRL (2022). (cf. table 7.7) Visually literate citizens	Theme 1 (Profile of participants; barriers) Sec. RQ 1
3	What have you been taught about visual literacy?	This question speaks to Sec. RQ 1 on the VL they bring with them when entering HE. Could also contribute to Sec. RQ 5.	Theme 1 (Profile of participants; barriers) Sec. RQ 2 Sec. RQ 5

4	What type of visuals do you generally use in academic assignments?	*Data from Phase 1 shows mainly graphical visuals receive attention. *To determine what type of visuals students had to engage with in practice. *Follow-up question to Phase 2	Theme 2 (accessing of visuals) Sec. RQ 1 – competencies they bring with them Sec. RQ 2 – needed competencies
5	Where do you obtain suitable visual material?	To determine the correlation between this answer and their response in phase 2, section 3 (items 34-41)	Theme 2 (accessing of visuals) VLC 1 – ACCESS of images Sec. RQ 2
6	Which criteria do you use when looking for visual material for academic purposes?	*To gain more insight into how participants evaluated images after the responses in phase 2, section 3 (items 27-29)	Theme 3 (interpretation of visuals) VLC 1 – ACCESS of images
7	What processes do you follow to add visuals to your academic work?	*To gather more detail on the practical competencies of participants when adding visuals. Related to phase 2, section 5 (items 74–78)	Theme 4 (use of visuals) VLC 3 – PRODUCING of visuals
8	Reflect on your ability to use visual material.	*To determine perceived ability related to response in phase 2, section 7 (items 82–83)	Theme 7 (Opportunities for development) VLC 1-3
9	Do you acknowledge the source of visuals you include in your academic work? Why / Why not?	*To determine the correlation between this answer and their response in phase 2, section 6 (items 30 31; 79–80).	Theme 5 (ethical awareness) VLC 1 & 3

10	What aspects of visual literacy would you want to learn more about?	Gather data with regard to Sec. RQ 3 & 5.	Theme 6 (Opportunities) Sec. RQ 3 & 5
11	What motivates you to develop your visual literacy?	*To determine needs and attitudes of participants. *To explore self-directedness	Theme 6 (Opportunities) Sec. RQ 1,4 & 5
12	Who (if anybody) assists you in gaining skills in visual literacy?	To determine support offered and SDL abilities.	Theme 1/7 (Opportunities) Sec. RQ 1,4 & 5
13	Do you think you are able to take charge of your own learning about visual literacy? Explain your answer.	To address multimodal mobile self-directed activities.	Theme 6 (Strengths) Sec. RQ 4
14	What role does your mobile phone play in your studies?	To gather more detail on the device user patterns as addressed in phase 2, section 2 (items 8–24).	Theme 6 (device user patterns; strengths) Sec. RQ 3–5

The next consideration in terms of the data collection was the platform to be used.

8.3.2 Platform for interviews

Several platforms for online meetings or discussions gained popularity during COVID-19 for a variety of reasons. I decided on Zoom® for the semi-structured online interviews. My motivation for this decision was as follows:

- Students had already downloaded the application and were familiar with the platform as it was used for online classes as well.
- It is uncomplicated to join the event, as one just has to click on the link provided in the invitation e-mail.
- I had access to a licensed copy, which means there was no time-limit on the period of usage, whereas unlicensed apps often disconnect after 30 minutes.

- The platform had a ‘screen share’ function, which enabled me to show the participants whatever I deemed necessary at any time within the interview.
- The platform had a recording function that could be activated. Students gave their permission to be recorded for transcription purposes.
- The app is also compatible with the *Seed*® and *Otter.ai*® applications, which offers a voice to text transcription service.

8.3.3 Arrangements with participants

Once the questions had been approved and the platform for data collection had been decided on, the individual students were contacted again. I included a calendar, indicating the available dates and times for the interviews as determined by me. They were requested to choose a time and also to include the number and network of the device they would be using so that I could supply them with 1G data. The data were supplied due to the contextual factors relevant to the participants. These included the reality that participants in this study often did not have access to the Internet, did not have data and I did not wish to burden them with the financial implications of using their own data. They were also informed on the platform that was to be used, namely Zoom®. This was not regarded as an incentive but rather a means to make the interviews possible and this was also approved by the relevant research ethics committee.

8.3.4 Interview process

The interviews were scheduled over a period of three weeks in November 2021 after the examination at the institution had been completed, as I did not wish to disturb the participants during their final examination. One week prior to the interviews, I confirmed the time and date of the relevant interview with every participant personally and requested them to make sure that they would have a reliable connection for the interview. I also sent them the relevant Zoom® link and reminder one day before the interview was scheduled through a WhatsApp message.

The interview questions were also prepared in a written form on a PowerPoint presentation and shared via the screen-share function of the Zoom® application. This written format of the oral questions was shown to support the participants’ understanding of the questions in case either the connection or their understanding was not so clear. On average, the duration of the interviews was 40–60 minutes and they were recorded in full to be available for transcription in preparation for the data analysis.

8.4 DATA ANALYSIS

The data collected through the semi-structured interview questions during phase 3 of the study can be classified as narrative data, according to FraIM (Plowright, 2011). The questions were

open-ended, which, as Plowright (2011) argues, allowed the participants more control over the answer they gave. The data obtained also left the researcher with more freedom of interpretation, because the participant was not restricted by having to react through pre-designed categories (Du Plessis, 2015). The data analysis of the semi-structured interviews was done according to the process for analysing qualitative data (in this study referred to as narrative data analysis) proposed by Creswell (2013). The motivation for this approach is that it includes several steps which lead to the engagement with the data more than once and on different levels, thus supporting optimum reliability.

Step 1: Organise and prepare the data for analysis

The *Seed*® and *Otter.ai*® transcription applications, which can be used with Zoom®, were used to provide a basic transcription of every interview. Each individual recording, as well as the transcription, were downloaded and saved to Google Drive. Each recording was then listened to, with the transcription visible at the same time. I anticipated that there would be several errors in the transcripts due to possible pronunciation issues. Therefore, I listened to individual sections of the voice recordings several times, implementing corrections while doing so. This process ensured that the transcribed texts were a true version of the audio recordings. I regarded this process of great importance, as the iterative nature of the process assisted me to familiarise myself with the content. As a final level of control, independent colleagues also read the corrected transcribed versions. Each transcription was done in a separate MS Word™ document, and each student was allotted a symbol to identify their recording and transcription, for example, “Participant A”.

Step 2: Reading through the data

This step entailed reading through all the transcribed documents to form an overview of the data. This was followed by carefully reading through each individual interview transcript a few times, with the aim of ensuring a general understanding of the information before the coding process (Creswell, 2013). The first coding phase already started here, by using basic colour coding with markers. I did this by reading the transcribed answers as provided by all participants to one question at a time and highlighted the core information with different highlighters on a hard copy.

Step 3: Detailed analysis through coding

Once I was familiar with the general content, the detailed analysis could start. This process required a dedicated and focused approach to identify the crucial elements that can contribute to the coherent and trustworthy account that addresses the research questions and produced insight in line with the data (Miles et al., 2013). The process of analysing the data entailed coding the

data. Coding is a process of identifying fragments of meaning and labelling them with a code, which can be defined as “a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data” (Saldaña 2015: 3). Thematic coding is important in a researcher’s attempt to analyse, interpret and present the research (Boyatzis, 1998). To code and organise the data into themes, I used a combination of methods that complemented each other:

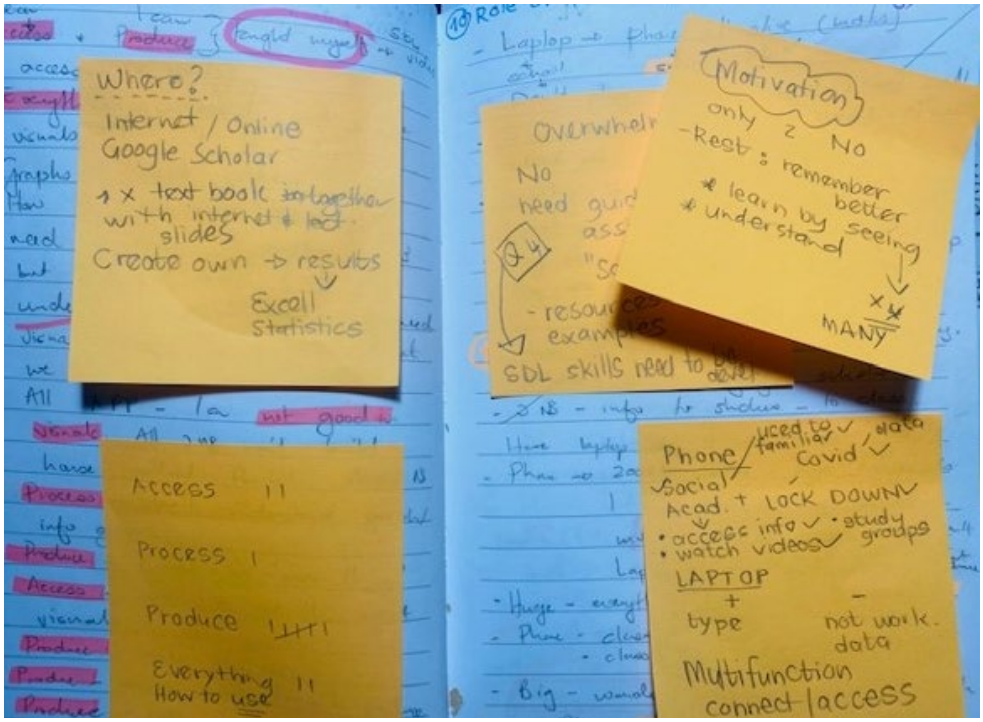
- colour-coding per question on a hard copy as described in step 2 above;
- the second method I used was to copy and paste these results into an Excel document, making sure to add the source (e.g., “interview#3). I deliberately used these two “manual” coding methods as a start to stay in touch with the data and not be hasty or become mechanical in the process, which could have led to a lack of deep reflective analytical focus (Linnneberg & Korsgaard, 2019). Within my pragmatic research paradigm, I found that the repetitive nature of engaging with the data while coding allowed me to understand the phenomenon of visual literacy from the perspective of the participants.
- As a final method, I used the ATLAS.ti™ version 22 application to re-combine the ideas shared by students into a newly formatted coherent whole. This assisted me even further in understanding the VL issues that were relevant to the students’ experience.

As indicated in chapter 7 (§ 7.6) as well as earlier in this chapter (§ 8.3.1), the themes that emerged from phase 2 of this study were used to guide me in the setting of the interview questions for this phase. In a sense, it can thus be regarded as a deductive coding process, as the codes were imposed from the previous phase. Deductive coding can be described as using a pre-defined list of codes to provide a frame before coding the data (Miles et al., 2013). Although it can be regarded as a narrower approach, I deliberately chose it for this phase for the following reasons:

- In the literature, a combination of inductive and deductive coding is not an unusual approach (Graebner et al., 2012).
- I wanted a focused approach to narrow down the large amount of narrative data, especially due to the language challenges experienced during the interview process (cf. 8.5.1).
- Working with basic themes as derived from the questionnaire data, provided structure; however, I could adjust the coding frame if interesting additional data emerged.
- This combination of inductive and deductive analysis further complemented FraIM, as it suggested a revisiting back and forth between the different phases (Pierce, 1978),

leaving room to be open for surprises and suggestions in the data. This may even be relevant to phase 1, namely the document analysis.

Throughout the above coding process, I also referred to my analytical memos, which can be described as reflections, which I noted during the data collection process. Saldaña (2015) describes these as informal notes based on hunches and unexpected incidences which lead to unexpected insight. An example is provided below:



Screenshot 8-1: Analytical memo-style notes

8.5 Evidence

A post-coding phase involved the comparison of the themes that emerged during phase 2, the questionnaire, with the themes that emerged through the coding process of this phase. The content-rich data from the interviews provided a deeper understanding and expansion of adjustment to some of the themes. This data integration of the different phases is possible, and even desirable within FraIM (Plowright, 2011). The following themes, which incorporated the themes from the previous phase, emerged from this post-coding phase:

Table 8-3: Themes emerging from the integration of phase 2 and phase 3

	INTEGRATED THEMES
1	Barriers to VL

2	Aspects related to the access of visuals
3	Use and processing of visuals
4	Producing of own visuals
5	Ethical practices related to the use of visuals
6	Strengths for the development of visual literacy

The following discussion of the evidence aims to provide an overview of the themes, categories, and codes. This is informed by a selection of quotes from the interview data. The letter from the alphabet is the identification code for each participant and the number indicates the timestamp of the quote in the interview.

8.4.1 Theme 1 – Barriers to visual literacy

The theme is unique to this phase of the data collection and did not emerge through the questionnaire. The first theme of the questionnaire (namely “Profile of participants”) was found to emerge as a category within this theme. Figure 8-2 provides an overview of the categories and codes within the theme:

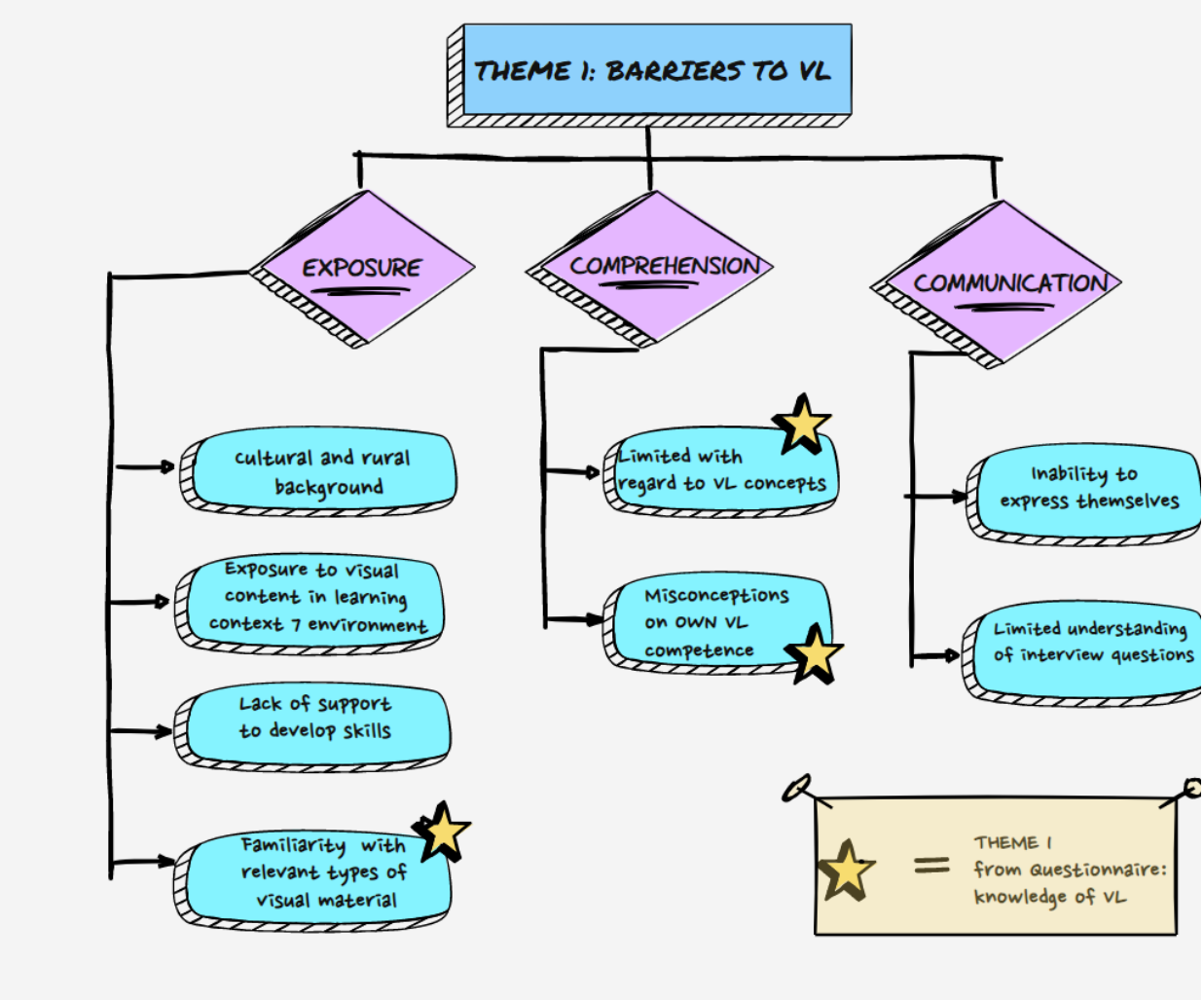


Figure 8-2: Theme 1: Barriers to VL

Relevant quotes in terms of this theme – as presented in figure 8-2 – include:

8.4.1.1 Exposure – environmental background

Relevant quotes in terms of the first category, namely exposure, as indicated under the theme "Barriers" in figure 8-2 above:

> *...and most of the time visual literacy was technology…So urban area compared to rural I think, would be more advanced. [B; 03:41]*

> *… because in the village where we are there is nothing like that [visuals]… no materials to learn from. [M; 07:55]*

> *Going to class… meant just looking at the board… [J; 04:09]*

> *No, nobody actually taught us anything about visual literacy; it was all about theory, there were no pictures with nothing like it just words. [A; 4:46]*

I learnt on my own. I used the YouTube videos. [J; 18:07]

One of my study buddies actually assisted me […] He is studying in the same field, but he wants to do IT. So, he's been a big help. [D; 8:55]

No, I had to figure things out on my own. If I couldn't understand, I would just ask Google. [H; 15:24].

No, no one helped me. Most of the time I use YouTube to learn. There are a lot of videos people make – you have to look for those people who give accurate information. [M; 24:36].

From the quotations above, it is clear that the environment and level of exposure to VL varied between participants. Whether participants came from an urban or rural area also played a role. However, it was significant that some element of self-direction was clear, as these participants took charge of their own VL learning.

8.4.1.2 Comprehension of the visual literacy concept

The following quotations relate to the second category in figure 8.2 above, namely the understanding of the concept of VL:

I think visual literacy is some let's say… pictures or graphs that illustrate information [B; 01:20]

I think it means something that you can see; yes. [E; 2:44]

I think it is the interpretation of information in the form of images. [Part. K; 00:32]

…learning with pictures instead of words. [A; 00:42]

… education about pictures… on graphs, anything visual [J; 02:31]

Vision literacy means the state of seeing something with your own eyes… [N; 7:59]

The quotations above reveal that the participants did not have a clear understanding of the concept. They could link the term "visual" to seeing and, in some cases, the connection with information or learning.

8.4.1.3 Communication levels

The following quotations relate to the communication levels as indicated as the third category related to theme 1 in figure 8-2:

I do understand I'm just trying to find the right words [H; 9:33]

For the next example, I include the conversation to illustrate the level of communication during the interview. This is just one of many examples available:

[C; 05:40 – 06:39]

Interviewer 05:40 My first question to you is, what do you think visual literacy means?

Participant 06:01 About visual literacy?

Interviewer 06:03 Yes. You know what literacy is?

Participant 06:15 Sorry?

Interviewer 06:16 You know normal literacy? It means to read and write. So, what do you think visual literacy means?

Participant 06:28 Sorry, come again.

Interviewer 06:30 So, question one is, what do you think does visual literacy mean?

Participant 06:39 Okay, I think visual literacy is a set of ability... that... like..., individual can (put) effectively find information to use and create image. [D; 07:19 – 07:37]

Interviewer 07:19 Okay, so, what role does your cultural background and environment play in your visual literacy?

Participant 07:37 I can't understand this question clearly.

The participants experienced a number of barriers with regard to VL. Firstly, the participants noted a lack of exposure to visuals in their environment and in the teaching and learning context. The second matter related to exposure was the lack of support to develop their VL. This, however, translated into a positive effect, as where support was indicated, it was not from teachers or lecturers only but mainly from friends or fellow students with whom they interacted in the social and academic domain. The positive effects of peer support and student interaction are clear from

the responses and is reflected in the literature (Ertmer et al., 2007; Li, 2009). Participants also mentioned online applications like YouTube and Google to inform themselves. The lack of support actually forced participants to take initiative and teach themselves. Ozkanal et al. (2021) reported similar behaviour in a study on online searching strategies of students, with internet tools being regarded as both a learning resource and a way of interacting and communicating.

Two barriers were recognised while collecting the data. The first of these was the participants' lack of comprehension of the VL concepts (accessing, processing, and producing) as well as the misconceptions about their own perceived VL. This was revealed through their inability to come up with clear answers on some basic questions related to VL. In a study by Matusiak et al. (2019), they found that students' understanding of VL was also limited to the "reading" of images related to the understanding and interpreting of visuals. The ability to use and produce visuals were scarcely mentioned. The third and final barrier was the inability of the majority of participants to understand the questions and/or to express themselves clearly. This reality can be related back to the literacy challenges as discussed in chapter 2 (cf. § 2.3.1) and impacts heavily on academic literacy, of which VL is considered part of. It could also impact on the findings of the research in terms of the clarity of responses by participants. Apart from these contextual and conceptual barriers, aspects related to visual access patterns of participants were attended to.

8.4.2 Theme 2 – Aspects related to the access of visuals

Of the categories related to the access of visuals, two (identifying the need for visuals and search strategies to find suitable visuals for assignments) were not addressed in this phase of the study, as the information from phase 2 was deemed adequate. The aspects which were re-visited in this phase to get richer data were the type of visuals suitable for academic assignments, where suitable visuals could be found, as well as the criteria applied to determine suitable visuals.

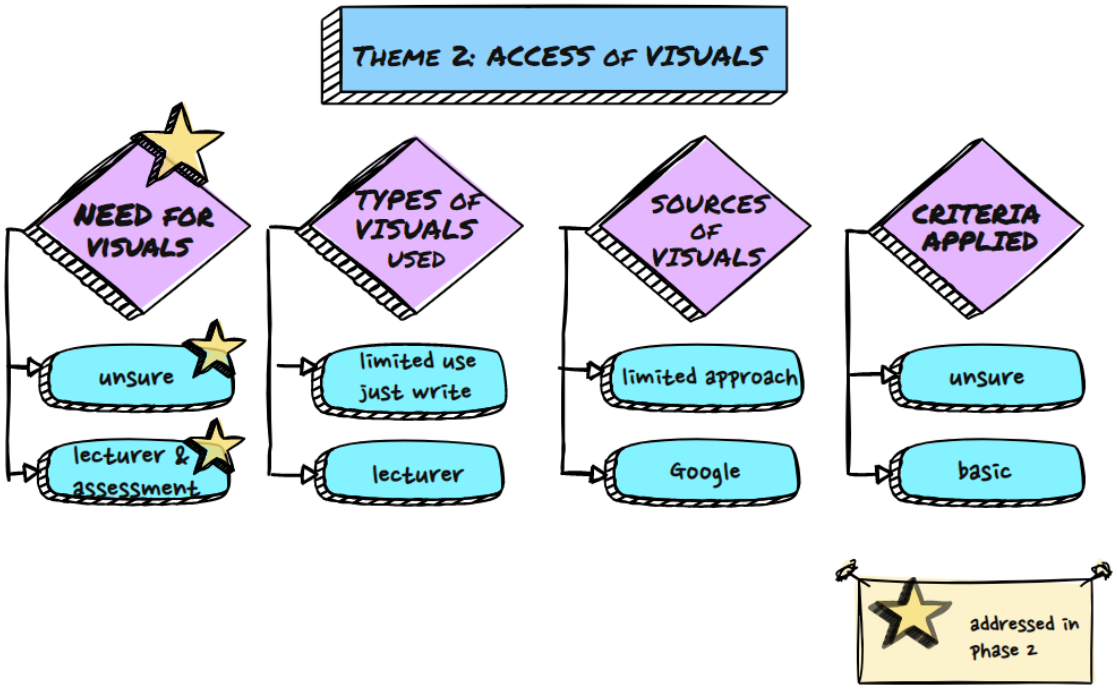


Figure 8-3: Theme 2 – Aspects related to access of visuals

The following quotes relate to the above-mentioned codes, categories and theme in figure 8-3:

8.4.2.1 Types of visuals used in assignments

These quotes relate to the participants' replies on types of visuals used:

> *Well, we were taught about visual literacy but at most times we were using the graphs. [E; 06:01]*

> *We had graphs and charts, actually pie charts. We even did a poster. [J; 6:39]*

> *… used pictures in geography, but in out other modules they were not telling us to use pictures and other visuals; they were only needing assignments without visuals. [M; 11:26]*

> *I used graphs, pie charts and those kinds of data. [N; 19:17]*

> *Mostly, I used pictures. That was the instruction of the assignment - we had to come up with health problem solutions. [L; 8:39]*

> *Mostly we write, we don't use visuals a lot. But it just inspires when we are asked to do something visual - then we use them. [K; 9:33]*

The types of visuals used in academic assignments were limited to graphs and pictures, and they were not used spontaneously but only after direct instruction. A study by Matusiak et al. (2019) revealed that the use of images in formal academic assignments was limited and students also refrained from using images due to a lack of instructions to do so. However, in class presentations, students used a wide array of visual resources, especially in PowerPoint presentations. The motivation for this was entertainment and to keep the audience engaged (Matusiak et al, 2019). This was contrary to the findings of this study, where PowerPoints were hardly mentioned.

8.4.2.2 Source of suitable visuals

The following quotes are related to the matter of suitable sources for visuals as addressed in figure 8-3 above:

> *Before I start searching, I go to the library archives. I firstly searched the topic then I read what the topic is all about; then after I go and look for pictures related to the topic. [C; 12:26]*

> *At most times I do use my textbooks and the Internet and the slides that the lecturer provides us with. [E; 8:57].*

> *I used to check on the Internet, then I was told it's not an ethical thing to do. Now I take my cell phone and take a picture. [I; 8:36].*

> *I go to Google and get information which is reliable; you have to check… I have forgot, but I know you have to check something that information is reliable. [M; 13:49]*

Participants only referred to the Internet and Google as sources, as well as their textbook or lecturers' notes.

8.4.2.3 Criteria applied for suitable visuals

The last category in terms of the theme "access of visuals", as indicated in figure 8-3 above, produced the following quotes:

> *I look at the size and the quality and the colour; I mean the quality and the size of the picture. [E; 10:42]*

> *It should be colourful and eye-catching. [I; 9:28]*

> *I choose the one that attracts me – the colour attracts me; a beautiful colour. [K; 12:56]*

The participants were unsure and indicated basic issues such as size and colour as criteria in the choice of visuals to use.

8.4.2.4 General feedback on theme 2: accessing of visuals

Participants commented that the types of visuals were determined by the assignment as well as the lecturer's instruction. A survey study by Emanuel and Challons-Lipton (2013) also found that students did not have the skills to identify suitable images. The type of visuals that the participants mentioned were graphs and tables. Participants indicated that they used Google as search engine to find suitable visuals for academic assignments. A study by Choi (2010) also confirms that 87% of students used Google to find images and only 12.7% consulted a specific site. Some participants in this study mentioned Google Scholar but acknowledged that they struggled to navigate it and stopped using it to obtain visuals. No reference was made to speciality apps like Pinterest, freepik®, flicker®, or Creative Commons. Some participants also reported using the slides provided by lecturers to copy visuals into their assignments. Participants seemed unsure of the criteria with which visuals had to comply and only responded after the question was re-phrased and an example was provided. Choi (2010) indicated that participants in his study identified reliability as a critical factor when choosing images. This was not the case in this study where the participants who did mention criteria, mentioned colourfulness, size and clarity. No or very basic editing was applied to selected visuals. The next theme was concerned with the processing of visuals.

8.4.3 Theme 3 – Use and processing of visuals

This theme produced a lot of data in phase 2, where participants were required to recognise and identify different types of visuals from different contexts. The only category relevant in this phase was related to the technical skills they possessed to insert the chosen visuals into their assignments.

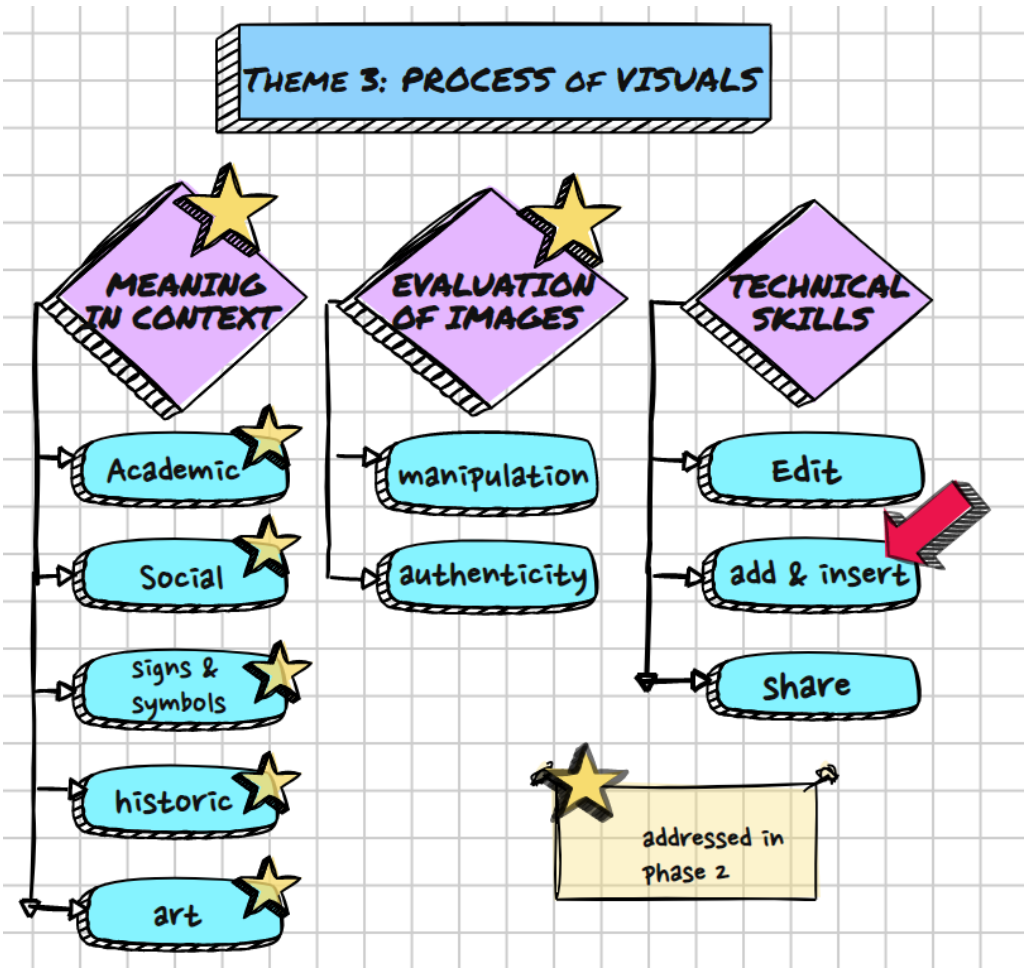


Figure 8-4: Theme 3 – Use and processing of visuals

The following quotes relate to the codes pertaining to the technical skills required to add visuals to assignments, as indicated in figure 8-4 above:

8.4.3.1 Adding visuals to academic assignments

> *Okay, I go to Google. I read the content. (They will be) there will be many articles; the list will show them, and I click on the one that I want. in the article that will show a picture, I download it; then I click on it and say 'copy'; no - download it. Then I take the reference from the article. [J; 13:21]*

> *Actually, not all my modules have to do with visual literacy; I use visuals in one module. I use Google and then whatever I get, I just copy and paste into Microsoft Word. [H; 14:43]*

> *I search the picture, then download it, then save it to my files. From there I will open my Microsoft wherever I am typing. I will click a button and access the picture. [M; 17:15]*

All the categories, except for the technical skills, were addressed thoroughly in the questionnaire through practical examples of different visual categories (cf. § 7.5.4). The participants described the process as copying and pasting the visual or image into the assignment. Once again, this corresponds with the findings of Matusiak et al. (2019), as in their study, the typical behaviour when using images was copying and pasting, with a few downloading the images. Minimal, if any editing was done, and images were also not saved for future use. Some indicated that they first downloaded it and saved it to use later when the assignment was done. A few also referred to taking a screenshot and then pasting it into the assignment. Feedback by the participants on the producing, the third VL competency, was attended to next.

8.4.4 Theme 4 – Producing own visuals

This theme of producing visual material was addressed in phase 2 of the research, namely the questionnaire. As a result of the feedback received, this theme was not re-addressed in the semi-structured interviews. The feedback from the previous phase (cf. § 7.5.1.1) had already revealed that this competency needed to be addressed due to a lack of skills.

Some participants did, however, spontaneously refer to creating their own visuals.

> *… so, I made one of my statistics into a pie chart because I thought that is what is important - it will make it easier for the person who gets to see my report rather than having to read and to get numbers. [A; 05:31]*

> *I want to produce; I want to come up with my own things. [J; 24:12]*

The reactions show initiative on the part of the participants as well as a need to develop the necessary skills to create their own visuals. Considine (1986) was one of the few early VL scholars to emphasise that “visually literate students should be able to produce and interpret visual messages”. (p. 38)

The participants were also required to give feedback on referencing of visuals.

8.4.5 Theme 5 – Ethical practices related to use of visuals

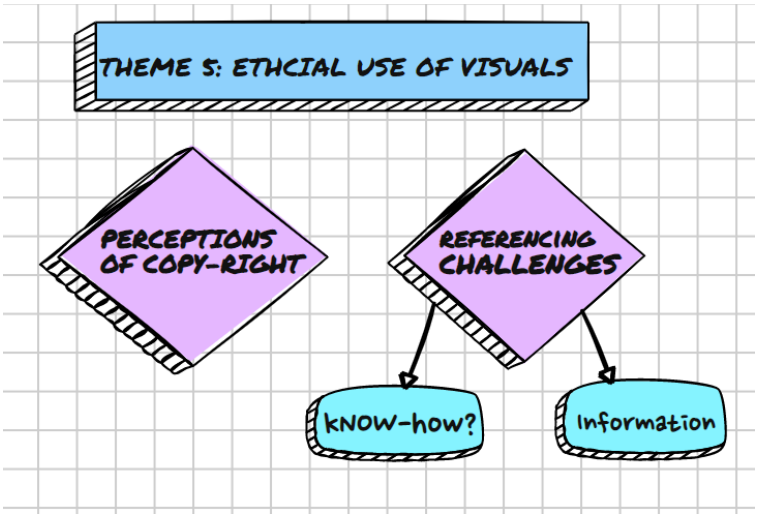


Figure 8-5: Theme 5 – Ethical practices related to the use of images

The following quotes relate to the codes, categories and theme in figure 8.5 above:

8.5.5.1: Perceptions of ethics

The following quotes reflect the perceptions of participants with regard to ethics:

> *You have to give credit to the author or the producer or whatever you call them, because it's not your own work. Hmmm… it's plagiarism if I'm not mistaken. [D; 5:34]*
>
> *I don't want to commit plagiarism or commit something that is fraud so that's why I acknowledge sources. [H; 18:51]*
>
> *Yes, I do reference because it is important, and those pictures are not mine. It is taken from someone Who somebody who posted it. [C; 17:12]*
>
> *Sometimes yes, sometimes no. I can't always, because time is going. Actually, there's this thing in our school that's it's a must for us to reference – so I do reference sometimes. [J; 18:21]*

The participants seemed informed and motivated to reference the visuals they used, referring to ownership of visuals and plagiarism.

8.4.5.1 Referencing challenges

Relevant quotes with regard to challenges with referencing visuals were the following:

At first, I didn't reference; in fact, I never acknowledged any source because I didn't know it was important; but now I am aware. But I do not know how to reference a picture. [I; 11:46]

I have a problem with understanding about pictures - how do we reference it. That is my main problem. I can easily reference my work, but pictures give me problems. [M; 20:23]

Sometimes it is difficult to find the referencing of the picture. [K; 15:48]

In phase 2, students replied to the closed questions related to the legal matter of copyright and their referencing habits when it came to visuals. This interview question was included to gain more insight into their perceptions of ethics and referencing behaviour when using pictures or other visual images. The participants noted that they did reference visuals, as they were taught to do so, and they did not wish to plagiarise. A lack of citation or captions is also reported in the literature as a major theme in one study, with 13 out of 15 (87%) individuals providing no citation at all (Matusiak et al, 2019). In addition to not citing, participants in the current study also noted that it was difficult to find the information to reference a picture or other visuals.

Apart from the above aspects, a number of opportunities and strengths relevant to the enhancing of their VL were revealed through the interviews.

8.4.6 Strengths for enhancing VL

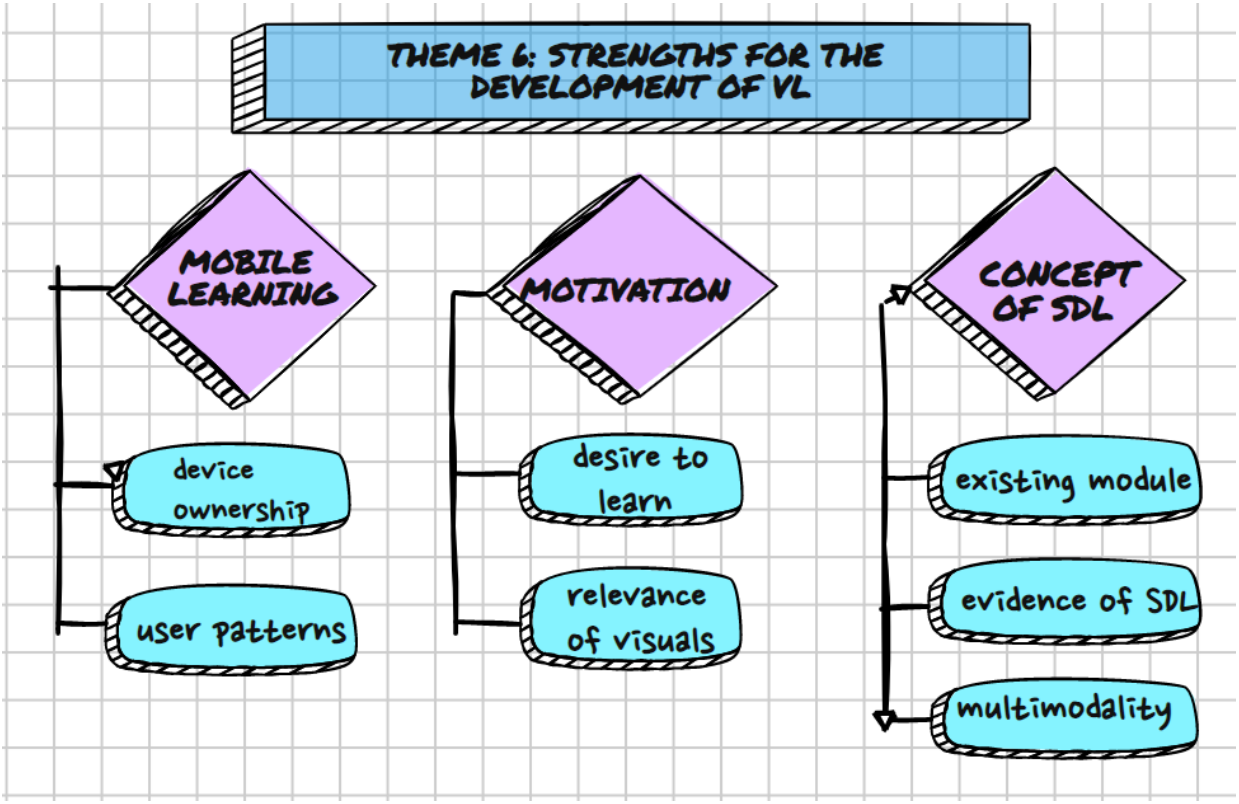


Figure 8-6: Theme 6 – Strengths for the development of VL

The following sub-section relates to the above-mentioned codes, categories and theme in figure 8-6:

8.4.6.1 Category: Mobile learning

Quotes relevant to the category of mobile learning – as represented in figure 8-6, are:

> *Since it is lockdown, I think my phone plays a role because we are doing research, and everything is done online. We do have groups for… even lecturers, the make groups to communicate with us. [B; 05:39]*

> *At the moment a big one; we have study groups on WhatsApp. We have classes on WhatsApp. So it kind of plays a big role in the studies - without that I will not be able to attend the classes. [D; 10:12]*

> *My mobile phone plays a very big role, especially concerning things that I don't know. I can't work without Google nowadays we use online dictionaries. I use my phone to search for information mostly when I use my laptop it's only for typing and submitting. [H; 28:13]*

> *It plays a huge role, cause I'm able to access the Internet easily. I do everything on my cell phone. The phone it doesn't consume a lot of data, unlike the laptop. I am connected on my phone, but not on the laptop. [K; 23:30]*

The reaction from participants revealed the important role of mobile devices in their lives, also in an academic context to access information and to communicate.

8.4.6.2 Motivation

The following quotes are relevant to the category of motivation as in figure 8-6 above:

> *When you see a picture or something it is easier to explain a picture than for you to remember a whole paragraph. [A; 03:53]*

> *… because visual literacy… hmmm… I don't know how to put this one… the reason is visual literacy is something that can give people clear understanding, so I can understand better. [C; 22:21]*

> *In my job, working with my learners - for them to remember everything I have to use visuals to keep their interest. [E; 15:31]*

I must be effective; I think visuals for me in is one of the most powerful tools that I can use to be effective. [G; 13:11]

I think it is better to develop my visual literacy. Let's say in the future when I find work, I have to do a presentation and then I want to be good. [H; 22:04]

I think I need to know more about visuals, like how to use them from the Internet. Maybe being the presenter. It makes things easier. [I; 14:17]

… because most of the time we use visuals. It's … it's an essential. Mostly I learn by seeing things. [J; 17:16]

As regards motivation to learn more about VL, participants were positive and regarded it as a skill necessary in the future.

8.4.6.3 Concept of self-directedness

The quotes below are relevant to the concept of self-directedness:

I would love to learn more about it and somebody to guide me. Then I will learn on my own cause there will come times when I have to do it and not have someone to hold your hand. [A;15:45]

I think I still need some assistance there and there; I am not that perfect. [B; 09:56]

Yes, I think there's enough information on the Internet to give you the examples you need; to give you the insight you need. [D; 18:12]

I would like to have someone on my side to teach me about it so that I can learn it more. It is possible to learn on my own. But it's gonna give me like tough time to understand some of the visual literacy. [E; 21:44]

Honestly speaking, I don't think I can. There has to be someone teaching something, like a guidance. So, without a lecturer or mentor, I think it is going to be more difficult. [H; 25:57]

I used YouTube a lot last year to learn myself. My friends also helped me; we are helping each other. [M; 26:43]

Participants indicated the major role of their mobile devices in their studies, with specific reference to research, communication, ease of use, and internet access. Their use of mobile devices was similar to that reported by Ilci (2014), who regards mobile learning as an educational tool that

offers opportunities to both students and educators. Abidin and Tho (2018) mention the specific benefits of mobile learning – for example, the sharing of knowledge without limitations of time or space; participatory learning; problem-solving; and modern communication skills.

Participants also communicated an overwhelming motivation to develop their VL, although they were not sure which competency they needed most. The reasons for their interest were learning preferences, the proliferation of visuals in all spheres of life, as well as the perception that VL would be an important skill in future careers. Participants responded in a mixed fashion regarding taking charge of developing their own VL. The majority of participants indicated that they could do it on their own but that some kind of guidance or assistance – perhaps a person (lecturer or peers) – would make it easier. This need for support and assistance could lead to different types of positive interdependence in a collaborative learning situation (Laal, 2013). Participants also referred to online sources which could be accessed according to individual needs. The main findings of this phase of the research are presented in the next section.

8.5 CLAIMS AND FINDINGS

The aim of this chapter, as explained in the introduction (see § 8.1), was to gain a deeper insight into the VL competencies and needs of participants as gathered in phase 2, in which only closed-types questions were used. This quest for a deeper understanding was structured by integrating the themes from phase 2 with the emergent themes from phase 3. In turn, the claims and findings related to these themes were explored in the context of the relevant research questions, as indicated in the beginning of the chapter.

The research question on the VL competencies students bring with them when entering HE (as addressed in SRQ 1) revealed similar results as phase 2; some additional insights were also gained as anticipated. Concerning all three main competencies – accessing, processing, and producing – students had limited skills. In terms of access of visuals (cf. § 8.5.2) as well as the type of visuals, students indicated that they only utilised the basic methods known to the general internet user and did not have any skills related to academic content and search strategies. The claim that they did not use visuals due to a lack of instruction from lecturers, the very basic criteria participants applied when selecting visuals (colour, clarity, and size), as well as the search methods they used, all confirm the earlier claim of lack of exposure or attention to visuals (cf. 6.4.2.3) that emerged from the documents analysis (cf. table 6-5). The findings on use and processing of visuals (cf. § 8.5.3) revealed slightly better skills in terms of adding and using visuals in assignments. However, no special skills were mentioned – just the very basic “copy and paste”, which is not regarded as good practice in HE.

Claims with regard to producing original visuals (cf. 8.5.4) were almost non-existent, suggesting a definite lack of specialised skills. Moreover, in terms of ethics and referencing, two claims have

implications. The challenge with referencing visuals is a practical matter that could be solved through exposure and attention. Some of the claims by participants that they did reference visuals in assignments appeared to be driven by the notion "I have to say the right thing". This convinced me to take a look at assignments where participants used visuals in a final phase of data analysis in the form of a very basic artefact analysis. All the above claims related to the VL competencies, in response to SRQ 5, can serve as a guideline for the activities and content of a possible VL component within the academic literacy module.

The three barriers to the development of VL are all related to the social and economic contexts of a rural background and the digital divide. At a national level, this term indicates the digital gap between urban and rural areas (Aruleba & Jere, 2022; Salemink et al., 2017). This divide is caused by the lack of internet infrastructure in rural areas (Velaga et al., 2012) as well as the socio-economic circumstances of a low income, which makes both mobile data and devices too expensive (Aruleba & Jere, 2022). This lack of resources is also mentioned in the theory of rurality (Balfour et al., 2008). In addition, Botha and Herselman (2013) and Mabaso (2017) mentioned how these challenges also lead to the lack of focus on 21st-century skills in schools in rural areas. These 21st-century skills include ICT and visual skills (cf. § 3.1, 4.2). Although these existing barriers cannot be rectified by HE institutions alone, they can narrow the digital gap by offering support and relevant modules to students. According to Chetty et al. (2017), the closing of the digital gap would contribute to, among others, social well-being, the mitigation of poverty, and improved education.

Three opportunities relevant to SRQs 4 and 5 emerged from the data. Participants were comfortable with mobile learning and its affordances. Mobile learning could, therefore, be utilised to enhance the VL of students. In addition, the motivation expressed by participants to learn more about VL confirms the need for a VL component in the academic literacy module. The finding that participants used their mobile devices to access sources to teach themselves new VL skills, with or without the support of others, is an indication that VL activities facilitated through mobile learning could contribute towards fostering SDL.

8.6 SUMMARY AND CONCLUSION

This chapter reported on the third phase of this study on enhancing the VL of first-year students. The phase involved semi-structured interviews with volunteer participants from the previous phase. The aim of this phase was to access data-rich information on aspects identified during the two previous phases, namely the document analysis (phase 1) and the survey in the form of a questionnaire consisting of closed-ended questions (phase 2). The themes that emerged from phase 2 were collated with the data from this phase. The following themes were identified: Barriers to VL; aspects related to the accessing of visuals; using and processing of visuals;

producing of own visuals; ethical practices with the use of visuals; and opportunities and strengths for the development of VL. A decision was made to complete the research with an artefact analysis of the visuals submitted by the participants in phase 3. This enabled me to observe the practical implementation of claims made by participants during the semi-structured interviews. This artefact analysis (Phase 4) is addressed in chapter 9.

CHAPTER 9: EMPIRICAL RESEARCH PHASE 4: ARTEFACT ANALYSIS

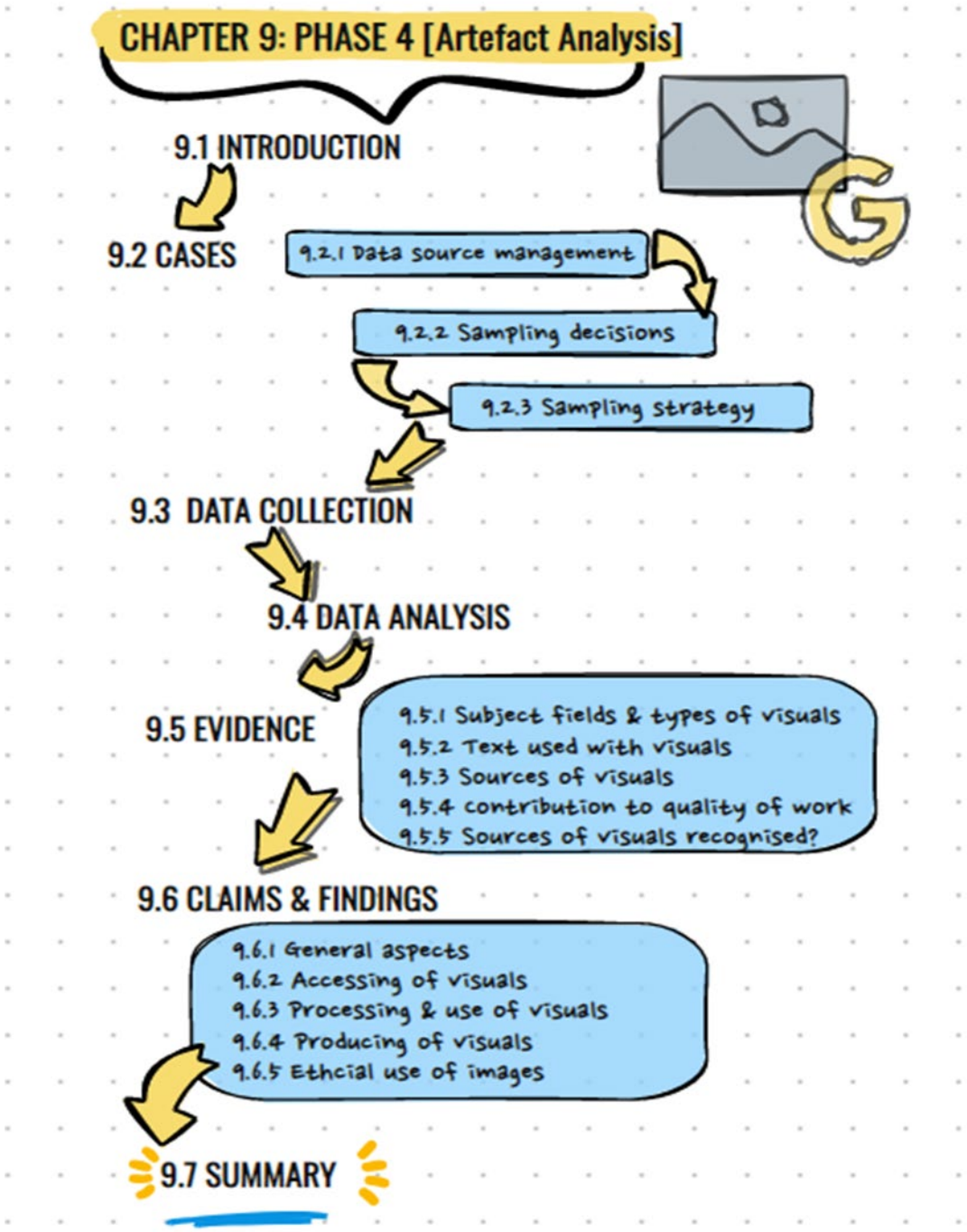


Figure 9-1: Mind map of chapter layout

9.1 INTRODUCTION

The previous three chapters each described a specific phase in the research process. Chapter 6 (phase 1) described the document analysis performed to gain insight into existing frameworks for VL in educational contexts. Chapter 7 (phase 2) described the survey in the form of a questionnaire. The questions for the questionnaire were partially informed by the results of phase 1 and were organised into categories related to the VL framework conceptualised for the context of this study. Chapter 8 (phase 3) described another phase of questioning – this time semi-structured individual interviews. Once again, the findings of the previous phases were integrated into the questions for this phase. The rationale for this approach was to offer the researcher an opportunity to gain a deeper understanding on the core claims that emerged.

This chapter presents the final phase (phase 4) of the empirical research and involves the analysis of artefacts in the form of visuals used by students in academic assignments. Artefacts in the context of FraIM refer to objects created or produced by people and can be regarded as multimodal, as they can have a variety of modalities: an artefact can be text, it can be visual, aural, and spatial. It can even be something you can smell or taste (Plowright, 2011). The function of an artefact, according to Plowright (2011), is a way "of encoding or expressing information, knowledge and understanding, in order to make these accessible to and usable by the participants involved in the process" (p. 110). The aim of the artefact analysis was to address the secondary research questions as presented in table 9-1:

Table 9-1: Research questions guiding this phase of the study

Research question:	
Secondary Research Question1:	What visual literacy competencies do students bring with them when entering university?
Secondary Research Question 2:	What are the visual literacy competency standards (VLCS) needed by students in an academic multiliteracies environment?

This final phase also used the structure of Plowright's FraIM (cf. figure 1-2) to inform the different steps of the process. First, the approach to the artefact analysis as the main data source management strategy for this phase as well as the sampling decisions are clarified. This is followed by the explanation of the data collection process and the procedure applied for the analysis. Third, the evidence that emerged from this part of the empirical investigation is presented. The process is concluded with a summary of the claims (main findings) of the phase.

9.2 CASES FOR THIS PHASE OF THE STUDY

The cases as data source for this phase of the study are inanimate objects in the form of assignments containing visuals, submitted by participants. The whole assignment was submitted to provide the context of the visual, but only the visual component was used in the analysis. These are referred to as “visual artefacts” in the rest of the chapter and discussions. Decisions on data source managements and sampling had to be made.

9.2.1 Data source management strategy

One of the methodological issues relevant to the artefact analysis relates to depth and detail of the collected data. Decisions on manifest and latent contents influence these aspects. Only manifest content, referring to what can be observed readily about the artefacts (Chapter 3, 2017 – SAGE publication), was used during this analysis because the aim of the artefact analysis was not to discover hidden or inferred information, as would be the case if latent content was relevant or present, for example, in an artwork; the aim was to observe the basic use of visuals within an academic context. This process assisted me in gaining insight into the practical VL APP(LE) competencies students bring with them (SRQ1) and their needs in an academic multiliteracies environment (SRQ2). Decisions as regards sampling and degree of control were considered next.

9.2.2 Sampling decisions

The sampling decision for this phase can be regarded as non-probability, purposive sampling. The choice of assignments was not done randomly but according to specific criteria that met my needs in order to achieve the aim of this phase. As explained by Cohen et al. (2007), in non-probability sampling, the researcher targets a specific group, while being aware that this group does not necessarily represent a wider selection of cases (in this case, the artefacts). In addition, I also identified a specific purpose for selecting these artefacts or assignments. In the case of this phase of the study, the main criteria were that the academic assignments had to include a visual component; and they had to be original work from other modules which had been completed before the participants volunteered to participate in this study. This contributed towards the validity and trustworthiness of the submitted work.

I did not have control over the quality of the students’ work. This, however, contributed towards the validity and naturalness of the data.

9.2.3 Sampling strategy for the fourth phase of data collection

The artefacts comprised of academic assignments that included a visual component deemed relevant and suitable by the participants. The artefacts were collected from the same group of participants who participated in the semi-structured interviews. All seventeen (n=17) students

indicated that they had used visuals in at least one academic assignment and were willing to submit an example of their work electronically. The artefacts were collected from this group of students because I had already engaged with them; they were, therefore, more engaged in the process and were more likely to comply, and I could refer to their interview responses if deemed necessary.

9.3 DATA COLLECTION METHODS

The collection method of the visual artefacts had to be communicated clearly to interviewees as to what was required and the method of submission. This process was handled as follows:

- During the interviews, the 17 participants who participated in the semi-structured interviews were asked if they had used visuals in any assignments from any of their modules. All of them replied positively.
- They were then asked if they would be willing to share these assignments with me for analysis purposes. Once again, all of them responded positively. All participants also agreed that a screenshot or copy of their assignment may be used in this research report as illustrative examples of the use of visuals in academic assignments.
- They were then requested to submit the whole assignment via any digital application they found most suitable or easy, for example, via e-mail, or WhatsApp. In the end, twenty three artefacts were submitted, as some participants submitted more than one example.

This collection method implied a medium level of structure, as I could dictate the collection method but did not have much control over the submission of content or context. However, this contributed towards the authenticity of the artefacts submitted.

9.4 DATA ANALYSIS

The visuals contained in the assignments were evaluated in respect of basic aspects deemed relevant to the use of visuals in an academic context. The qualities of an integrated methodology were once again evident, as the nominal data rendered through the artefact analyses were counted or categorised and then reported on through a narrative account.

The following steps guided the artefact analysis:

Step 1: Creating an MS Excel spreadsheet

An Excel spreadsheet was created to capture details relevant to the visuals. These included contextual information (categories, type, field of study, sources, and referencing). Some of the

categories required just a “Yes” or “No” where the focus was on technical issues, such as the use of headings with the visuals. Within the research design of FraIM, the option also existed to add extra items or categories if deemed necessary during the analysis process. This spreadsheet was compiled prior to accessing the assignment submissions.

Step 2: Accessing and downloading the artefacts

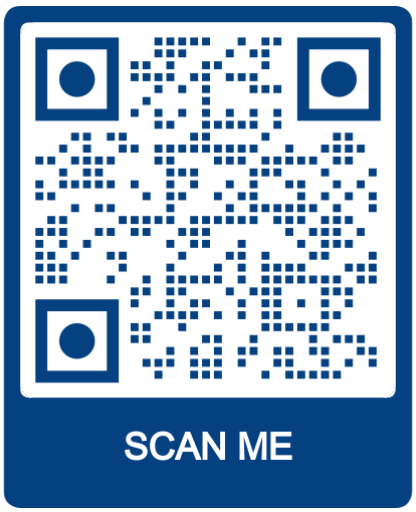
The submitted assignments were retrieved, accessed and downloaded. Screenshots of the visuals were then taken, and they were numbered according to the participant who submitted them to anonymise them.

Step 3: Categorisation of data

Individual submissions were now attentively observed and analysed. The visual components of each submitted assignment were analysed using the proposed analytical frame, in the form of the MS Excel spreadsheet, to organise the data.

9.5 EVIDENCE

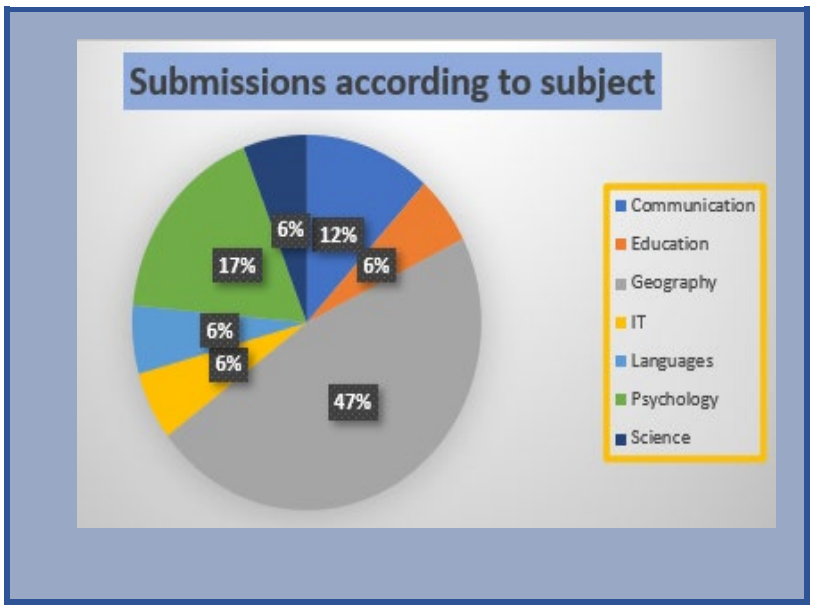
The evidence is discussed according to the different categories used to organise the data. Annotated examples of some of the visual artefacts are also added for illustration purposes. As there is no space to display all the visual artefacts, I selected suitable examples to illustrate the use of visuals relevant to the discussion. All the submitted artefacts can be accessed by scanning the following QR-code:



9.5.1 Subject fields and types of visuals used

The first data are relevant to the module in which the graphs were used and types of visuals.

9.5.1.1 Study module relevant to visuals artefacts

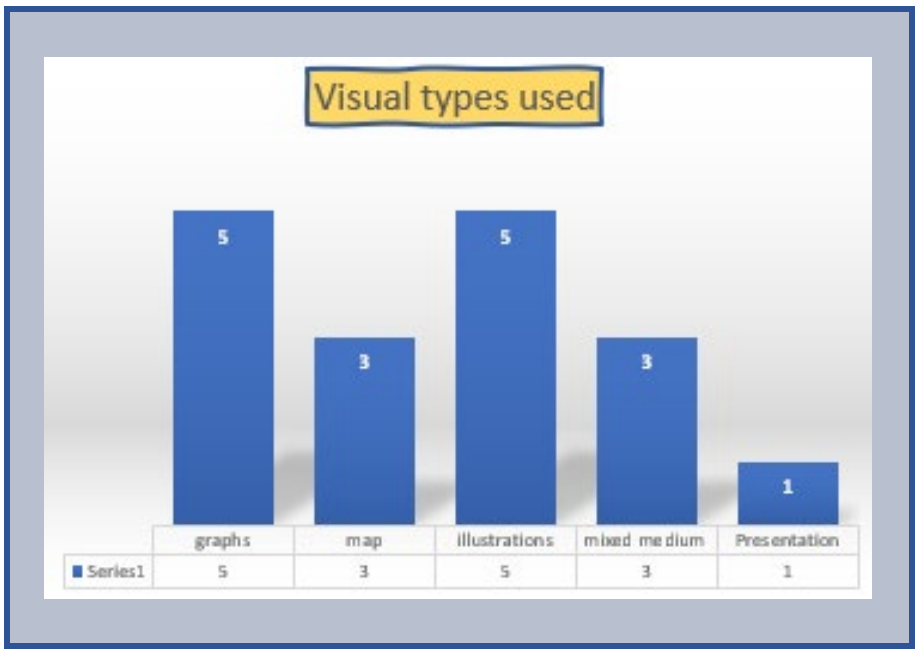


Graph 9-1: Subjects in which academic assignments with visuals were submitted

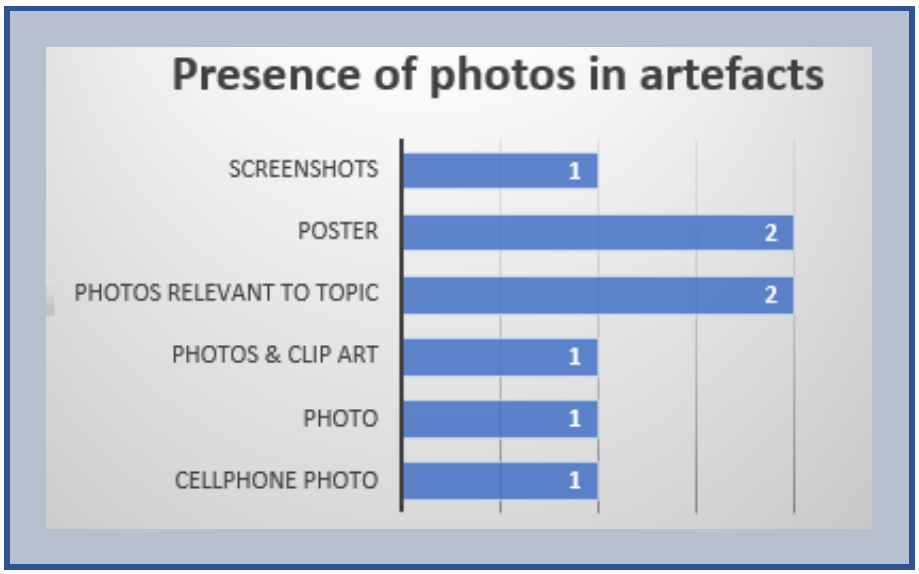
The participants indicated the fields of study from which they submitted the assignments containing visuals. Deduced from this information, the submitted assignments came from seven subjects. Most submissions were from Geography (47%). The second largest number (17%) came from Psychology; the third largest (12%) from Communications. The submissions from the remaining fields of study were equal at 6%. This information is of course not only relevant to the visual artefacts but to those participants who volunteered to participate in the semi-structured interviews (phase 3).

9.5.1.2 Types of visuals used in assignments

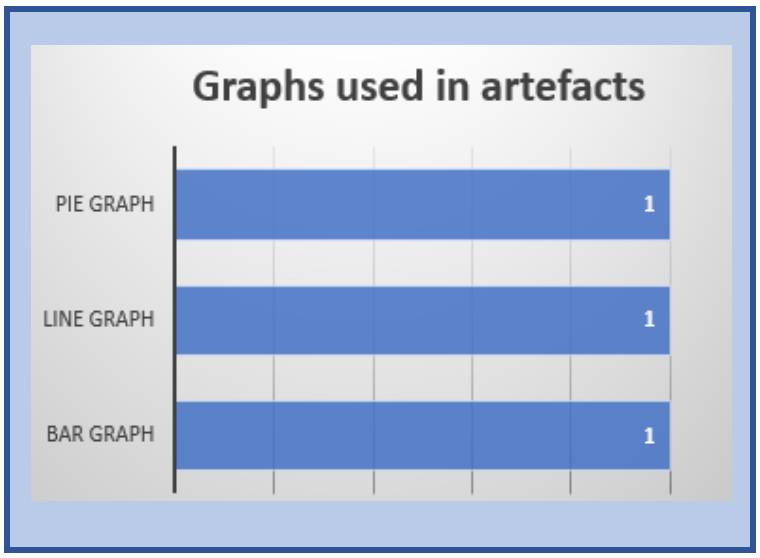
Graphs 9-2 to 9-4 provide an overview of the categories and types of visuals used by the participants:



Graph 9-2: Frequency of type of visuals used



Graph 9-3: Type of photos used as visuals in assignments

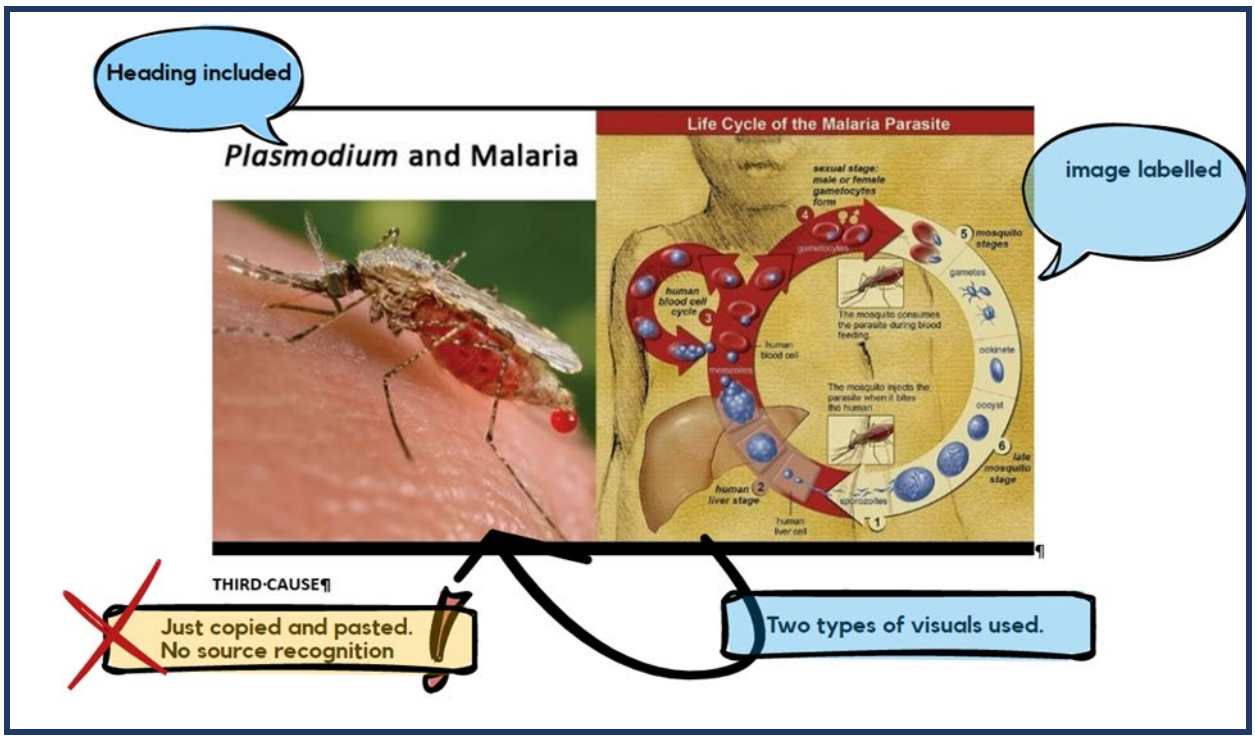


Graph 9-4: Types of graphs used in assignments

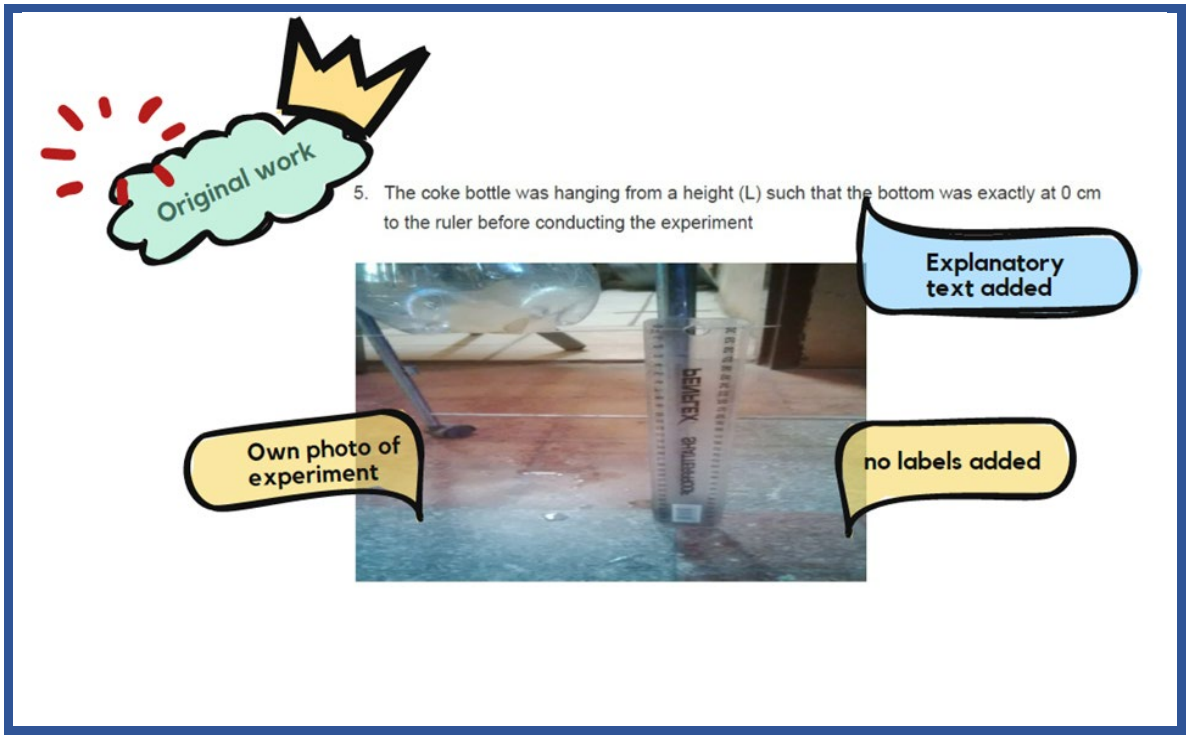
Both graphs and illustrations were equally often used in the assignments. In two cases, a graph and an illustration were combined. Mixed mode can also be added to the total, as it indicates a combination of text and illustrations. This translated into 64.7% of visual artefacts being illustrations. Eight of these illustrations were photos of some kind (72.4%). The other illustrations were maps, either hand-drawn or copied (17.6%). Alone-standing graphs were used in three artefacts (17.6%). Each type of graph – pie, line, and bar – was used only once.

9.5.1.3 Annotated examples of types of visual artefacts submitted

The screenshots below are examples of the types of visuals included in academic assignments.



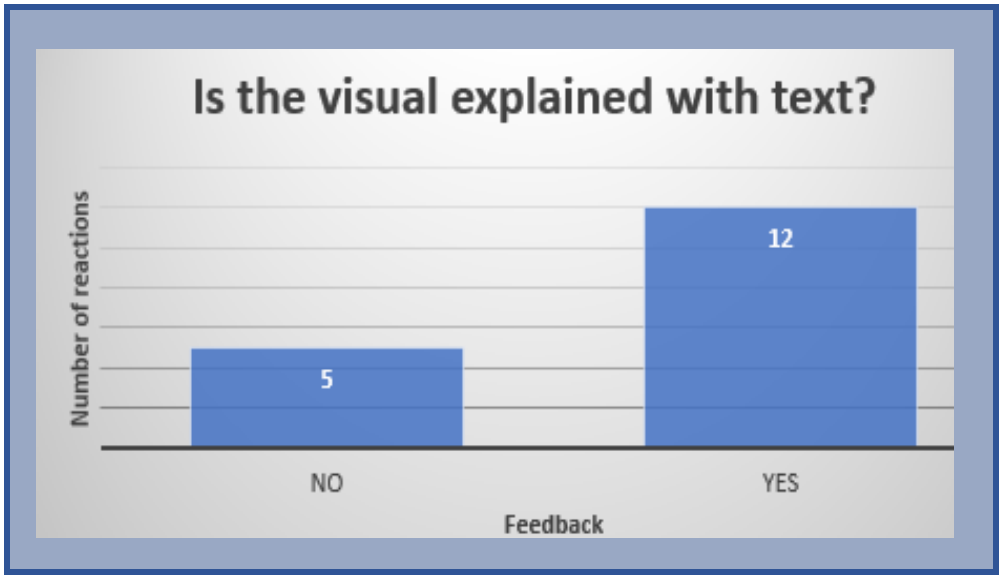
Screenshot 9-1: Visual artefact with photo and sketch



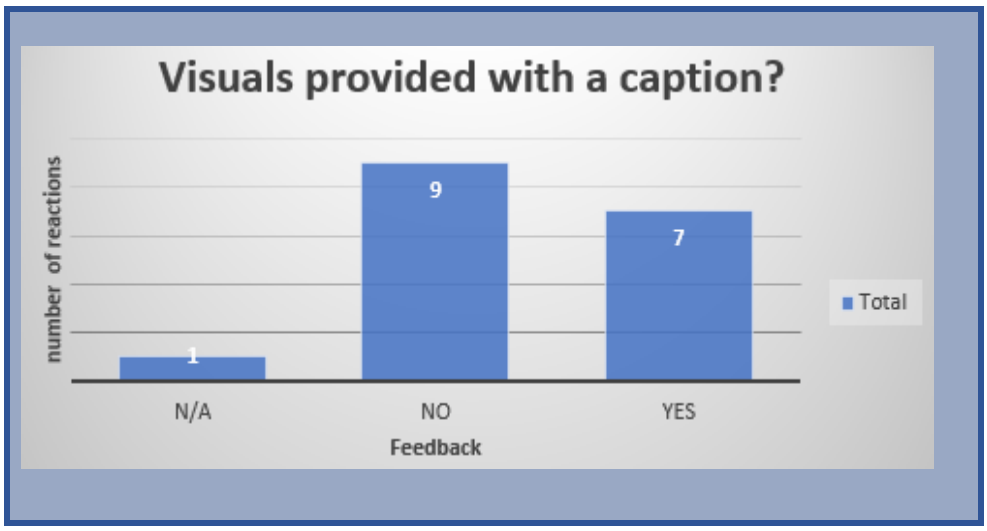
Screenshot 9-2: Visual artefact – photo taken by participant to illustrate experiment

9.5.2 Text related to images

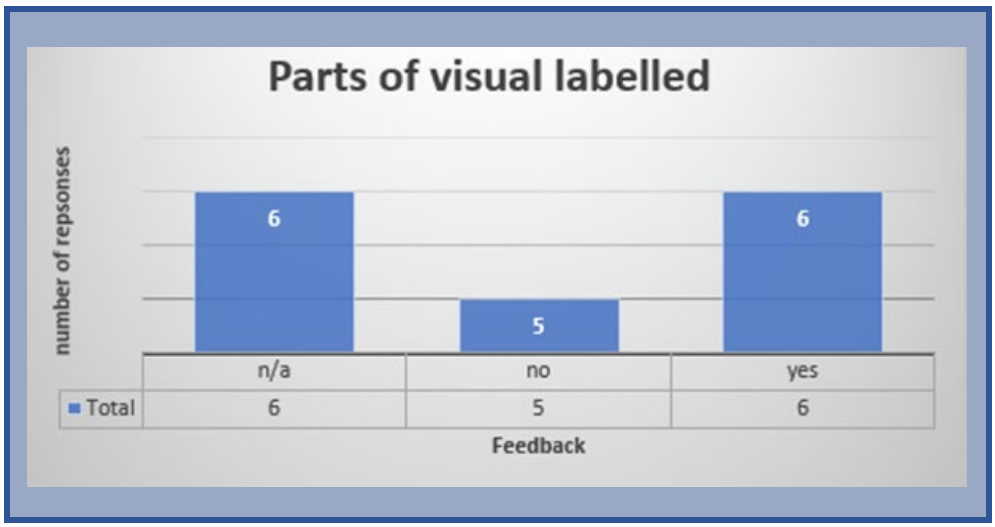
Graph 9-5 to 9-7 share information on the use of text with the visual artefacts used by participants:



Graph 9-5: The use of text to explain visuals



Graph 9-6: The use of captions with visuals

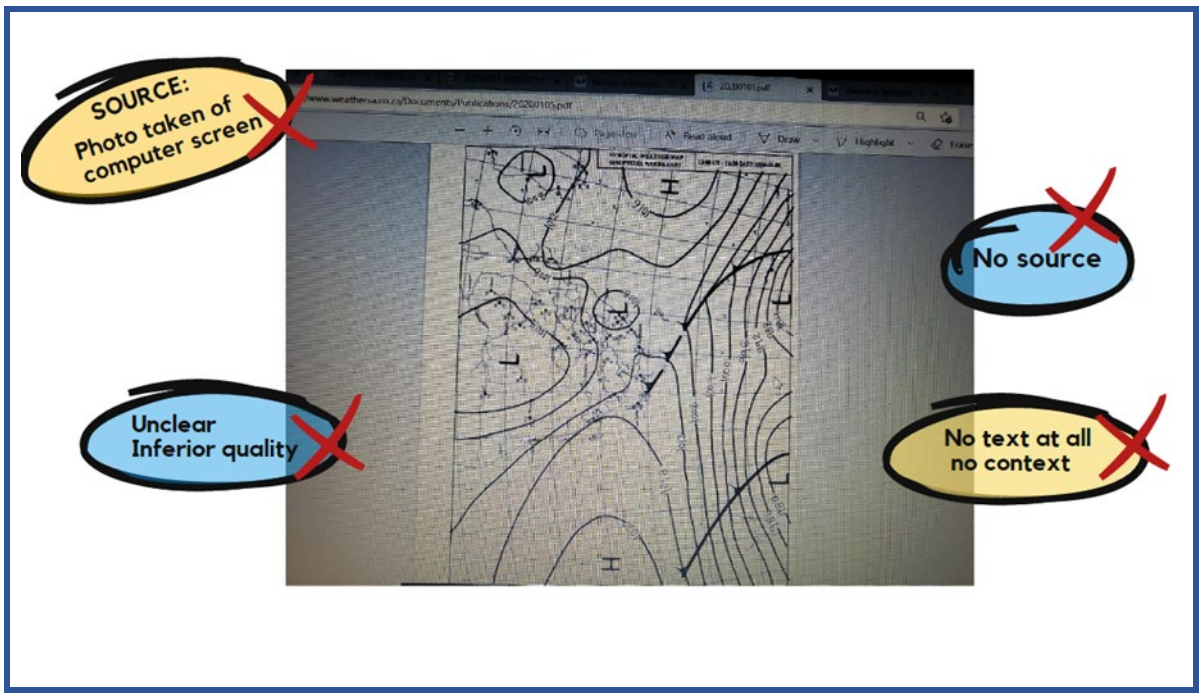


Graph 9-7: The use of labels with visuals when applicable

Three aspects regarding text use with visual artefacts were evaluated. As regards text to explain the visuals, 12 visuals (63%) included explanatory text. As far as headings or captions were concerned, only seven visuals (43.8%) were accompanied by a caption to explain what the visual was about. This made it difficult to relate the visual artefact to the content. Six out of a possible 11 (54.5%) visuals consisted of parts where labelling was relevant. Some examples are show below.

9.5.2.1 Annotated examples of the use of visuals and text

Screenshots 9.3 and 9.4 provide examples of text used with visuals:

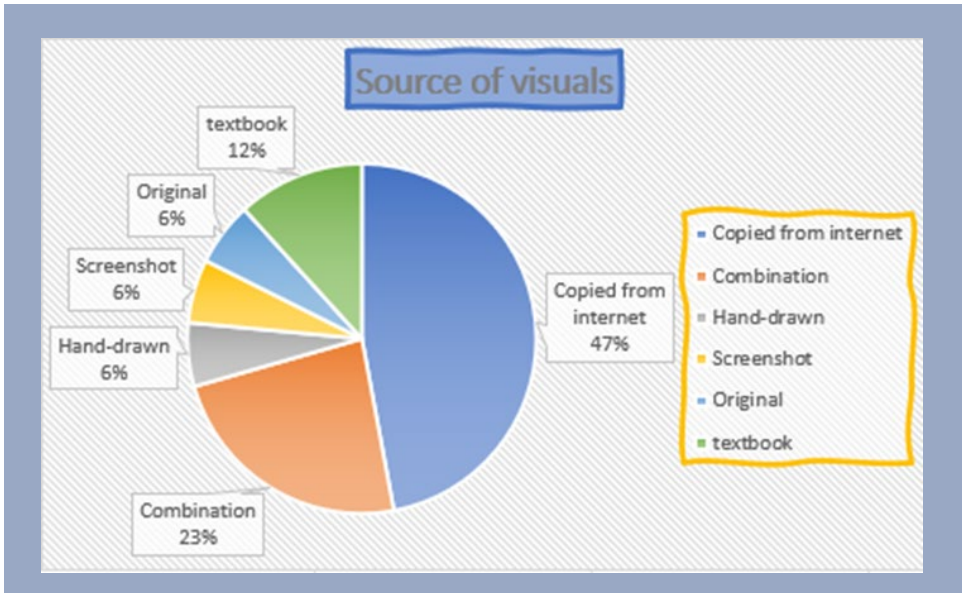


Screenshot 9-3: Photo of computer screen submitted as visual for assignment

Screenshot 9-4: Cover page of magazine submitted as visual artefact for an assignment

9.5.3 Sources of the visuals

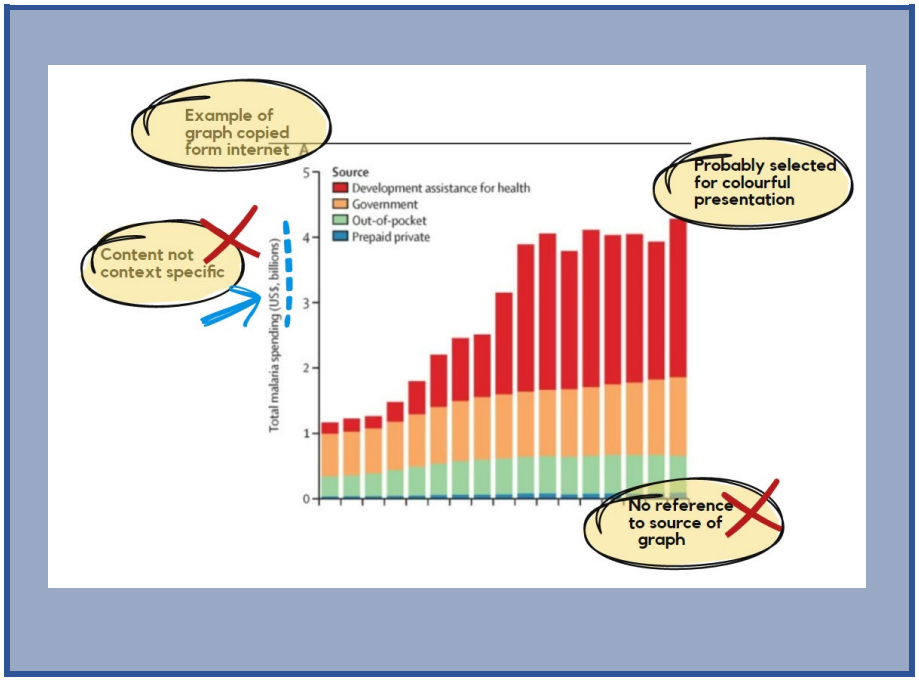
The pie graph below indicates the sources participants used for the visual artefacts they included in their assignments. This was deduced by the researcher based on the format and content.



Graph 9-8: Sources where visual artefacts were obtained

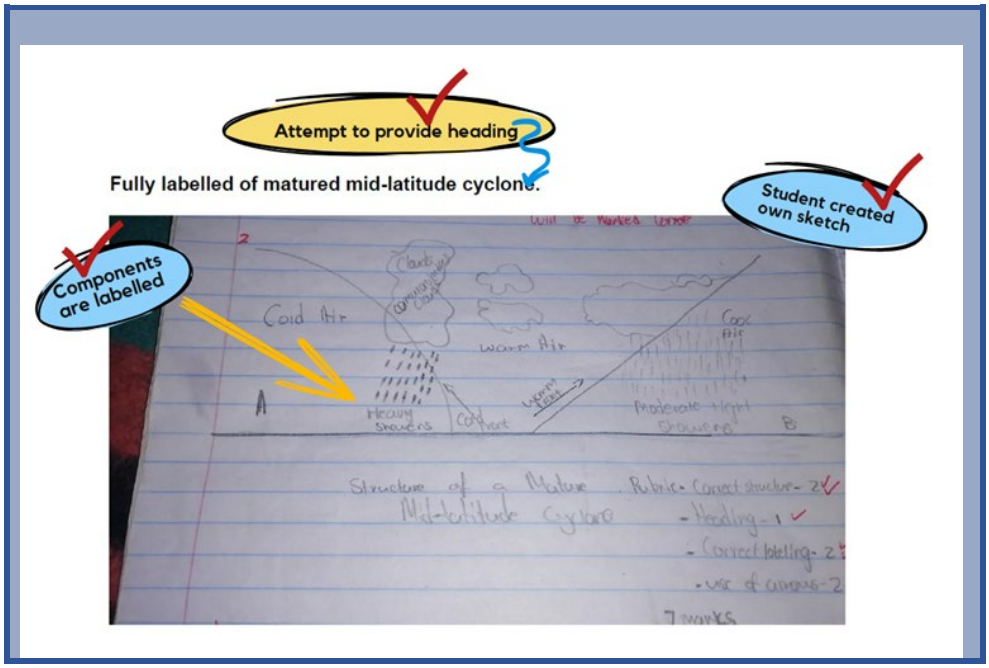
Most visuals (47%) were obtained from the Internet, whereas another 23% were a combination of the students' own and Internet material. Original work by the students themselves made up 12% of the submissions, with 12% copying from textbooks. The sources of some of the visual artefacts are shown below.

9.5.3.1 Annotated examples of sources of visual artefacts



Screenshot 9-5: Graph copied from the Internet

The example shows how a graph was copied from the Internet, even though the information was not relevant to the context of the student. There was also no indication as to the source of this graph.

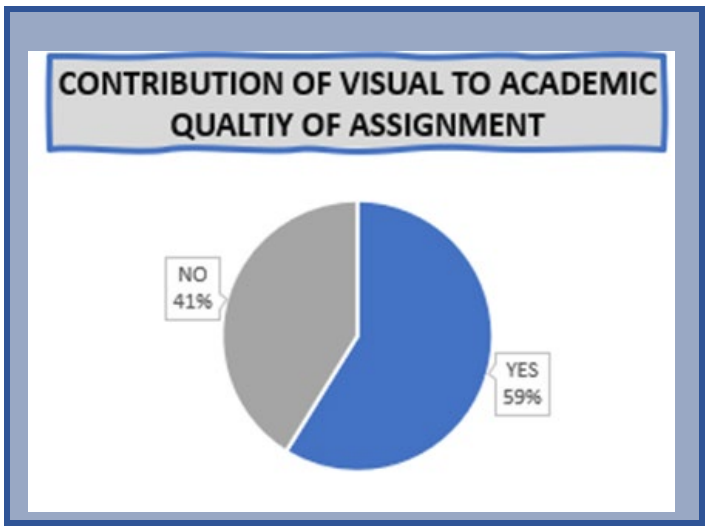


Screenshot 9-6: Own visual artefact produced

This example shows an attempt from a student to provide their own visual content relevant to the assignments. A heading and labels were included.

9.5.4 Contribution towards quality of work

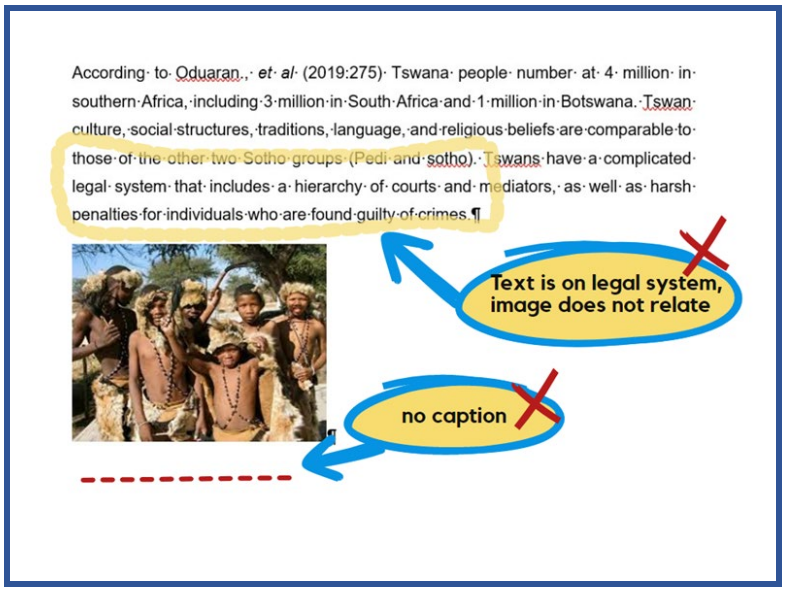
Another aspect related to the use of visuals in academic assignments is whether they contribute towards the academic quality of the work. Graph 9.9 reveal the results in this regard:



Graph 9-9: Contribution to quality of work

The evaluation on the perceived contribution of the included visual artefacts was done against the background of the content of the whole assignment. The perceived percentage of visual artefacts that did contribute to the meaning and quality of the assessment was 59% in comparison to 41% regarded as not contributing to the quality. An example is shown below.

9.5.4.1 Annotated example of visual artefact not contributing to quality of work

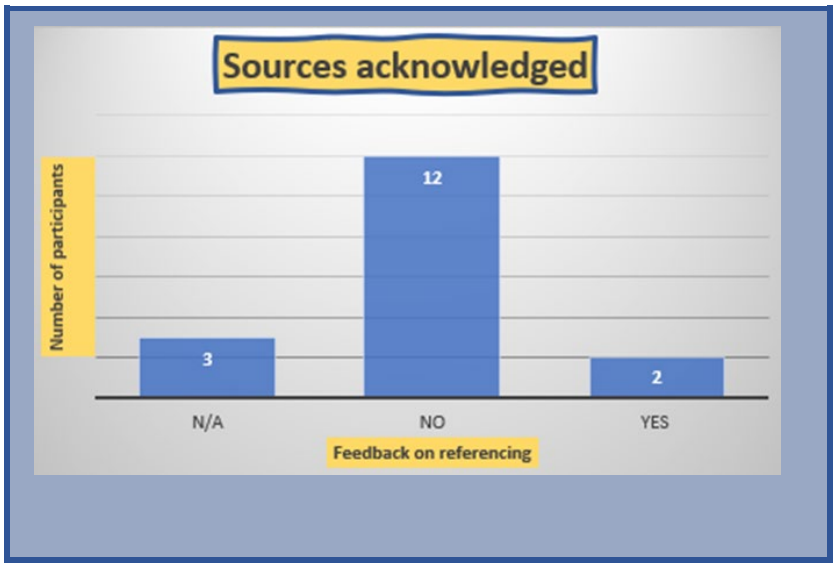


Screenshot 9-7: Example of visual as part of an academic assignment

The perceived contribution of this image is hardly anything – the text and visual are not thematically related. There is also no explanation as to what the image is about, even though it contains some culturally specific information that needs some further explanation.

9.5.5 Sources of visuals acknowledged or referenced

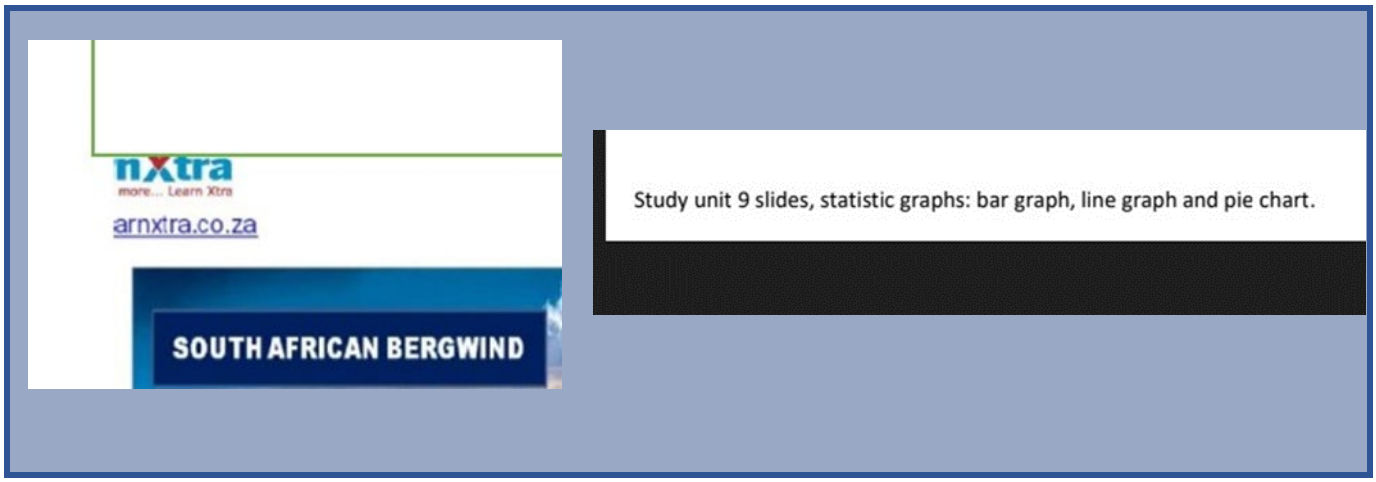
The graph below shows the statistics related to the referencing of the visual artefacts used in the assignments:



Graph 9-10: Frequency of acknowledgement of sources

Only two participants (11.7%) referenced or acknowledged the sources from which they obtained the visuals. In comparison, 12 participants (70.6%) did not acknowledge the source of the visual in any way. Where original work was submitted, referencing was not relevant (17.6%). The screenshots below indicate the two attempts that were made to reference the visual artefacts in the assignments.

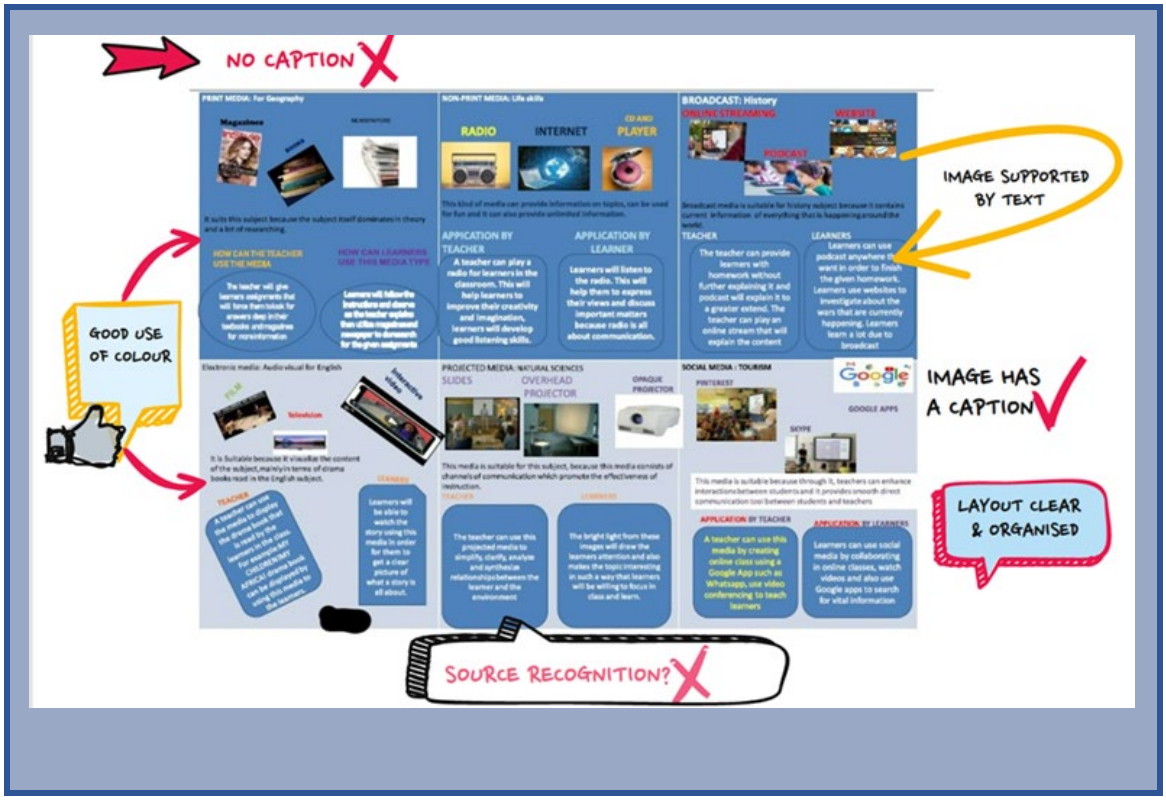
9.5.5.1 Example of referencing included for source acknowledgment



Screenshot 9-8: Examples of referencing used for visual artefacts

The participants did try to reference, but their citations lacked so much information that they did not make any contribution towards acknowledging the source. The following screenshot shows the absence of referencing despite the multiple use of visuals.

9.5.5.2 Example of no referencing despite the use of multiple visuals



Screenshot 9-9: Visual artefact without any source references

Despite the use of multiple images and integrating it into a poster-type design for display, no sources are acknowledged.

9.5.6 Claims and findings related to phase 4

This was the final phase of the study, aimed at gaining practical insight into how participants actually applied what were referred to and discussed in the previous phases. The claims are listed in the table below to provide an overview:

Table 9-2: Claims and findings related to phase 4, artefact analysis

RELEVANT ASPECT	FINDING	COMMMENTS
Subject field of majority of submitted visuals (cf. § 9.5.1)	Geography, Psychology	Not surprising, as Geography is a field of study where visuals play an important role (De Jager, 2014)
Types of visuals used most in artefacts submitted (cf. § 9.5.2)	Illustrations - Only one photo taken with mobile device.	Surprising as students share a lot on social media. Possible explanation: type of assignments; not suitable for academic use. Contrary to a number of studies referring to the affordance of mobile phones to bring the outside world into the learning process (Hoban, 2009; Wishart & Triggs, 2010)
	Graphs – line, bar, pie (cf. § 9.5.2.1)	These are addressed in academic literacy course (cf. § 6.4.1.3)
		Limited use of visuals (cf. 9.5.1.2) Possible reasons: uncertainty; lack of know-how or unaware of affordances of visuals.
Accessing of visuals for assignments	No speciality websites used (cf. § 6.5.3.3) Downloaded or copied from the Internet	This corresponds with the findings of both phases 2 (cf. § 7.5.3) and 3 (§ 8.5.2). Google major source; corresponds with research (Choi, 2010; Emanuel & Challons-Lipton, 2013; Matusiak et al., 2019).
Contribution to quality of work (cf. § 9.5.4)	Low level	Participants seemed unaware of reasons for adding visuals. In a few submissions, the visuals had a targeted function, but in most submissions, although the image was related to the topic of the assignment, it did not make any contribution to the quality of the assignment.
Processing and use of visuals	No editing related to size, colour or aspect ratio noticed.	Technical skills might not be up to standard; also recognised in literature (Matusiak et al., 2019) as well as in phase 3 (cf. § 8.5.3)
	Use of text with visuals	Majority of visual artefacts revealed a lack of captions and headings, labelling more common (cf. § 9.5.4)
Producing of own visuals	Only two attempts submitted – mobile photo and drawing; no other form of presentation like PowerPoint used in any submitted assignments	The content matter was not original; it was just an original design using pre-existing content.

Ethical use of images	No referencing; just two unsuccessful attempts (cf. § 9.5.5.1)	Despite the acknowledgement in previous phases that they did reference and were aware that they had to reference (cf. § 7.5.6, 8.5.5.2). Literature confirms lack of referencing (Emerson, 2008; Matusiak et al., 2019; Power, 2009; Sulikowski, 2008).

9.5.7 Findings on general aspects relevant to the visual artefacts

The subjects from which the visual artefacts were submitted were diverse. This was expected, as there were no prerequisites for study field of subjects. Geography was represented best, which was not surprising, as it is a field of study where visuals play an important role (De Jager, 2014). The two types of visual artefacts used most were illustrations and graphs. The graphs used resorted under the most commonly used, namely line-, bar- and pie graphs (cf. § 9.5.2.1). These are also the type of graphs dealt with in the academic literacy course (cf. § 6.4.1.3). The use of photos did not reveal any pattern; however, it was noticed that only one photo taken with a mobile device was used. This is interesting considering the usage patterns of young people sharing numerous visuals on social media (Vogles et al., 2022). This is contrary to a number of studies referring to the ability of mobile phones to bring the outside world into the learning process (Hoban, 2009; Wishart & Triggs, 2010). The limited selection of visuals used (cf. § 9.5.1.2) reveals a conservative approach to or uncertainty about the inclusion of visuals in academic assignments.

9.5.8 Accessing of visuals for assignments

The main source when accessing visuals was Google. This corresponds with the findings of both phases 2 (cf. § 7.5.3) and 3 (§ 8.5.2.2) where Google was indicated as the source participants used for visuals. Choi (2010) reported similar results, with 87% of students in his study indicating Google as primary source. As was also the case in the previous phases, it was clear that no speciality websites were used to access visual sources (cf. § 7.5.3.3). The reason for this is not clear. Given the general level of VL skills, as displayed in this study, the most likely explanation is that the students are unaware of such sources.

The majority of visuals in the assignments were downloaded or copied form the Internet. This was done without any reference to the source or finding out what the original site was. This finding related to the accessing of visuals was also expressed by research participants in a study by Matusiak et al. (2019). The perceived lack of awareness as to the suitability of visuals for use in an academic assignment was also noticed in the previous two phases of the study. In phase 2, only 21.2% of participants indicated that they “definitely” knew which visuals were suitable for academic assignments (cf. § 7.5.3). In phase 3, the participants indicated that they were guided by the instructions of the assignment or lecturer (cf. § 8.5.2.1) as well as criteria such as colourfulness and attractiveness (cf. § 8.5.2.3).

9.5.9 Use and processing of visuals

The use of images in academic assignments was influenced by the instructions (or lack thereof). Reasons for this behaviour, as cited in the literature, include the emphasis on text in academic contexts and the perception that visuals are just add-ons to the “real” content (Harris, 2006; Matusiak et al., 2019).

No indication could be found that any of the submitted visual artefacts had been edited in any way. Again, this is in line with the findings of phase 2, where more than half of the participants indicated that they “almost never” edited visuals downloaded from the Internet (§ 8.5.4.3). In general, the perceived technical skills related to the use of visuals seemed underdeveloped. This was observed by looking at the size, positioning of the visual artefacts or the change of aspect ratio in relation to the page and text. Matusiak et al. (2019), however, noted that some students in their study downloaded the images and processed them on their computers. The use of text with the visuals is another aspect that was not addressed in the questionnaire or the semi-structured interviews. As regards using a heading or caption, most visual artefacts did not show evidence of captions being used. The occurrence of labelling certain parts of a visual where necessary revealed more positive results (cf. § 9.5.4). This could be a result of the fact that students in the relevant areas of study, especially the sciences, are aware of this need.

The contribution the added visual content makes to the academic quality of an assignment is also relevant here. Bowen (2017) mentions the challenges for both lecturers and students related to identifying what an appropriate image is. The perceived level of this awareness observed in the visual artefacts was low. In a few submissions, the visuals had a targeted function but in some, although the image was related to the topic of the assignment, it did not really make any contribution. This use of images to just support the textual information without making any meaningful contribution has been noted by Kress (2003) and Lester (2014) as a lack of critical engagement with the visual.

9.5.10 Producing of visuals

The competency of being able to produce visuals was found lacking in all the phases. Only two attempts towards producing own visuals were submitted (§ 9.5.6). Two participants also submitted a form of online magazine as part of a Psychology project (cf. screenshot 9.5). This can be regarded as producing of visuals, but it was overtly requested by the lecturer and it was a group assignment, which contributed to the lack of clarity on what the contributions of the specific student were. The content matter was not original; it was just an original design using pre-existing

content. No academic presentation format (e.g., PowerPoint, Infographics) or other methods of sharing visuals (e.g., mobile videos or a series of photos to share a process or event) were used. One visual artefact contained a pie graph created through one of the many possibilities offered by Excel. Another submission contained a very basic sketch in pencil. This absence of self-produced visuals is also in line with the results of phase 2, where participants acknowledged the regular resharing of visuals in a social context (cf. § 7.5.5.1) but indicated that they "almost never" created their own visuals for either the social or academic context (cf. § 7.5.5.2). This perceived lack of producing of visuals even guided me to not address this competency at all in phase 3 (cf. § 8.5.4). The habit of just copying and pasting may lead to irrelevant information being used or adding an image just for the sake of having it in the assignments. It does not make any contribution towards the quality of the work. The comment by Hasan and Khan (2018) that "... no one wants to take time to create something new because they can find it on the internet Readymade or Cooked with ease and without effort" (p. 127) seems a relevant explanation for not investing time in creating unique visuals.

9.5.11 Ethical use of images

The legal and ethical use of images is perceived as an extremely important aspect in academia in general and also for VL. It must be noted that I did not confirm if any of the used visuals were in the public domain but given the general level of expertise participants displayed in their assignments, I do not believe the issue is relevant here. Concerning the visual artefacts submitted in this study, only two of the possible 15 visual artefacts showed a form of referencing (cf. § 9.5.1.1). It is even questionable whether the participant intended to include it and if it was on the source. This was not surprising because, during my experience as lecturer, it has been a lengthy process to instil the habit of referencing of text sources as well. The first relevant question is to determine if participants were aware of the fact that visuals should be referenced. McCabe (2005) found that students regarded information on the Internet as public knowledge which need not be referenced; Oliphant (2002) confirmed the same attitude from the general public. This was not the case with this study: more than 60% of participants in phase 2 indicated that they were aware of the need to reference the material produced by another person (cf. § 7.5.6). The responses revealed perceived high levels of referencing of visuals in an academic context and much lower levels when using visuals in a social context. The practice displayed in phase 4 revealed a discrepancy between perceptions and practice: in phase 3, the majority of participants indicated that they did reference because they "did not want to plagiarise" (cf. § 8.5.5.2). However, only two visual artefacts included an attempt to referencing. This led to the conclusion that they were aware of the need to reference visuals, but they did not comply. Here the role of the Internet cannot be ignored. Several studies claim that easy access to online resources offers an incentive

for plagiarism (Emerson, 2008; Power, 2009; Sulikowski, 2008). My next question was why do students not reference, even when they say they do and are aware that they should?

Dawson and Overfield (2006) noted that students understood that plagiarism was wrong, but that they were unclear about how to avoid it. Vogles et al. (2022) mentioned lack of planning and bad time management, ignorance and a lack of integrity as contributors to plagiarism. In this study, one of the reasons for not referencing visuals was that they did not know how to reference visuals, even if they wanted to. They also noted that it was a challenge to find the relevant information to reference visuals (cf. § 7.5.5.2).

9.6 SUMMARY AND CONCLUSION

This chapter explained the fourth and final phase of the empirical research, which involved a visual artefact analysis of academic assignments submitted by participants who also participated in the previous phases. It was hoped that the data collected, and the subsequent analysis would contribute to the findings and claims of the previous phases, which, in turn, could assist in answering two sub-questions on the VL skills students bring with them and which skills they need. In response to the data analysis, the claim can be made that students lack skills in all three VLC. The students seemed to possess some level of skill related to one or two components of the specific competency, but without an overall understanding and ability to apply them in practice. The findings on the accessing of visuals revealed the limited effort by students only accessing Google for image searches. Claims relevant to processing include the lack of knowledge on image selection, absence of editing, and a low level of awareness of the contribution of the visual towards the quality of an assignment. Basic technical skills were also missing. The claims on producing visuals are that the skills, or the application of them, are almost totally absent, even in the most basic applications. Ethical behaviour related to the use of visuals was found to be an area of great concern.

This chapter concluded the series of four chapters, dealing with the four phases of the empirical research for this study. From these chapters, it is clear that even though we live in an image-intense world, students are far from being the experts they are often assumed to be due to their incessant exposure to and interaction with images on digital platforms. Such exposure does not instantaneously make them visually literate. Students need to be assisted in developing their VLC at all levels – from accessing, processing, producing as well as the legal and ethical considerations when interacting with visuals, especially in an academic context.

This chapter concludes the discussion, findings and claims of the four research phases that were conducted as empirical part of this study. Chapter 10 presents an overview of the research project, a summary of the research questions, and a synthesis of the findings and conclusions

drawn. The significance and implications of the research and limitations of the study are highlighted, and suggestions are made for future research.

CHAPTER 10: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

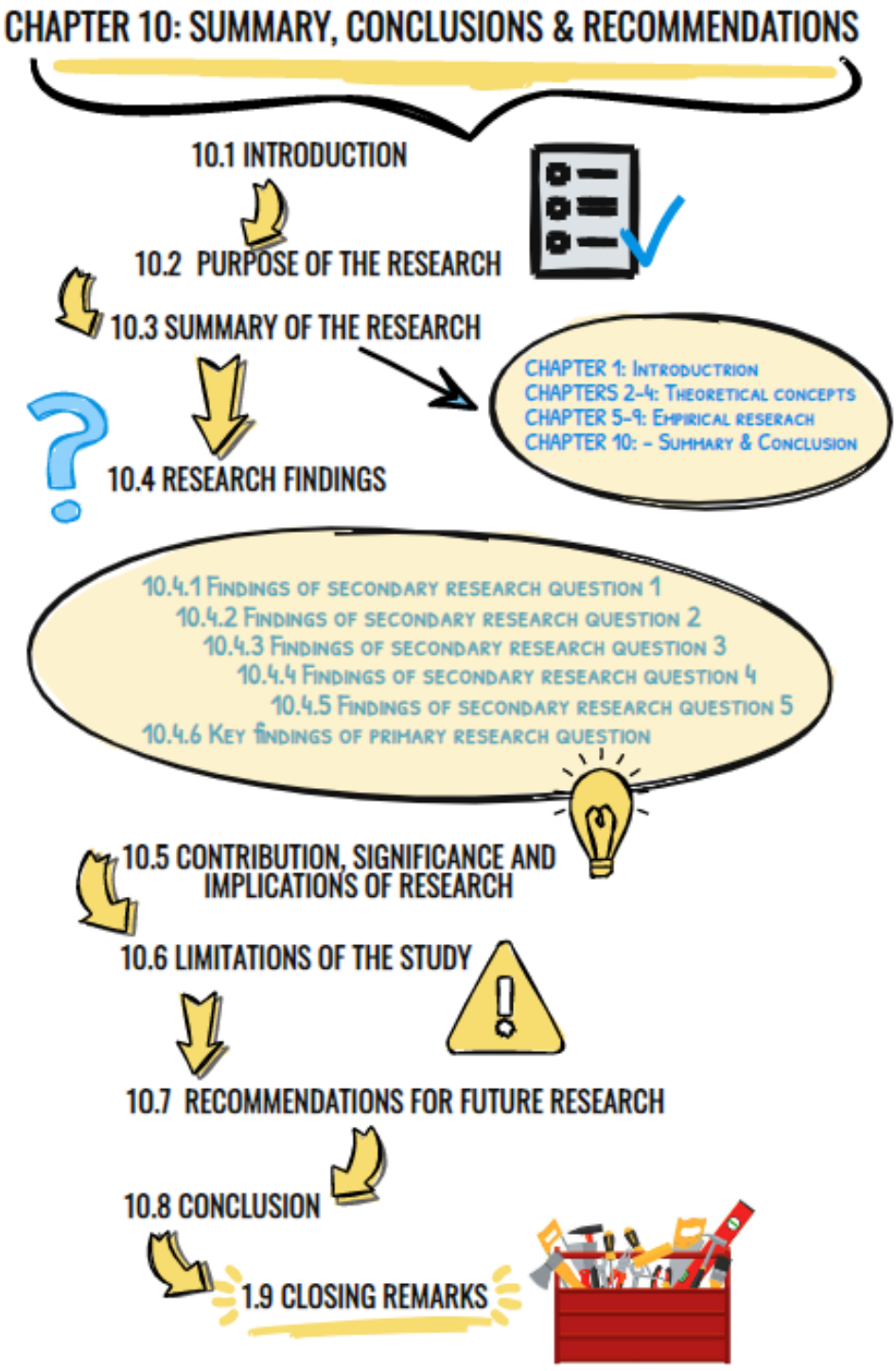


Figure 10-1: Mind map of chapter 10

10.1 INTRODUCTION

This chapter provides an overview of how the purpose of the study was addressed through the relevant research questions. A brief summary of each chapter is provided. The conclusions of the study are presented, followed by the recommendations on the incorporation of a VL component in the academic literacy course. The recommendations are followed by a discussion of the significance and implications of the research. The limitations are also addresses, followed by suggestions for future research. The conclusion of the study is followed by a final closing remark.

10.2 PURPOSE OF THE RESEARCH

The purpose of the study was to make a practical and theoretical contribution towards the development of the VL of students from a rural South African campus.

Resulting from my lengthy engagement in language and literacy teaching, I have progressively noticed the lack of attention to the competencies and skills needed by learners to empower them to navigate the vast variety of visual information they are confronted with every day. Within the context of this study, the attention given to VL in the academic literacy module offered at the institution where the research took place was minimal (cf. § 6.4.1) nor could evidence be found of targeted attention to VL in subject-specific modules. The responsibility of VL education is also not, like at some other institutions, formally assigned to the librarians. The other platform that could enhance awareness of VL, even if only in a more informal manner, is through Art and Architecture and Design courses. At the time of the study, these courses were, however, not offered on the site of the HE institution where the research was conducted. A targeted and formal approach to address the VL of students was, therefore, lacking. The body of literature on VL was deemed the suitable place to gain information relevant to such an approach.

Despite the ever-growing body of literature on teaching VL skills in HE (Kedra, 2018), Brumberger (2019) maintains that VL research remains dispersed in respect of questions and methods. Internationally, only a few studies determining students' general VL skills have been published (Arslan & Nalinci, 2014; Brumberger, 2011; Palmer & Matthews, 2015; Takaya, 2016). Within a South African context, two studies with limited relevance could be found (Le Roux, 2009; Mnguni et al., 2009). Studies reporting on the impact of formal instruction on the VL skills of students are also scarce (Hollman, 2014; Linenberger & Holme, 2014; Yeh & Lohr, 2010). Most studies in the pedagogical strand are case studies. A valuable contribution to the pedagogical strand of VL was made by Kedra (2018) as well as the ACRL (2011, 2016, 2019) by producing lists of concrete, measurable competencies.

The study, therefore, aimed to contribute to the enhancement of VL of first-year students. This entailed determining the VL competencies needed by students in a multiliteracies academic environment. In addition, the VL competencies they already had needed to be determined. The results obtained from these two activities then informed the competencies that needed to be addressed to accomplish the envisaged aim. A strong focus was placed on multimodality, SDL as well as mobile learning. In this regard, the study also aimed to contribute to these fields by highlighting opportunities they offered to be used in collaboration with each other in the planning and implementation of educational teaching and learning activities. It was hoped that by combining the enhancement of the VL and the suggested affordances of a multimodal mobile approach, the self-directedness of students would be influenced positively. The recommendations could assist scholars who also want to attempt to include these components in their teaching and learning activities.

10.3 SUMMARY OF THE RESEARCH

In this section, the individual chapters that made up this thesis are briefly summarised.

Chapter 1 provided the foundation for the inquiry on how the VL of first-year students could be addressed, specifically in the existing academic literacy module. I presented some background to the transformation of literacy, referring to the multiliteracies environment, as well as the relevance of VL. I also touched on the dissonance that exists between the everyday reality of students as regards exposure to technology and different modes of communication and the academic environment where traditional literacy practices are still dominant. After the terms had been clarified, the research questions were announced, followed by a brief discussion and motivation of the research design, as well as the different contexts that influenced the research. In this regard, I wish to specifically refer to the challenges within the organisational context in respect of the diverse student body, as well as the expectations from HE as stipulated in the national policy, which, among others, expect HE institutions to prepare students for the modern world, where information and data are shared via technology and the visual mode stands central. This was followed by a brief discussion of the research process and methodology, including sampling, data collection and analysis. The chapter concluded with the ethical considerations and reference to the contribution and significance of the study. The next three chapters were dedicated to the theoretical and conceptual frameworks of the study.

In ***Chapter 2***, the concept of literacy was reviewed, referring to the traditional and 21st-century views of the concept. The important components of 21st-century literacy were attended to. The social context of literacy, the role of technology, and the multimodal nature of literacy were found to be some of the cornerstones that would play a role in this study. This was followed by literacy

within the context of this study, namely HE. The focus was on the literacy challenges that existed in the SA rural context, as they were key determiners of the success or failure of students.

Two of the discussed challenges, specifically relevant to this study, were the lack of general literacy skills as well as the issue of academic acculturation. The logical next section provided a look at one of the interventions that was put into place to address all these literacy challenges, namely the introduction of academic literacy modules. The conceptual background was provided, after which the different approaches were explained. The section on academic literacy at the relevant institution provided insight into the context, approach and content of the modules.

Chapter 3 was dedicated to VL. It started with a chronological overview of the historical phases and development of the concept. An important conclusion in this regard was the identification of shared concepts throughout the history of the concept. These proved to be highly relevant to this study: the role of technology, the intersection with other literacies, the visually orientated society as well as the need for formal instruction. Other important findings relate to the challenges that impact on the field of VL, both on a theoretical and practical level. The various VL definitions were attended to with the aim of formulating a working definition for this study.

Aiming at narrowing down of this vast concept, the next section focused on VL in HE. Owing to the importance of this in the context of the study, several aspects were investigated. The body of research served to inform me on the different aspects that had been researched as well as where the existing gaps were. The reality of VL in HE worldwide was addressed to determine and compare the position related to this study. Then the motivations for attending to VL in HE were unpacked. A look at the current student body and their perceived VL skills served as important background in respect of the aim of this study to address the VL of students in a specific context. The final section on the acquisition of VL provided the necessary practical information to inform the approach that would be suitable for this study.

Chapter 4 was the last chapter concerned with the literature review and addressed the remaining three theoretical concepts in this study, namely multimodality, SDL, and mobile learning. I attempted to use a similar structure for all three concepts, starting with a contextual and conceptual overview of each concept. First, I discussed the concept of multimodality. Multimodality was addressed within the teaching and learning context. I provided an overview of the relevant aspects and also included a section on the levels of multimodality. This was followed by a look into specific multimodal models for education. This was important to inform my decisions on how to address VL.

The SDL section also looked at different models as well as the misconceptions related to SDL. The different role players in SDL relevant to the study were then attended to, including the student, the role of the lecturer, and the role of technology. The section concluded with the fostering of SDL and what it entailed. The third concept was mobile learning. Once again, I deemed it necessary to look at misconceptions to clarify the concept from the start. Mobile learning in HE was then attended to, with specific reference to challenges and affordances. In this regard, the specific context was kept in mind to ensure the relevance of the information.

Each section, as well as the chapter, was concluded with a synthesis of the concept as well as its relation to the other concepts. This was done to clearly address the integration of the three different concepts as envisaged for this study.

Chapter 5 marked a shift from the literature reviews covered in the previous three chapters to the empirical research that was described in the remaining five chapters. After the theoretical background of literacy, academic literacy and VL, as well as the relevance of multimodality, SDL, and mobile learning had been established, the VL competencies and needs of students were discussed.

The chapter involved an overview of the overall research methodology; it explained the possible strategies that could be followed to identify the cases, how the data were to be collected as well as the envisaged analysis process within the specific integrated methodology that was followed. The validity and trustworthiness, as well as the various ethical considerations were attended to in this chapter for the research as a whole. I also provided a motivation for the decision to handle each of the four research phases in a separate chapter due to the different methodologies applied in each.

The next four chapters each reported on a phase of the empirical research. Each chapter followed the same structure as presented in FraIM (Plowright, 2011). This involved the cases, which included the specific data source management strategy and sampling decisions for the specific phase. The next section of each chapter explained the data collection methods, followed by the data analysis, the findings, and claims and recommendations.

Chapter 6 presented the first phase of the empirical research, namely the document analysis. The documents included three different sets: The first was the programme guidelines and syllabus of the two academic literacies modules offered at the specific institution. The outcomes, structure and lessons content were analysed. The section was concluded by providing the evidence and findings and finally making certain claims. The other two sets of documents were the ACRL and CEFR-VL framework documents. After the analysis, the evidence was combined in tables,

enabling a comparison of the different components. Similarities and differences were compared. The combined results of the document analysis led to the conceptualisation of a framework, which enabled the incorporation of the identified and needed VL competencies into the existing framework of the academic literacy module. In addition, a synthesis of the themes perceived as relevant to a visually literate citizen was also included. Both the framework and the themes were presented in the form of an acronym which would make it easy to remember the components.

Chapter 7 presented the second phase of the research, namely the survey that was administered in the form of an online questionnaire. The cases involved first-year students, and the methodology explained the design content and administration of the questionnaire. The sections of the questionnaire were informed by the components of the framework as conceptualised in chapter 6. The data analysis on turn was organised according to the different sections of the questionnaire. The data analysis process, in the form of thematic coding of the data, was discussed next. This led to certain claims and findings that informed the next phase of the research.

Chapter 8 discussed the third research phase, namely semi-structured interviews. The section on the cases described the sampling process and data source management strategy. The methodology employed to determine the interview content, the platform and the arrangement with the participants as regards the interview process were explained. This was followed by a description of the data analysis and the evidence that emerged. The six themes that emerged were introduced. These included the identification of barriers and opportunities as it relates to the VL of students. The chapter concluded with the findings and claims.

Chapter 9 was the fourth and final empirical chapter and concluded the research. It consisted of an artefact analysis aimed at confirming some of the findings and claims from the previous phases. The artefacts consisted of academic assignments with visual components and were collected from the participants who took part in the interviews. The criteria decided on to evaluate the artefacts were also discussed. These included criteria relevant to types of visuals, their presentation, as well as their sources. The findings, based on the evidence, were once again presented according to the framework structure as conceptualised in chapter 6.

10.4 FINDINGS OF THE RESEARCH

The research findings are based on and discussed with reference to how the study addressed the research questions. The following sub-section discuss the findings that emerged in respect of the five secondary research questions and one primary research question.

10.4.1 Findings of secondary research question 1

What are the visual literacy competencies (VLC) needed by students in an academic multiliteracies environment?

The answer to the above research question is informed by the complex and dynamic nature of 21st-century literacies (cf. § 2.2) as well as the recognition of the central role of the visual in many of the "modern" literacies over the last 50 years (Fransecky & Debes, 1972; Kress, 2005; Messaris, 2012). Internationally, the pedagogical strand of VL research has shifted to a more student-centred and social approach (Kedra, 2018). The key question is how students can best be supported to develop their VL as well as what competencies are needed (Brumberger, 2019).

No evidence of the existence of any formal approach or framework to address the VLC in a South Africa HE context could be found. The attention given to VL in the academic literacy modules was confirmed to be limited to the basics in respect of time, approach and content (cf. § 6.4.1). This was regarded as an underscoring of the needed competencies. This implied finding other sources to determine the VLC needs.

This research question was then approached through a document analysis of two sets of documents, representing frameworks that have been developed and revised to address VL in the United States of America and Europe (cf. § 6.4.2). The aim of these frameworks was to provide tools for educators, as well as to provide standards that can be used to formulate learning outcomes that address VLC (cf. ACRL, 2011; 6.4.2.2). In addition, they aim to provide guidance, not prescribe (cf. ENViL, 2016; 6.4.2.2).

These frameworks (cf. § 6.4.2.3) also contend that VL can (and should) be taught through direct instruction (cf. § 3.6.5.1) but also emphasise that it requires lifelong commitment (cf. § 6.4.2.2). The competencies (also referred to as skills – thus implying that they can be learnt) have an observable outcome that can be taught and assessed and are not stand-alone concepts but are embedded in the general educational domain. However, they need not be addressed at the same time and students can be introduced to them in a staggered approach, depending on the level of literacy and need (cf. § 6.4.2.2). If initiated in an educational milieu and approached in a structured manner, it could result in the fostering of SDL (cf. § 4.3.7).

The combined evidence from the two frameworks (cf. tables 6-7 and 6-8) revealed the premise that VL comprises a group of competencies or standards aimed at addressing a range of skills students need to navigate the multimodal environment. This approach implies a combination of

knowledge, skills and attitudes. Seven skill areas or standards were identified to address the needed VLC of students (ACRL, 2011):

Table 10-1: Needed VLC standards

Standard 1	**Defining the need for images**
Standard 2	**Finding and accessing visuals**
Standard 3	**Interpreting and analysing visuals**
Standard 4	**Evaluating images and their sources**
Standard 5	**Using images**
Standard 6	**Creating images and visual media**
Standard 7	**Understanding ethical and legal issues**

The format of the CEFR (cf. ENViL, 2016) includes the following:

Table 10-2: Dimensions of CEFR

Dimension 1	**Producing**
Dimension 2	**Responding**
Two dimensions	**Broken down into 16 competencies**

The structure of the academic literacy module offered an opportunity to incorporate the needed VLC (as identified in the document analysis) into a conceptual framework to address VL as a component of academic literacy. The three existing academic literacy sections – namely accessing, processing and producing academic information – were used to address the needed VLC (cf. § 6.5, table 6-9). The legal and ethical components of interaction with visuals were added

separately to complete the “APPLE” acronym for the proposed VL framework (cf. figure 6-2). A “4PC” concept represents the ultimate goal for visually literate citizens (cf. figure 6-3).

The overall conclusion on this sub-question is that the VLC needed by students include skills related to accessing (needing and finding of suitable visuals), processing (interpreting, analysing, evaluating, and using visuals) and producing visuals. These skills should be applied within the legal and ethical context relevant to the use of visuals. In addition, these skills need to be addressed in a focused way to properly introduce the concept and its relevance within the academic as well as everyday environment. This would lead to visually competent individuals.

The researcher realised that the detail of specific learning outcomes envisioned for the different VL skills might change or be adapted, as they still needed to be applied in practice. Another factor that could influence the perceived needed VL competencies in the context of this study was attended to in sub-question two. This question aimed to determine what VLC the students brought with them when they entered HE.

10.4.2 Key findings of secondary research question 2

What visual literacies do rural first-year students bring with them to the university?

The findings are discussed according to the structure provided by the sections of the questionnaire, which were informed by the proposed VL framework (see § 10.4.1).

Overall, the participants showed a lack of understanding of the concept of VL. Although they indicated that they were familiar with the term VL (cf. § 7.5.7), the interviews revealed that participants did not have a clear understanding of the concept, except for linking it to what one sees and, in some cases, to information and learning (cf. § 8.5.1.2). The majority of participants regarded themselves as being visually literate (cf. § 7.5.7). However, the interviews and academic assignments revealed that this was a misconception and that their VL competencies were limited (cf. § 7.7).

Biographical data deemed relevant addressed language and environmental aspects. The majority of participants studied in a language that is not their mother tongue (cf. § 7.5.1). This was identified as a barrier to literacy skills and communication in general, as well as to this research on VL (cf. § 2.3.1.5, 7.7, 8.5.1.3). The rural background of participants translated into a lack of exposure to visuals in both an educational and environmental context (cf. § 8.5.1.1; 8.5.1.3).

The findings on the competency of accessing visuals and related skills (need for visuals, search strategies, source of visuals, types of visuals, criteria of visuals) revealed the following:

Participants were not able to determine when the use of visuals in academic assignment was appropriate – they waited for instructions to guide them (cf. § 8.5.2.4). This is confirmed by the literature on similar studies (cf. § 8.5.2.1). A limited number of participants indicated that they employed specific search strategies (cf. graph 7-5).

As regards the sources participants used to access visuals, Google was indicated by the majority of participants for both academic and social purposes (cf. figure 7-3; 7-4, § 7.5.3, 8.5.2.2, 9.5.3; Graph 9.8). Similar results were reported in the literature (cf. § 7.5.3). Google Scholar was also mentioned, but difficulties with using the site were mentioned (cf. § 8.5.2.4). No speciality websites were used as sources for visuals in an academic context. These were, however, used for social purposes (cf. graph 7-4; § 7.5.3), indicating that participants were aware of these websites, but probably did not regard them as suitable for academic images.

Findings on the types of visuals revealed that the majority of participants did not know which types of visuals were suitable for academic assignments. They reported that they mainly engaged in writing activities (cf. figure 7-3; § 8.5.2.1). Participants were also unaware of criteria to determine the suitability of visuals (cf. § 8.5.2.3, 8.5.2.4). Contrary to this finding, in studies reported on in the literature, participants identified reliability as an important factor (cf. § 7.5.4, 8.5.2). In cases where visual material was used, participants indicated the use of graphs (cf. § 8.5.2.1). However, in their assignments, a variety of illustrations were also included (cf. graph 9.2; § 9.5.1.3).

These findings on the accessing of visuals led me to conclude that in general, participants were unsure and only had limited competencies in the different skills needed when accessing visuals.

The second competency was the processing of visuals and the skills related to it, namely, to interpret, analyse, evaluate, and use visuals.

The first set of findings are related to the physical recognition of visuals in different forms. Most participants were able to identify images related to academic activities (cf. table 7-6; § 7.5.4.1). Similar results were recorded for everyday images taken from the direct environment of the participants (cf. table 7-7; § 7.5.4.1). In terms of universal icons, participants were unable to interpret the use of colour (cf. figure 7-6; § 7.5.4.1). As regards historical photos, they could only recognise the one directly related to their world and experiences (cf. table 7-8; § 7.5.4.1).

Findings pertaining to the ability to evaluate images revealed that participants were aware of the manipulation of visuals, especially on social media and in magazines (cf. graph 7-6; § 7.5.4.2). In

the literature, this recognition is linked to their constant exposure to these types of visuals in everyday life (Lazard et al., 2020). Participants perceived visuals in academic sources as also being manipulated relatively often. This was surprising, taking into consideration the attention given to ethical practices when working with academic sources (cf. graph 7-6; § 7.5.4.2).

Findings on technical skills to process and use visuals in assignments indicated that participants did not process or modify visuals they downloaded from the Internet (cf. figure 7-7; § 7.5.4.3). The results on editing visuals on mobile devices showed a much higher incidence (cf. figure 7-7). Participants used the copy and paste functions to insert visual material into their assignments (cf. § 7.5.5.1, 8.5.3). The lack of other technical skills is also reported on in the literature on similar studies (cf. Matusiak et al., 2019; § 8.5.3.1). The assignments submitted illustrated that many participants did not provide visuals with a caption (cf. § 9.5.2; graph 9.6). The majority of visuals was, however, accompanied by explanatory text (cf. graph 9.5) and parts of visuals were labelled when relevant (cf. graph 9.7).

The final claim related to the different processing skills is as follows: Participants had the competency to recognise visuals they were regularly confronted with in their environment but were unable to recognise historically and culturally embedded images or place them in the relevant timeframe, even if the images were regarded as “famous”. This confirms the notion that modes or representation, in this case, visual mode, are embedded in the social semiotic approach (cf. § 1.6.1, 4.2.2, 7.5.4.1). The implication is that the social and cultural context within the multicultural environment of this study must be considered in all planned actions to address the VL of students. Other conclusions include that participants were aware of the manipulation of visuals. Regarding technical competencies skills, they only displayed basic skills. The third competency that was addresses was the producing of visuals.

Findings on the producing of visuals by creating their own visuals revealed that participants did not regularly attempt to create visuals in either the academic or social context (cf. § 7.5.5.2, 9.6). Participants also did not use applications suitable for creating academic presentations and indicated that they needed support in all of the relevant applications (cf. § 7.5.5.3). It was unclear how participants used graphs in academic assignments (cf. § 9.5.2.1) if they were not able to use MS Excel or similar applications to create the graphs. Participants indicated that they were interested in acquiring the relevant skills to create PowerPoint presentations, infographics as well as other visually orientated designs (cf. figure 7-8; § 8.5.4). When engaging in online activities through mobile devices, the most popular mode of communication was a combination of text and emojis, followed by text only (cf. § 7.5.5; graph 7-9).

The conclusion reached on the producing of visuals was that this competency appeared to be the least developed of the three. A lack of skills was clearly revealed. Participants, however, indicated a need to develop these skills. The applications relevant to academic presentations and assignments are deemed the most important due to their multimodal attributes.

The findings relevant to the legal and ethical use of visuals revealed that most participants indicated that they were aware of copyright protections of images. However, they did not know where to find free images (cf. § 7.5.6.1; figure 7-9) and indicated a lack of knowledge on how to reference visuals or where to find the necessary information relevant to the visual (cf. § 8.5.5.2). They did seem motivated to reference images to avoid plagiarism (cf. § 8.5.5.1) and except for just one participant, all indicated that they did acknowledging visual ownership in academic assignments (cf. § 7.5.6; graph 7-10; § 8.5.5.2). However, in reality, they did not reference visuals in their assignments (cf. § 9.5.5; graph 9.4; § 9.5.1.1; 9.5.5.2). Similar behaviour was confirmed in studies reported on in the literature (cf. § 9.6).

The claim that can be made on the understanding participants had of the ethical and legal use of visuals is that students had some awareness of the ethical requirements when using visual; however, they did not apply it in practice and did not reference visuals in any way.

A general finding related to this sub-question and important in the context of this study was the claim by participants that they received minimal guidance or support in their engagement with visuals. Peer support was indicated as a form of support received. This was deemed important in terms of the theoretical grounding of a constructivist approach to the teaching and learning activities of this study. Participants also indicated that they consulted the Internet when they wanted to gain some VL skills needed for assignments. This, in turn, suggests a perceived motivation towards self-directedness (cf. § 8.5.1).

The overall conclusion reached regarding secondary research question 2 is that the VL competencies, with all the related skills, that first-year students bring with them are very limited in terms of the needed competencies identified in sub-question 1. This served as a confirmation and motivation for the decision to attempt to include VL in the academic literacy module.

10.4.3 Key findings of secondary research question 3

What multimodal teaching and learning activities could be used to develop the visual literacy of students?

The findings related to this question were mainly informed by the literature review of the study. Multimodal teaching and learning activities imply a multimodal environment. Such an environment would enable lecturers to design and use activities offering differentiated instruction, considering learning needs, and motivating to students to succeed (Kennedy, 2020). The following guidelines should be attended to when deciding on multimodal activities. The first guideline for multimodal teaching and learning activities is the use of multimodal texts. Students need to engage with different types of texts, not be verbally informed about them. Examples of multimodal texts that include visuals are infographics, slides, PowerPoint presentations, visual worksheets, and videos (cf. § 2.2.2.4, 3.6.3).

The second guideline is to refrain from overloading students with too many modes too often, especially while in the introductory phase of multimodal activities. Picciano's multimodal model for Online Education (2017) (cf. § 4.2.4; figure 4-3) could contribute positively in terms of being a flexible approach to pacing and spacing multimodal activities. A balance in the type and mode of activities will prevent students from becoming detached and demotivated (cf. § 4.2.3).

The third guideline as regards multimodal activities is to include a variety of modes. Although the Internet and mobile technologies have impacted strongly on multimodal content (cf. § 4.1.2), multimodal activities do not imply technological sources only. Multimodal source material can be paper based (e.g., posters, PowerPoints, textbooks, infographics), live (performance, enacting), or digital (films, videos, slideshows, podcasts). It is important to include and support digital activities. Such visual activities can relate to the real world where students communicate and engage through digital modes. The interaction through digital modes is enabled by the affordances of the mobile devices that students use (cf. § 4.4.3.2.2). Preparing students for careers in the digital future serves as motivation for including these types of activities. According to Kennedy (2020), technology and digital modes offer a way to engage students and enhance their confidence, as they are familiar with the device and mode. Activities that can offer digital learning opportunities include online research, game-based learning (cf. § 4.2.3.1), collaborative online discussions (§ 4.2.4), and contributing to a wiki for a group assignment.

The fourth guideline is to include multimodal assignments – if teaching is multimodal, the assignments and assessments should be too. Students should be encouraged to use more than one mode by designing multimodal assignments, for example, group projects, reflection exercises, and presentations. However, the instructor should carefully consider what is being assessed and provide clear guidelines on the use of multimedia or multimodal sources.

The fifth guideline pertains to the interactive nature of multimodal learning – the student should be central and the teaching and learning activities should focus on the sharing of semiotic

resources between learner and instructor, as well as learner and learner (cf. § 3.4.4; 4.2.3). This is in line with Gardner's theory of multiple intelligences (1983) (cf. § 4.2.3) as well as Picciano's motivation for multimodal activities (2017) (cf. § 4.2.3).

The final guideline is to provide multimodal feedback – multimodal learning activities followed by multimodal assignments cannot be assessed giving numerical or textual feedback only. Examples of multimodal feedback include short videos with screenshare where the instructor demonstrates and indicates both the positive aspects and the needs for development – verbal feedback through applications like "backchat". Surprisingly enough, even tertiary students are motivated by external rewards such as stickers and badges (Eikmeier, 2018). These can be in the form of stickers on paper assignments, virtual stickers, or emojis in WhatsApp feedback. Some other considerations related to multimodal activities include the following:

Content of activities: In the context of this study, the content was guided by the VLCs as identified through the document analysis (cf. chapter 6) and the subsequent "APPLE" framework (§ 6.5; cf. figure 6-2). The array of VL competencies, based on ACRL's VL Standards (Hattwig et al., 2013), can also be consulted for a more detailed summary of skills that can be addressed within each competency. The following examples of possible multimodal activities were inspired by:

- my engagement with published VL studies on the incorporation of VL in the classroom.
- documents like *Visual Literacy for Librarians* (Brown et al., 2016) and *Data Visualizationn in Society* (Kennedy & Engebretsen, 2020);
- websites like *Visual Literacy Today* and the *Visual Literacy Group* on Diigo;
- my own reflective journal that I have been compiling during my teaching career;
- continuous professional development opportunities offered by my institution (e.g., "OLC Multimodal course design: offered by the Online Learning Consortium);
- training offered by other institutions through the online or face-to-face mode of delivery, for example, a 16-week online introductory course and an advanced face-to-face course on teaching and learning with digital media at the Goethe Institute in Berlin, Germany ("M2.1-K & M 2.2-K Unterrichten mit digitalen Mediien für Fortgeschrittene").

Examples of multimodal activities and strategies to improve the VL of students:

- using sources with a variety of images and diagrams;
- including visual elements in lessons, for example, slideshows or videos;
- activities that require students to organise their thoughts, like flowcharts, diagrams, and graphs;
- give activities that include visual elements like diagrams, models, pamphlets;

- employ case-based learning by using real-life examples or events; watch a news clip, listen to an interview, have a class discussion as an introduction, and give assignments for example, to find images, create a visual presentation, conduct interviews, make a video with a mobile device;
- let students engage in reflective journaling to comment on class material, and encourage them to personalise it through charts, illustrations, trackers, tables, and colours;
- think-pair-share, for example, use a suitable visual and employ the following steps: individual thinking, then discuss their views with a partner, then share their understanding/interpretation with the class, or online, depending on the mode of communication. This activity employs collaborative learning (cf. § 1.6.1, 8.5) to understand, cooperate and express ideas.
- Assign multimodal research projects in a staggered fashion by explaining a concept or competency and then requiring the students to apply that knowledge through different sources and modes. Feedback can be in the form of multimodal group presentations, or via a video uploaded in the LMS or Google drive.

The attention to this secondary research question led me to conclude that there are many opportunities and possible multimodal activities to address the VL of students. Employing a multimodal approach can empower students and optimise learning. However, the lecturer should "practise what they preach" and model the interaction with multimodal sources by engaging with multimodal content and methods. The integration of multimodal components should be well-planned and not be applied haphazardly. In addition, the needed VL competencies represent such a wide variety of skills; introducing VL should be seen as a process and regarded as a long-distance journey.

10.4.4 Key findings of secondary research question 4

How could multimodal mobile visual literacy activities contribute towards fostering SDL?

The findings of this sub-question are once again based largely on the information obtained through the literature review, although some empirical findings also contribute to the findings. The SDL model, as designed by Oswalt (2003) (cf. § 4.3.3; figure 4-5), was chosen to inform the SDL component of this study. The decision to use one model is motivated by the many different approaches and models relevant to the comprehensive field of study as well as its compatibility

with Picciano's multimodal model (2017) (cf. § 4.2.4; figure 4-3). Thee three contributors towards SDL, as identified by Oswalt, are drawn on used to answer the secondary research question.

One of the role players is the lecturer, who becomes the facilitator of learning within the SDL context. The findings on their role within the context of this study indicate that it is their responsibility to create a learning environment where learners can engage with different modes of learning. This opportunity enables learners to discover their specific learning styles and preferences, which serves as intrinsic motivation to become more self-directed (cf. § 4.3.7). In their goal to guide students towards becoming self-directed, the lecturer should give students a degree of control over their own learning and then provide them with support (cf. § 4.3.3). According to the multimodal model of Picciano (cf. § 4.2.4), the processes students engage with in multimodal activities imply the use of a combination of different modalities – for example, face-to-face instruction to introduce a topic, followed by content provided in the LMS, a collaborative discussion session via the affordances of technology and finally, a reflective process where personal input is required. These different modalities involve the students in their own learning, guide them to be self-directed in making decisions on how, what and where to engage in the process, and offer the opportunity for collaboration with others (cf. § 4.3.5). All of these are facilitated by the lecturer.

Another role player in the SDL process is the learning resources. Findings in this regard include the important role of the educator to provide not only learning material but also motivate students with the aim of instilling self-confidence in learners. This can be done by selecting appropriate multimodal activities on a level that is achievable. Another finding implies that lecturers can engage and motivate students by selecting appropriate learning approaches, for example, problem-based learning, which engages the student with real-life contexts. Once again, the selection of available components within Picciano's multimodal model creates opportunities for collaborative learning, problem-solving and constructing knowledge – all skills associated with self-directedness.

The student is also a role player in the SDL process. According to Francom (2010), students should be engaged in their own learning if they want to become self-directed, and Guglielmino (1997) provided both a valuable definition as well as a list of characteristics of SDL learners still recognised today. Findings in this regard imply that the lecturer can control this component the least. Of course, lecturers can facilitate the process through the structuring of multimodal activities as explained above and raise awareness by informing students on the affordances of being self-directed, but in the end, it remains the choice and responsibility of the students themselves. They need to be active contributors to their own learning process.

The final role player in the fostering of SDL is technology. Findings include the fact that the mobile device has many affordances that support multimodal learning that fosters SDL (cf. § 4.4.3.2). Technology also enables learners to take control of their own learning – they can decide where and when they want to learn and what information they want to access and with who they want to communicate or collaborate on which platforms (cf. § 4.3.6). Research offers many examples of the positive influence of technology supported learning of SDL (cf. § 4.3.6). Other findings relevant to mobile learning is that most students own mobile phones and use them for learning activities (cf. § 7.5.2).

In conclusion, it can be claimed that multimodal activities offer the perfect opportunity to develop and foster SDL. In the context of this study, these multimodal activities also imply VL activities. The contributions of the different role players, namely the lecturer and students, are of cardinal importance to foster SDL. The one is reliant on the other. Technology, with the mobile phone the device of choice, offers many affordances that can support both multimodal activities and enhance self-directedness.

10.4.5 Key findings of secondary research question 5

What recommendations can be made with regard to the content, multimodal teaching and learning activities and fostering of SDL skills for a visual literacy component in the academic literacy module?

I draw on the conclusions from the first four secondary research questions (cf. § 10.4.2–10.4.3) to make the following recommendations for a VL component in the academic literacy module. The recommendations pertain to content, multimodal teaching and learning activities, as well as fostering SDL skills.

10.4.5.1 Recommendations for content

The first recommendation is to include a wide variety of multimodal texts in VL activities. This would ensure the exposure of students to all possible types they might be confronted with. The most popular types are infographics, videos, slides, visual worksheets, PowerPoint presentations, photo series, cartoons, and photos.

Another recommendation is that this variety of multimodal texts should be used to address the VLC as identified for development of VL of students.

Select content that is suitable for the learning objective – for example, a graph cannot be used to illustrate design principles.

Select content and multimodal texts that speak to the world of the students – this would contribute to their interest and involvement. Also link the content to real-life situations and practical applications with regard to where students would need the abilities addressed through the content.

Stagger the content of the multimodal VL activities in a way that would empower students to apply and produce a product. When the goal is to enable students to create their own infographics, the relevant components should be offered in a series of sessions, for example, design principles – size of text, use of colour, use of font, type of information, page layout to highlight certain content; evaluation of examples of infographics, the function of an infographic. At the end of the series of sessions, the students would then be required and able to combine all the acquired skills in their own design.

The content should also be suitable for online collaboration and evaluation. The LMS or a blog can be used to which students can upload the content they created.

The next sub-section discusses the recommendations for multimodal activities.

10.4.5.2 Recommendations for multimodal teaching and learning activities

The first recommendation is to determine the learning objective of the VL activity – what do we want students to be able to do? This is regarded as a crucial starting point, given the vastness of the VL field.

Once the objective has been determined, an image or suitable visual material is needed – o worthwhile outcome of any VL activity can be attained without a suitable image to guide the activity. Depending on the purpose of the activity, the recommendation is to familiarise oneself with websites specialising in visual material suitable for educational purposes or to consult an image bank for resources suitable for visual analysis.

Use the multimodal model of Picciano (2017; cf. figure 4-3) to plan multimodal online, classroom or assessment activities aligned with the outcomes and goals identified. These pedagogical goals are already incorporated in the model and clearly structured.

Another recommendation is to take advantage of the flexibility of the model to combine different goals for different activities. Also keep a balance between instructional, individual and

collaborative activities. This would keep students engaged and expose them to different combinations of multimodal activities to foster their self-directedness.

It is recommended that the levels of multimodality be used (Olivier, 2018, 2020) to ensure that different combinations of levels and modes are used in multimodal learning activities.

It is also recommended to start with basic multimodal VL activities and gradually increase the level of expertise needed. In this way, the different competency levels of the students can be determined. In addition, it will boost students' confidence if they feel they can manage the new concepts; in turn, this should encourage them to become more self-directed.

Activities need not be complicated but should encourage critical engagement with visuals, an ability the majority of students do not possess (cf. § 3.6.4). One example of such an activity was used in connection with art but can be translated into other suitable visuals as well. The process involves six steps – look, observe, see, describe, analyse, and interpret. Each step involves a deeper level of interaction (Toledo Museum, "The art of seeing art", n.d.)

Picciano's model (2017) includes three processes associated with the instructional mode and three with the evaluation mode. The recommendation in this regard is that the multimodal activity should always include at least one phase of both these processes. Assessing multimodal activities should also be done in a multimodal. A similar approach is followed in a learning programme of enhancing VL, designed by Ariga et al. (2016). The figure below shows the five steps or phases in their design:

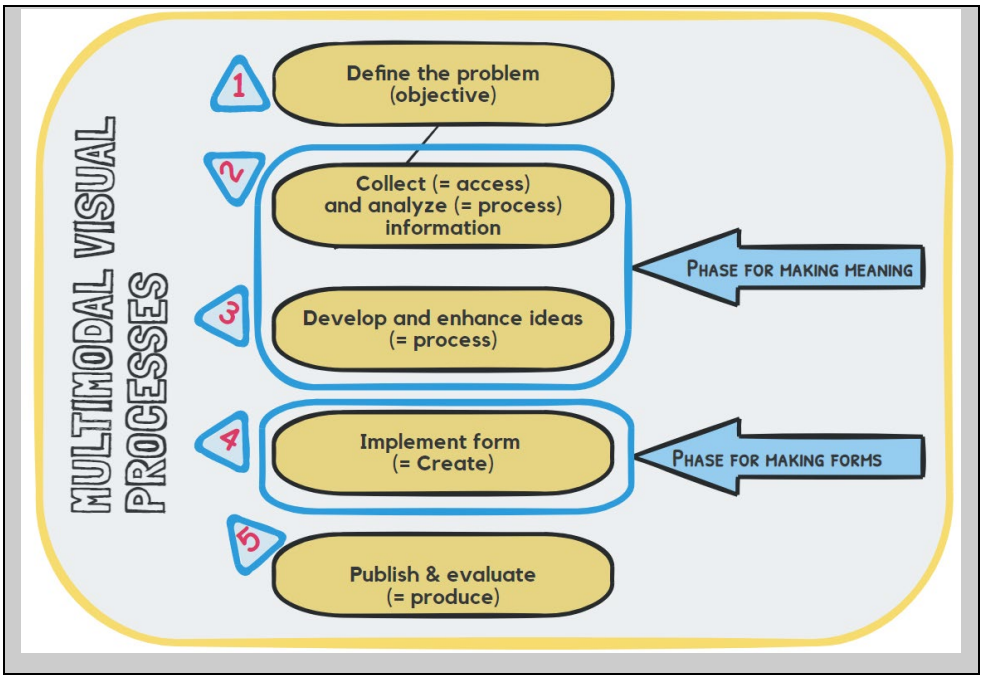


Figure 10-2: Phases for multimodal visual design process (adapted from Ariga et al., 2016)

Another recommendation is to display professional integrity in the interaction with images and assist students to understand current ethical and legal practices.

The final recommendation is to regard the teaching and learning of VL through multimodal activities as a long-term project with changing parameters. The ultimate goal is to prepare learners to be self-directed and visually literate members of society. There is no "one-size-fits-all" tick list for addressing VLC, as the social semiotic and communal constructivist approach emphasise the unique literacies of different communities, implying unique literacy needs as well.

10.4.5.3 Recommendations for the fostering of SDL skills

Recommendations for the fostering of SDL skills focus on which components of the multimodal teaching and learning process support SDL.

The first recommendation addresses the role of the educator: the educator should provide students the opportunity to develop their self-directedness. In addition, they should support them by balancing control and freedom when the students engage in multimodal activities.

It is recommended that activities be structured in such a way to ensure sufficient opportunities for collaboration with other students, as it has been proven as a definite influence on successful self-directedness (cf. § 4.3.3).

Another recommendation relevant to content skill is that students need to engage with the learning material to get a basic idea of the content, as the level of self-directedness is influenced by the skills level.

An important recommendation pertains to the learner's attitude and willingness: role players involved in the teaching and learning process should inform students on the effort required of them if they want to become self-directed.

A final recommendation in terms of fostering SDL is to design the instructions for multimodal activities according to the steps in Guglielmino's SDL process (2013), thus offering students a definite "plan" to foster their SDL. The process is visualised in the figure below:

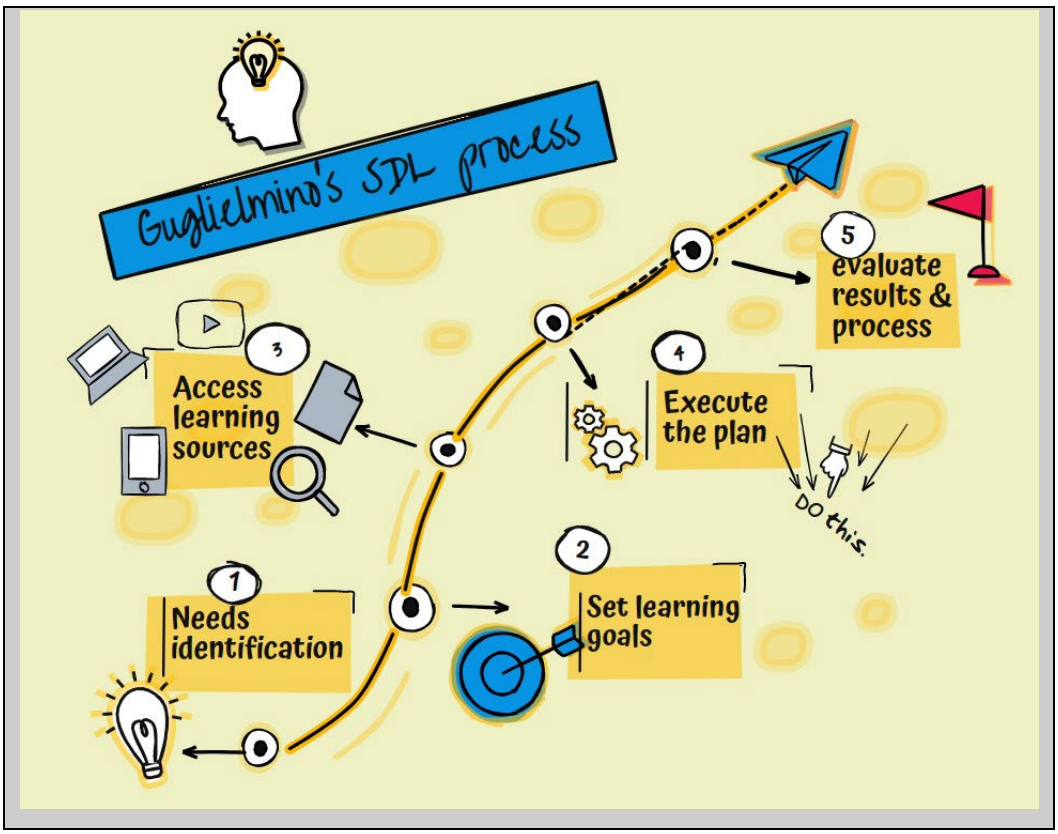


Figure 10-3: Visualisation of Guglielmino's SDL process (2013)

10.4.6 Key findings of the primary research question

How can the visual literacy of first-year university students be enhanced by means of self-directed multimodal mobile learning?

Self-directed learning in the context of the research refers to a process as described in the classical definition by Knowles (1975) (cf. § 4.3.2). The same components have been incorporated as steps in the SDL process of Guglielmino (2013), as visualised in figure 10-3. In the context of this main research question, it would mean that students could apply the steps in accordance with their VL needs. Şentürk and Zeybek (2019) contend that SDL is a requirement for multimodal learning. In addition, the levels of multimodality open up the options students have in respect of individual preference, interactional behaviour, and instructional action (Olivier, 2018, 2020). As far as the use of technology like mobile devices is concerned, Jewitt (2003) states that it makes students more independent, thus contributing towards their self-directedness. Rashid and Asghar (2016) state a positive relationship between technology and SDL and, according to Ioannou et al. (2016), mobile technology, can create self-directed multimodal learning environments where students can create online multimodal content. In addition, mobile

technology can facilitate communal constructivism – an important component of SDL (Brockett & Hiemstra, 2019).

The affordances of SDL, multimodality and mobile learning, as well as their interrelatedness as described above, serve as motivation to conclude that when applying them in combination in a learning situation or field of study (in this case, VL), the outcome will be positive.

10.5 CONTRIBUTION, SIGNIFICANCE, AND IMPLICATIONS OF THE RESEARCH

In terms of research design, it is hoped that the empirical approach to the subject matter, instead of the more often used theoretical approach, will be regarded as a timely contribution to the much needed practically orientated approaches to address real-life challenges in education.

Regarding the research topic, namely VL, the study provided a snapshot of VL within a specific context and, therefore, makes a significant contribution to the scholarship of VL in the rural university context of South Africa. Due to the role of technology as reflected in the study (cf. § 4.3.2.2), it could also contribute toward other studies on the role of mobile learning in both formal and informal educational settings, and ultimately life-long SDL through the use of IT. In addition, it is hoped that this study has contributed towards the knowledge on VL within the HE context of the study.

The pedagogical strand of VL, and more specifically research addressing the VLC of students, is an under-researched area. A questionnaire was designed to determine the VLC of the research population.

The research also contributed to the discourse on academic literacy by designing a conceptual framework for the incorporation of VL into an academic literacy module. This could serve as a starting point for other institutions who also wish to introduce VL as part of an existing programme.

The research also aimed to determine the role of multimodal mobile VL activities in the fostering the self-directedness of students. Through this aim, the study contributed to these study fields as well as to the research output of the SDL research entity in the Faculty of Education.

The study also provides a roadmap for lecturers in terms of what multimodal activities imply as well as their contribution towards the self-directedness of students. It also identified the VL needs of students and suggests a possible way of incorporating VL into the existing academic literacy module. In terms of VL, it provides pointers as to the content of a VL component.

10.6 LIMITATIONS OF THE STUDY

After the literature study, the empirical research and the results of the study had been taken into consideration, the following limitations were identified:

- The sample size was limited to the first-year students within one specific context (one selected rural university campus in South Africa). Consequently, no claims can be made as to the generalisability of the findings and conclusions. Although valuable results were obtained, perspectives from other campuses with a different student population could have enriched the study. A possibility could be considered to duplicate the research in another study.
- Despite all the efforts I had made, the online interviews offered some challenges in terms of the students understanding the questions. Also, the video function could not be used the whole time due to data and connectivity issues. This might have had an impact on the content of the answers.
- The effect of the planned VL component on the VLC of students could not be evaluated, as it has not been implemented yet. The ideal situation would be to re-administer the questionnaire after students had been exposed to the multimodal activities aimed at addressing their VL.

10.7 RECOMMENDATIONS FOR FUTURE RESEARCH

Based on the research, a number of recommendations for further research are made:

- A follow-up study can be done, but where an after-test is administered once students have been exposed to the basic VL competencies, as was done in the “APPLE” framework, to evaluate the effectiveness of the learning activities.
- As this study was conducted on only one of the three campuses of the institution, it would be interesting to see whether similar results would be found on the other campuses with a slightly different student body.
- The appropriateness of the mobile devices for the VL activities can be evaluated to determine the attitude and experiences of students.

10.8 SUMMARY AND CONCLUSION

This chapter concluded the study. It started with a short introduction, giving a brief overview of the context and the research methodology. This was followed by the purpose of the research and a summary of each chapter. The findings of the five secondary research questions were reported on, followed by the conclusion of the main research question. A summary was given of the

contribution and significance of the study. Limitations were mentioned, followed by suggestions for future research.

It is perceived that the study reached its aim of determining that the VL of first-year students could be enhanced through multimodal mobile self-directed activities. This conclusion was based on a literature review on the relevant concepts, a document analysis to determine the VLC needed by students, an online questionnaire to determine the VLC of students when they enter university, semi-structured interviews to confirm the findings of the questionnaire as well as an artefact analysis to determine how the practice relates to the information shared by students. These activities also enabled me to conceptualise a framework to accommodate VL in the existing academic literacy module. It is hoped that the findings and recommendations of the study will assist other researchers and scholars who also wish to incorporate VL into their learning programmes.

10.9 CLOSING REMARKS

The reader of this thesis would have noticed that I incorporated quite a number of colourful visuals to elucidate the written text. (I would have loved to include other modes as well, like recordings and videos; however, a thesis is not the appropriate vehicle for that.) I am a visually orientated person myself who can testify to being able to remember information better if I see it presented in colour and in a logical structure, enhanced by arrows and bullets. Allow me therefore to give a short visually inspired explanation of my perception of VL:

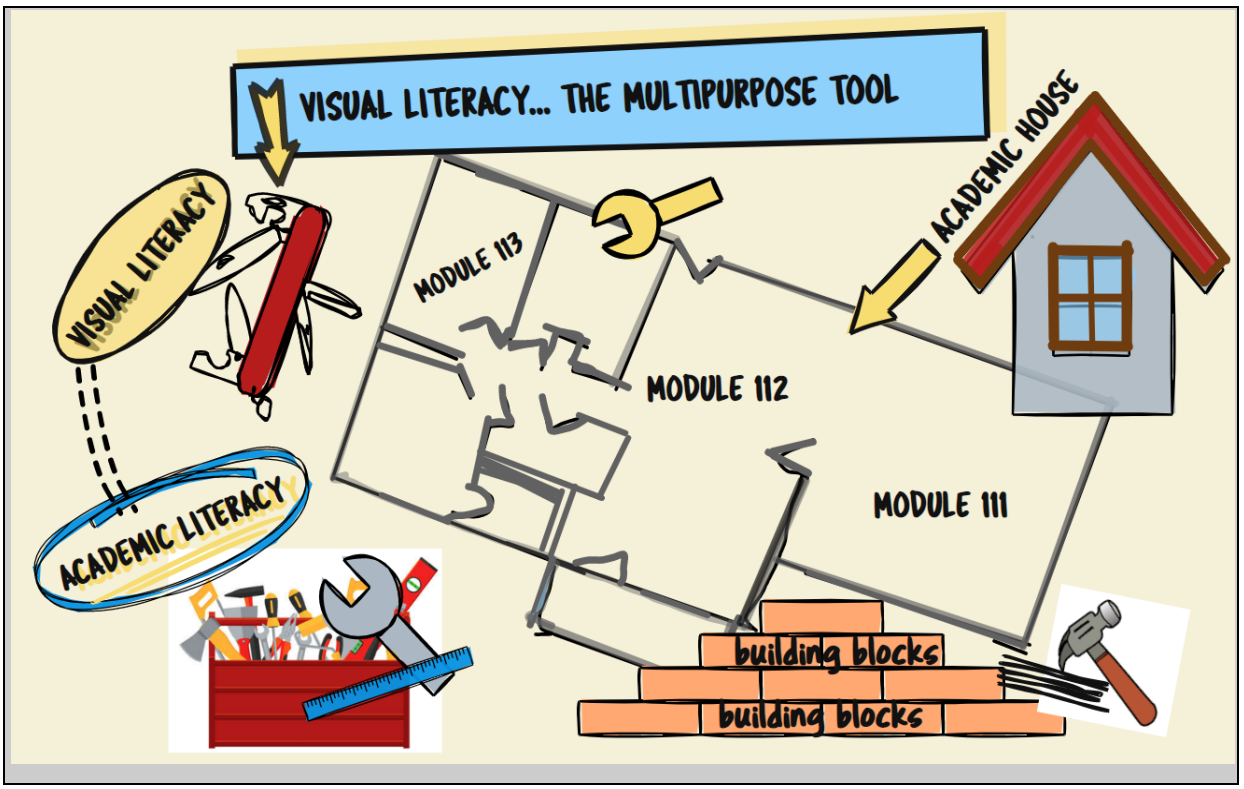


Figure 1010-4: Visual depiction of the role of VL

I regard first-year students as the architects and builders of their academic house. This process happens over time, as several rooms have to be constructed and lots of work has to be done: a foundation has to be laid and the different rooms must be built carefully, brick by brick. The rooms represent the different courses and activities they are engaged in which contribute towards the final house; houses also look different, as people use different materials and put in different amounts of effort. I regard the academic literacy course I am involved in as the toolbox students need to successfully complete in the building process. (By the way, I take a toolbox to class to remind my students of the relevance and importance of the academic literacy course, which provides tools, not subject content.) The different tools all have different functions – for example, the time-management tool enables them to plan for all their work; the reading tool supports the development of the rooms, et cetera. There are many tools in this toolbox, as building a house is a complicated endeavour!

VL is also a tool in this toolbox, but it is a special, multifunctional tool – almost like a Swiss army knife. It can be used for many jobs in many contexts and offers a variety of functions – it can, for example, help one access ("unlock") visual information; it can help you to process ('adapt/change') elements of your house; and it assists you in creating your dream house ('build'). In fact, it has so many functions that you can keep on exploring and you will find a new use for it every now and then. However, the best part is that this multifunctional tool does not stay in the toolbox when you go home after a day's work or when your house is completed – no, you take it

with you everywhere you go, as you can use it everywhere and you never know when you are going to need it to assist you.

It is this wide application and suitability of the different functions of the tool of 'visual literacy' that motivate me to expose students to it and to make them aware of the value of VLC, not only in an academic environment but also in their everyday engagement with visuals.

In the words of *Dave Gray, founder of visual thinking company XPLANE:*

We are a visually illiterate society...

Our world is changing fast — faster than we can keep up with our historical modes of thinking and communicating.

Visual literacy — the ability to both read and write visual information;

the ability to ***learn visually****;*

to ***think and solve problems*** *in the visual domain —*

will,

as the information revolution evolves,

become a ***requirement for success*** *in business and in life.*

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ADDENDUM A: CONTEXT

ADDENDUM B: RESEARCH INFORMATION AND CONSENT FORM

RESEARCH INFORMATION AND CONSENT FORM

I herewith wish to request your consent to participate in this research, of which this phase involves completing a questionnaire. Before you give consent, please acquaint yourself with the information below.

The details of the research are as follows:

TITLE OF THE RESEARCH PROJECT:
Enhancing the visual literacy of first year students by means of self-directed multimodal mobile learning.

ETHICS APPLICATION NUMBER
_____

PROJECT SUPERVISOR: Prof. J.A.K. Olivier
ADDRESS: Internal box 539, Faculty of Education, North-West University, Private Bag X6001, Potchefstroom, 2520
CONTACT NUMBER: +27 (18) 285 2215

MEMBER OF PROJECT TEAM PhD student M Mathee
ADDRESS: School of Languages, North-West University, Private Bag X2046, Mmabatho, 2745
CONTACT NUMBER: +27 (18) 389 2113

FACULTY OF EDUCATION RESEARCH ETHICS COMMITTEE
Contact person: Ms Erna Greyling, E-mail: Erna.Greyling@nwu.ac.za, Tel. (018) 299 4656

This study has been approved by the Research Ethics Committee of the Faculty of Education of the North-West University and will be conducted according to the ethical guidelines of this committee. Permission was also obtained from the NWU's Research Data Gatekeeper Committee.

What is this research about?
The aims of this research are to determine:

- The visual literacy competencies that students bring with them to the university.
- The visual literacy competency standards (VLCS) needed within an academic multiliteracies environment.
- The multimodal teaching and learning activities to develop the visual literacies of students.
- How the multimodal mobile visual literacy activities contribute towards fostering Self-directed learning (SDL).
- Recommendations with regard to the content, multimodal teaching and learning activities as well as fostering of SDL skills of a visual literacy component in the academic literacy course.

Participants
- First-year students (on the Mahikeng campus)

What is expected of you as participant?
The first phase requires you to complete and online questionnaire on visual literacy. The next phase of the research is completely voluntary and will entail self-directed multimodal interventions with the aim to develop your visual literacy. The exact content of the interventions will be determined by the results of the questionnaire. Focus group interviews on an online platform will evaluate your experience of the above interventions, if you were to volunteer to be part of the post-questionnaire phase.

Benefits to you as participant
You will learn more about Visual Literacy, why it is important and how it can be developed.

Risks involved for participants
No risks are envisaged.

Confidentiality and protection of identity
Your answers to the questionnaire will be kept confidential and the identity of participants will be protected and privacy respected.

Dissemination of findings
The finding will be shared with participants once the study is published.

If you have any further questions or inquiries regarding your participation in this research, please contact the researchers for more information.

Yours sincerely
M Mathee

DECLARATION BY PARTICIPANT:

I hereby agree to take part in a research study entitled:
Enhancing the visual literacy of first year students by means of self-directed multimodal mobile learning
I declare that:

- ☒ I have read this information and consent form and understand what is expected of me in the research.
- ☒ I have had a chance to ask questions to the researcher and all my questions have been adequately answered.
- ☒ I understand that taking part in this study is voluntary and I have not been pressurized to take part.
- ☒ I may choose to leave the study at any time and will not be penalized or prejudiced in any way.
- ☒ I may be asked to leave the research process before it has finished, if the researcher feels it is in my best interests, or if I do not follow the research procedures, as agreed to.

NAME: _____ SURNAME: _____ DATE: _____

ADDENDUM C: VISUAL LITERACY QUESTIONNAIRE

Visual Literacy Questionnaire

AIM: To determine visual literacy (VL) competencies of students. This was designed according to the Framework of VL competencies which has been adapted for the purpose of this study as well as the Visual Literacy Competency Standards (VLCS) as determined by the Association of College and Research Libraries (ACRL).
DESIGN: The questionnaire has been designed on the Google forms app. This has been done so that it can be administered electronically via eFundi to the relevant students.

* Required

RESEARCH INFORMATION AND CONSENT FORM

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- How the multimodal mobile visual literacy activities contribute towards fostering Self-directed learning (SDL).
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Participants
- First-year students (on the Mahikeng campus)

What is expected of you as participant?
The first phase requires you to complete and online questionnaire on visual literacy. The next phase of the research is completely voluntary and will entail self-directed multimodal interventions with the aim to develop your visual literacy. The exact content of the interventions will be determined by the results of the questionnaire. Focus group interviews on an online platform will evaluate your experience of the above interventions, if you were to volunteer to be part of the post-questionnaire phase.

Benefits to you as participant
You will learn more about Visual Literacy, why it is important and how it can be developed.

Risks involved for participants
No risks are envisaged.

Confidentiality and protection of identity
Your answers to the questionnaire will be kept confidential and the identity of participants will be protected and privacy respected.

Dissemination of findings
The finding will be shared with participants once the study is published.

If you have any further questions or inquiries regarding your participation in this research, please contact the researchers for more information.

Yours sincerely
M Mathee

DECLARATION BY PARTICIPANT:

I hereby agree to take part in a research study entitled:
Enhancing the visual literacy of first year students by means of self-directed multimodal mobile learning
I declare that:

- ☒ I have read this information and consent form and understand what is expected of me in the research.
- ☒ I have had a chance to ask questions to the researcher and all my questions have been adequately answered.
- ☒ I understand that taking part in this study is voluntary and I have not been pressurized to take part.
- ☒ I may choose to leave the study at any time and will not be penalized or prejudiced in any way.
- ☒ I may be asked to leave the research process before it has finished, if the researcher feels it is in my best interests, or if I do not follow the research procedures, as agreed to.

NAME: _____ SURNAME: _____ DATE: _____

Section 1: Biographical data

1. 1. Please insert your student number for administration purposes. *

_____

2. 2. Please indicate your age in numbers. *

_____

3. 3. Please indicate your gender. *

Mark only one oval.

- Female
- Male
- Prefer not to say

4. 4. Please indicate your mother tongue. (For the purposes of this questionnaire, "mother tongue" is defined as the language you have grown up with and have been speaking from childhood). *

Mark only one oval.

- 1. Afrikaans
- 2. English
- 3. IsiNdebele
- 4. Isixhosa
- 5. Isizulu
- 6. Sepedi
- 7. Sesotho
- 8. Setswana
- 9. SiSwati
- 10. Tshivenda
- 11. Xitsonga
- 12. Other

5. 5. Please indicate your second language (for the aim of this questionnaire, it is the language you learnt later and use most frequently besides your mother tongue). *

Mark only one oval.

- 1. Afrikaans
- 2. English
- 3. IsiNdebele
- 4. Isixhosa
- 5. Isizulu
- 6. Sepedi
- 7. Sesotho
- 9. Setswana
- 9. SiSwati
- 10. Tshivenda
- 11. Xitsonga
- 12. Other

6. 6. Please indicate any other single language you are most proficient in speaking after your mother tongue and second language.

Mark only one oval.

- 1. Afrikaans
- 2. English
- 3. IsiNdebele
- 4. Isixhosa
- 5. Isizulu
- 6. Sepedi
- 7. Sesotho
- 8. Setswana
- 9. SISwati
- 10. Tshivenda
- 11. Xitsonga
- 12. Other

7. 7. What kind of environment did you mainly grow up in? *

Mark only one oval.

- 1. Urban / City
- 2. Rural
- 3. Town

8. 8. Do you own a mobile phone? *

Mark only one oval.

- Yes
- No

9. 9 . Do you own a basic mobile phone with limited functions?

Mark only one oval.

- 1. Yes
- 2. No

10. 10. Do you own a smart phone? *

Mark only one oval.

- 1. Yes
- 2. No

11. 11. Do you own a tablet? *

Mark only one oval.

- 1. Yes
- 2. No

12. 12. Do you own a laptop? *

Mark only one oval.

- 1. Yes
- 2. No

13. 13. To what extent do you use a computer in the university lab for STUDY PURPOSES?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

14. 14. To what extent do you use a computer or laptop you share with other family members for STUDY PURPOSES?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

15. 15. To what extent do you use your own desktop computer for STUDY PURPOSES?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

16. 16. To what extent do you use your own laptop for STUDY PURPOSES?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

17. 17. To what extent do you use a smartphone for STUDY PURPOSES?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

18. 18. To what extent do you use a tablet for STUDY PURPOSES?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

19. 19. To what extent do you use a computer in the university lab for SOCIAL / RELAXATION PURPOSES?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

20. 20. To what extent do you use a computer or laptop you share with other family members for SOCIAL / RELAXATION PURPOSES?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

21. 21. To what extent do you use your own desktop computer for SOCIAL / RELAXATION PURPOSES?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

22. 22. To what extent do you use your own laptop for SOCIAL/RELAXATION PURPOSES?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

23. 23. To what extent do you use a smartphone for SOCIAL/RELAXATION PURPOSES?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

24. 24. To what extent do you use a tablet for SOCIAL/RELAXATION PURPOSES?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

25. 25. Do you ever use your mobile device for navigation or directions, e.g. Google Maps? *

Mark only one oval.

- Yes
- No

26. 26. If your answer to the previous question was YES, which do you rely on most heavily?

Mark only one oval.

- verbal directions
- graphic images of routes

Section 3

27. 27. Do you know what kind of visuals (e.g. illustrations, graphs, sketches) is suitable for use in university assignments? *

Mark only one oval.

	1	2	3	4	
not at all					definitely

28. 28. Do you know when it is appropriate and necessary to use visual content in an academic assignment?

Mark only one oval.

	1	2	3	4	
Not at all					Definitely

29. 29. Have you ever been required to use visual content (e.g. graphs, info graphics, images etc.) in academic assignments?

Mark only one oval.

- 1. Yes
- 2. No

30. 30. Do you know when an image is copyright protected?

Mark only one oval.

- Yes
- No

31. 31. Do you know where to find images which are free and not copyright protected?

Mark only one oval.

- 1. Yes
- 2. No

32. 32. To what extent do you create your own visual content for use in ACADEMIC WORK?

Mark only one oval.

	1	2	3	4	
almost never					almost always

33. 33. To what extent do you create your own visual content to use for PRIVATE/SOCIAL PURPOSES?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

34. 34. To what extent do you use GOOGLE to find images for ACADEMIC use?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

35. 35. To what extent do you use GOOGLE to find images to use for SOCIAL/ PRIVATE purposes?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

36. 36. To what extent do you use Wikipedia to find images for ACADEMIC use?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

37. 37. To what extent do you use Wikipedia to find images to use for PRIVATE/SOCIAL purposes?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

38. 38. To what extent do you use Google Scholar to find images for ACADEMIC use?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

39. 39. To what extent do you use Google Scholar to find images to use for PRIVATE/SOCIAL purposes?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

40. 40. To what extent do you use specific websites like Flickr, Pixsy, Instagram etc. to find images for ACADEMIC use?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

41. 41. To what extent do you use specific websites like Flickr, Pixsy, Instagram etc. to find images to use for PRIVATE/SOCIAL purposes?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

42. 42. Are you familiar with search strategies to help you find the best images for your purpose?

Mark only one oval.

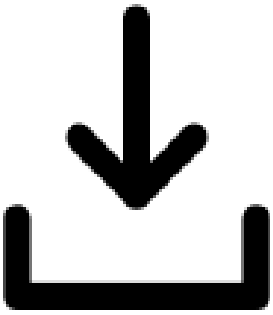
	1	2	3	4	
not at all	◯	◯	◯	◯	definitely

43. 43. What does the following symbol mean when you search for an image?

Mark only one oval.

- ◯ 1. Comedy Central
- ◯ 2. Company Credit
- ◯ 3. Copyright
- ◯ 4. Creative Commons
- ◯ 5. I do not know.

44. 44. What does the following symbol mean regarding images on the web?



Mark only one oval.

- 1. The image you found may be shared.
- 2. The image may be downloaded.
- 3. Internet is available to share the image you found.
- 4. The image you found may be saved.
- 5. I do not know.

45. 45. What does the following image refer to in an academic context?

Mark only one oval.

- 1. It is used in science to indicate that elements are being weighed.
- 2. It is used in history related subjects to show students what an old scale used to look like.
- 3. It is a symbol used to indicate the judicial system.
- 4. It is used in Sociology to indicate that everybody is equal.
- 5. I do not know.

46. 46. What does this image represent?

Mark only one oval.

- 1. studies
- 2. graduation
- 3. a diamond shape
- 4. a corner
- 5. I do not know.

47. 47. What does the following stand for?

Mark only one oval.

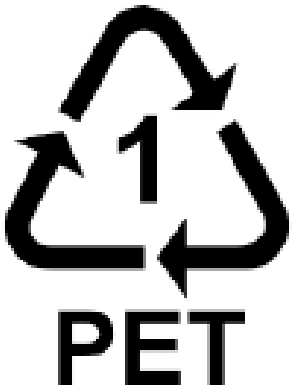
- 1. Internet available
- 2. Information
- 3. Symbol to indicate a new idea in a text book.
- 4. I do not know.

48. 48. What does the following sign stand for?

Mark only one oval.

- 1. It shows pedestrians where they should stand at road crossing.
- 2. A social space where friends can meet.
- 3. An emergency assembly point
- 4. I do not know.

49. 49. Where will you find this?



Mark only one oval.

- 1. On certain plastic products.
- 2. Inside a text book.
- 3. At an animal shelter.
- 4. I do not know.

50. 50. What does this symbol indicate?

Mark only one oval.

- 1. South Africa
- 2. The Proudly South African campaign.
- 3. It is used instead of the South African flag.
- 4. I do not know.

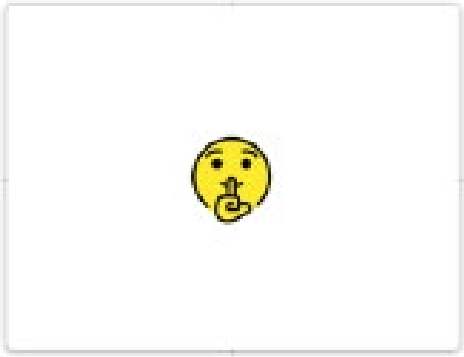
51. 51. Where is this sign most likely to be found?

Mark only one oval.

- 1. At the entrance of a lecture hall to indicate that WIFI is available.
- 2. Places where there is the risk of radiation.
- 3. Places where dangerous machinery is used.
- 4. Places where fans are used to circulate the air.
- 5. I do not know.

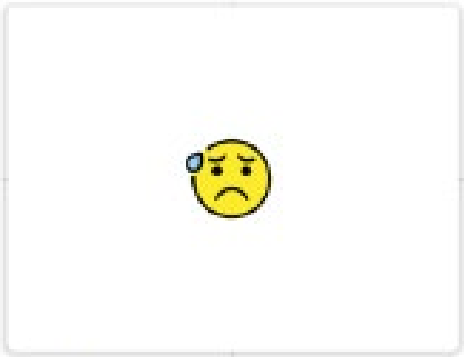
52. 52. If you wanted to convey anger, which emoji would you use?

Mark only one oval.

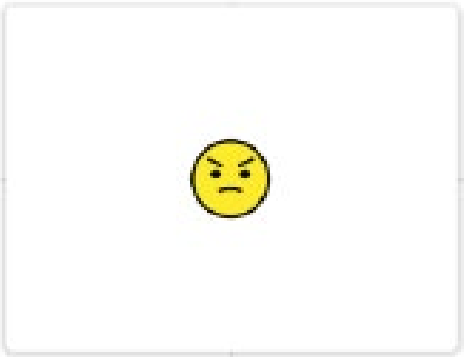


1.

2.



3.



4.

53. 53. Which of the following is universally associated with peace?

Mark only one oval.

1.

2.

3.

4.

54. 54. Which colour is traditionally associated with jealousy? *

Mark only one oval.

1. red
2. green
3. blue
4. black
5. I do not know.

55. 55. Have you ever seen this art work?

Mark only one oval.

- 1. Yes
- 2. No

56. 56. What is the historical context of this picture?

Mark only one oval.

- 1. It is an image after the Tsunami in Indonesia in 2004.
- 2. It is an image of the destruction during World War 2 (1984).
- 3. It is an image of damage in Perth, Australia caused by massive forest fires in 2019.
- 4. It is a photo of the ruines of the ancient city of Rome, dating back to 753 BC.
- 5. I do not know.

57. 57. What, according to you, is the context of this photo?

Mark only one oval.

- 1. Protesting.
- 2. Supporting a sports team.
- 3. Attending a social gathering.
- 4. Celebration of a national day.
- 5. I do not know.

58. 58. Do you consider the following to be a good or bad advertisement?

Mark only one oval.

1. Good - it gives a lot of information in different colours as well as the symbol for recycling.
2. Bad - Too many different fonts are used and some of the text is unclear.

59. 59. To what extent do you believe images of news events, e.g. natural disasters in a NEWSPAPER may have been changed in some way?

Mark only one oval.

	1	2	3	4	
almost never					almost always

60. 60. To what extent do you believe images in MAGAZINE may have been changed in some way?

Mark only one oval.

	1	2	3	4	
almost never					almost always

61. 611. To what extent do you believe images and other visuals in an ACADEMIC PUBLICATION may have been changed in some way?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

62. 62. To what extent do you assume images like photos or videos on a SOCIAL MEDIA PLATFORM may have been changed in some way?

Mark only one oval.

	1	2	3	4	
almost never	◯	◯	◯	◯	almost always

63. 63. I can INSERT photos or graphics from an outside source into a text or assignment.

Mark only one oval.

	1	2	3	4	
Need a lot of assistance.	◯	◯	◯	◯	Need almost no assistance.

64. 64. To what extent do you share visuals you created yourself on your social platforms?

Mark only one oval.

	1	2	3	4	
not at all	◯	◯	◯	◯	almost always

65. 65. To what extent do you share visual content you find on online platforms like tiktok on your social platforms?

Mark only one oval.

	1	2	3	4	
not at all	◯	◯	◯	◯	almost always

66. 66. To what extent do you re-share visual content you receive from your friends on your social platforms?

Mark only one oval.

	1	2	3	4	
not at all	◯	◯	◯	◯	almost always

67. 67. When you receive a message from a friend in a chat application, how often do you reply with a text message?

Mark only one oval.

	1	2	3	4	
Almost never	◯	◯	◯	◯	Almost always

68. 68. When you receive a message from a friend in a chat application, how often do you reply with a voice note?

Mark only one oval.

	1	2	3	4	
Almost never	◯	◯	◯	◯	Almost always

69. 69. When you receive a message from a friend in a chat application, how often do you reply with text accompanied by an emoji?

Mark only one oval.

	1	2	3	4	
Almost never	◯	◯	◯	◯	Almost always

70. 70. When you receive a message from a friend in a chat application, how often do you reply with an emoji / several emojis only?

Mark only one oval.

	1	2	3	4	
Almost never	◯	◯	◯	◯	Almost always

71. 71. When you receive a message from a friend in a chat application, how often do you reply with memes or GIFs?

Mark only one oval.

	1	2	3	4	
Almost never	◯	◯	◯	◯	Almost always

72. 72. Do you EDIT and MODIFY photos you take with your mobile device?

Mark only one oval.

	1	2	3	4	
Almost never	◯	◯	◯	◯	Almost always

73. 73. Do you EDIT and MODIFY images and visual material (e.g. photos) you DOWNLOAD from internet sources for ACADEMIC purposes?

Mark only one oval.

	1	2	3	4	
Almost never	◯	◯	◯	◯	Almost always

74. 74. To what extent can you use the functions of MS PowerPoint to design your own slides for a presentation.

Mark only one oval.

	1	2	3	4	
Need a lot of assistance	◯	◯	◯	◯	Need almost no assistance

75. 75. To what extent can you embed images and videos into MS PowerPoint presentation.

Mark only one oval.

	1	2	3	4	
Need a lot of assistance	◯	◯	◯	◯	Need almost no assistance

76. 76. To what extent can you create and edit a video on your mobile device, to e.g. submit for assignment purposes in your studies?

Mark only one oval.

	1	2	3	4	
Need a lot of assistance	◯	◯	◯	◯	Need almost no assistance

77. 77. To what extent can you draw graphs and tables with MS Excel?

Mark only one oval.

	1	2	3	4	
Need a lot of assistance.	◯	◯	◯	◯	Need almost no assistance.

78. 78. Would you be able to present results of research with an info-graphic instead of a written assignment if required?

Mark only one oval.

- ◯ 1. No, but I would like to learn how to do it.
- ◯ 2. No, I do not have the skills.
- ◯ 3. Yes, I would like to have the opportunity to submit an assignment in this way.
- ◯ 4. Yes, I have done it before.
- ◯ 5. I do not know what an info-graphic is.

79. 79. When you share visual images (e.g. pictures, videos) from the web for SOCIAL purposes, do you acknowledge the source?

Mark only one oval.

	1	2	3	4	
Almost never	◯	◯	◯	◯	Almost always

80. 80. When you use visual images (i.e. pictures, illustrations, videos, tables, graphs etc.) from the web for ACADEMIC purposes, do you acknowledge the source?

Mark only one oval.

	1	2	3	4	5	
Almost never	◯	◯	◯	◯	◯	Almost always

81. 81. Do you know how to acknowledge the source of a visual?

Mark only one oval.

◯ 1. Yes
◯ 2. No

82. 82. Have you heard the term "visual literacy" before?

Mark only one oval.

◯ 1. Yes
◯ 2. No

83. 83. Do you think you are visually literate?

Mark only one oval.

	1	2	3	4	
Not at all	◯	◯	◯	◯	Yes, definitely

84. 84. Would you be interested in learning more about visual literacy?

Mark only one oval.

- 1. Yes
- 2. No

85. 85. Would you be available for an online interview/ discussion to contribute towards the results of this research? *

Mark only one oval.

- 1.Yes
- 2. No

86. Please give your email address if you would be willing to be contacted with regard to this research.

Thank you very much for your time!

https://images.app.goo.gl/VH8hEA1wPbwHoS6v5

ADDENDUM D: INDIVIDUAL SEMI-STRUCTURED INTERVIEW QUESTIONS

TITLE: Enhancing the visual literacy of first-year university students by means of self-directed multimodal mobile learning

Guiding question set for semi-structured interviews for phase two of the data collection process:

1 What do you think “visual literacy’’ means?

2 What role does your cultural background and environment play in your visual literacy?

3 What have you been taught about visual literacy?

4. What type of visuals do you generally use in academic assignments?

5. Where do you obtain suitable visual material?

6. Which criteria do you use when looking for visual material for academic purposes?

7. What processes do you follow to add visuals to your academic work?

8. Do you acknowledge the source of visuals you include in your academic work? Why / Why not?

9. What aspects of visual literacy would you want to learn more about?

10. What role does your mobile phone play in your studies?

11. Reflect on your ability to use visual material and develop your own visual literacy.

12. What motivates you to develop your visual literacy?

13. Who (if anybody) assists you in gaining skills in visual literacy?

14. Do you think you are able to take charge of your own learning about visual literacy?

    Explain your answer.

15. Are you able to evaluate what you know about visual literacy? Explain your answer.

ADDENDUM E: ETHICS APPROVAL LETTER

Private Bag X1290, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Fax: 018 299-4910
Web: http://www.nwu.ac.za

Senate Committee for Research Ethics
Tel: 018 299-4849
Email: nkosinathi.machine@nwu.ac.za

ETHICS APPROVAL LETTER OF STUDY

Based on approval by the **Faculty of Education Research Ethics Committee (EduREC)** on 29 April 2021, this committee hereby **approves** your study as indicated below. This implies that the North-West University Senate Committee for Research Ethics (NWU-SCRE) grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the study may be initiated, using the ethics number below.

Study title: Enhancing the visual literacy of first-year university students by means of self-directed multimodal mobile learning

Study Leader/Supervisor (Principal Investigator)/Researcher: Prof JAK Olivier

Student / Team: M Mathee (PhD student – 23367784)

Ethics number:

N	W	U	-	0	1	2	6	7	-	2	0	-	A	2
Institution				Study Number						Year			Status	

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

Application Type: Project

Commencement date: 29/04/2021 **Risk:** Low risk

Expiry date: 29/04/2022

Approval of the study is initially provided for a year, after which continuation of the study is dependent on receipt and review of the annual (or as otherwise stipulated) monitoring report and the concomitant issuing of a letter of continuation.

Special in process conditions of the research for approval (if applicable):

General conditions:

While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:

- *The study leader/supervisor/principal investigator/researcher must report in the prescribed format to the EduREC:*
  - *annually (or as otherwise requested) on the monitoring of the study, whereby a letter of continuation will be provided, and upon completion of the study; and*
  - *without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.*
- *The approval applies strictly to the proposal as stipulated in the application form. Should any amendments to the proposal be deemed necessary during the course of the study, the study leader/researcher must apply for approval of these amendments at the EduREC, prior to implementation. Should there be any deviations from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.*
- *Annually a number of studies may be randomly selected for an external audit.*
- *The date of approval indicates the first date that the study may be started.*
- *In the interest of ethical responsibility, the NWU-SCRC and EduREC reserves the right to:*
  - *request access to any information or data at any time during the course or after completion of the study;*

ADDENDUM F: OVERVIEW OF ACADEMIC LITERACY MODULE

HUM.1.3 ACADEMIC LITERACY

All undergraduate students who register at the North-West University for the first time are required to register for a module / modules in academic literacy. They have to pass this module / these modules before they can graduate.

HUM.1.3.1 Testing

Students have to write a compulsory proficiency test in academic literacy, at a time and place determined by the University, to determine their ability to function within the academic environment. The purpose of this test is to identify students who, due to inadequate academic literacy skills, may not complete their study programme within the stipulated period in order to empower them with the necessary knowledge and skills.

Students have the option of writing the compulsory skills test in either English or Afrikaans. With the exception of students who are identified as borderline cases by the test, each student has only one opportunity to write the test. Students who are regarded as borderline cases, will be granted a second opportunity to write the test. It is the student's responsibility to check and verify his/her result within 14 days of writing the test and to register for the correct module in the correct semester (see below).

HUM.1.3.2 Module(s)

Academic Literacy Development (ALDE111) / Ontwikkeling van Akademiese Geletterdheid (ALDA111)

Students who are identified as at-risk by the test, must register for the module ALDE111 [English] or ALDA111 [Afrikaans], depending on the language in which the compulsory test was written.

i. **Level and credits**
This module is on NQF level 5 and worth 12 credits (additional credits).

ii. **Composition of module and calculation of module marks**
ALDE111 / ALDA111 comprises one component only, which includes two periods per week. Class attendance is compulsory. The module is only presented in Semester 1.

A system of continuous assessment is followed. The final module mark is calculated as follows: Exam mark = 40% and Participation mark = 60%. For admission to the exam in ALDE111 / ALDA111, a participation mark of 40% is required.

Note that for conditional admission to ALDE122 / ALDA122, a student who is required to follow ALDE111 / ALDA111 should obtain a module mark of 40% minimum for ALDE111 / ALDA111.

A final module mark of 50% is required to pass the module.

iii. **Important additional information**
Specific faculty rules in terms of termination of studies might apply if a student fails ALDE111 / ALDA111.

Students who have already successfully completed a module similar to ALDE111 / ALDA111 at another tertiary institution and can provide proof of this, may apply in writing on the prescribed form for formal recognition for the module. This application should

be submitted to the subject chair responsible for Academic Literacy. Recognition is only granted in cases where the modules are on the same NQF level (NQF5), where the credit values are of the same value (12), and where content is comparable.

iv. **Language and mode of delivery**
ALDE111 is presented in English and ALDA111 in Afrikaans. The module is presented in both contact and open distance learning mode. Note that only students who are formally registered for open distance learning may follow the module in this mode. Moreover, open distance learning is presented in English only.

v. **Outcomes**
On completion of this module students should be able to:

- bridge the divide between secondary school and university education;
- access academic information effectively in order to understand academic texts;
- process academic information successfully; and
- produce academic information responsibly and appropriately.

Academic Literacy Development (ALDE 112 or ALDE122) / Ontwikkeling van Akademiese Geletterdheid (ALDA112 or ALDA 122)

All students, regardless of the result obtained for the compulsory proficiency test in academic literacy, must register for the module ALDE122 [English] / ALDA112 or ALDA122 [both in Afrikaans]. Students with Afrikaans as language of teaching and learning and who do not need to complete ALDA111, register for ALDA112 in Semester 1 (applicable to Potchefstroom Campus only). Students who are required to enrol for ALDA111, register for ALDA122 in Semester 2. Note that ALDA112 and ALDA122 are exactly the same module presented in both semesters. The module codes, however, differ in order to distinguish between the semesters. Students with English as language of teaching and learning, register in all cases for ALDE122 in Semester 2.

i. **Level and credits**
This module is on NQF level 5 and worth 12 credits. Note that it is calculated in terms of programme credits. It thus carries a weight of 12 credits in the first-year programme.

ii. **Composition of module and calculation of module marks**
For admission to the module ALDE122 / ALDA122, a student required to take ALDE111 / ALDA111, must first pass this module. In all other cases students have immediate access to ALDE122 [Semester 2] / ALDA112 [Semester 1] or ALDA122 [Semester 2].

Students who did not pass the module ALDE111 / ALDA111, but were conditionally allowed to take ALDE122 / ALDA122 and passed the module, may have their result for ALDE111/ ALDA111 condoned to a pass by the entity concerned with Academic Literacy.

The module ALDE122 / ALDA112 or ALDA122 comprises two compulsory components: an Academic Literacy component and a Computer and Information Literacy component. For the academic literacy component, class attendance of two periods per week is

compulsory. Computer and Information Literacy requires that students learn autonomously, but they will have access to contact sessions if they wish to make use of them. A student must pass both components to pass the module.

A system of continuous assessment is followed. The final module mark is calculated as follows: Exam mark = 40% and Participation mark = 60%. For admission to the exam in ALDE122 / ALDA112 / ALDA122, a participation mark of 40% is required.

The exam consists of two papers, viz. Academic Literacy and Computer and Information Literacy. The subminimum required to pass the Academic Literacy component, is 40%. The subminimum required to pass the Computer and Information Literacy component, is 50%. These components are dealt with in a ratio of 80:20 when calculating the final mark (80% for the academic literacy and 20% for the computer and information literacy component).

iii. Important additional information

Specific faculty rules in terms of termination of studies might apply if a student fails ALDE122 / ALDA112 / ALDA122.

Students who have already successfully completed a similar module to ALDE122 / ALDA112 / ALDA122 at another institution and can provide proof of this, may apply in writing on the prescribed form for formal recognition of the module. This application should be submitted to the subject chair responsible for Academic Literacy. Recognition is only granted in cases where the modules are on the same NQF level (NQF5), where the credit values are the same value (12), and where content is comparable.

iv. Language and mode of delivery

ALDE122 is presented in English and ALDA112 / ALDA122 in Afrikaans. The module is presented in both the contact and open distance learning mode. Note that only students who are formally registered for open distance learning may follow the module in this mode. Moreover, open distance learning is presented in English only.

v. Outcomes

On completion of this module students should be able to:

- successfully become part of the academic learning community and participate in this community;
- access information in a responsible and ethical way in order to write an academic text;
- process information strategically in order to write an academic text;
- produce an academic text;
- demonstrate a fundamental level of computer and information literacy.

ADDENDUM G: TURNITIN REPORT

PhD - November 2022

ORIGINALITY REPORT

15%	13%	6%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	repository.nwu.ac.za Internet Source	1%
2	dspace.nwu.ac.za Internet Source	1%
3	books.aosis.co.za Internet Source	1%
4	Submitted to North West University Student Paper	1%
5	hdl.handle.net Internet Source	1%
6	scholar.sun.ac.za Internet Source	<1%
7	repository.up.ac.za Internet Source	<1%
8	uir.unisa.ac.za Internet Source	<1%
9	scholar.ufs.ac.za Internet Source	<1%