Using Scrum as a project management framework to promote social interactions in e-learning projects

by

Eugenie Wolff

Submitted in fulfilment of the requirements for the degree

PHILOSOPHIAE DOCTOR

in the Faculty of Education

at the

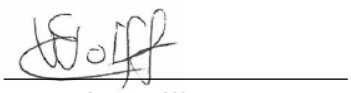
UNIVERSITY OF PRETORIA

Supervisor: Prof Linda van Ryneveld

November 2022

Declaration

I, Eugenie Wolff, student number 27011454, declare that the thesis entitled: **Using Scrum as a project management framework to promote social interactions in e-learning projects**, which I hereby submit for the degree Philosophiae Doctor (Computer Integrated Education) at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution. Work from other sources used in this study has been acknowledged accordingly.



Eugenie Wolff

22 November 2022

Ethical Clearance Certificate

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Make today matter
www.up.ac.za

FACULTY OF EDUCATION
Ethics Committee

RESEARCH ETHICS COMMITTEE

CLEARANCE CERTIFICATE	CLEARANCE NUMBER: **EDU177/20**
DEGREE AND PROJECT	PhD Using Scrum as a project management framework to promote social interactions in e-learning projects
INVESTIGATOR	Ms Eugenie Wolff
DEPARTMENT	Science Mathematics and Technology Education
APPROVAL TO COMMENCE STUDY	06 May 2021
DATE OF CLEARANCE CERTIFICATE	17 November 2022
CHAIRPERSON OF ETHICS COMMITTEE:	Prof Funke Omidire

CC

Mr Simon Jiane
Prof Linda van Ryneveld

This Ethics Clearance Certificate should be read in conjunction with the Integrated Declaration Form (D08) which specifies details regarding:

- Compliance with approved research protocol,
- No significant changes,
- Informed consent/assent,
- Adverse experience or undue risk,
- Registered title, and
- Data storage requirements.

Ethics Statement

The author, whose name appears on the title page of this thesis, has obtained, for the research described in this work, the applicable research ethics approval. The author declares that she has observed the ethical standards required in terms of the University of Pretoria's *Code of ethics for researchers and the Policy guidelines for responsible research*.

Dedication

As for the results and all the good that has come from this study, I dedicate it to the hard-working participants who contributed. It has been my pleasure to work alongside you.

In respect of the time, effort and emotional struggles that went into completing this PhD, I dedicate it to my ever-supporting family. In particular, I single out my sister, Nicole, for being my rock on those many days I felt emotionally drained.

And as with every other degree, triumph or blessing in my life, I give all honour and glory to God, my Heavenly Father, through His Son, Jesus Christ.

> “Let not the wise boast of their wisdom or the strong boast of their strength or the rich boast of their riches, but let the one who boasts, boast about this: that they have the understanding to know Me, that I am the Lord, who exercises kindness, justice and righteousness on earth, for in these I delight,” declares the Lord.
>
> ~ Jeremiah 9:23-24

Acknowledgements

To my Supervisor, Prof Linda van Ryneveld:

I am sincerely grateful for your guidance and support these past three years. Thank you for your ongoing encouragement despite your strenuous workload.

To the participants:

I thank you for your commitment to designing meaningful and well-thought-through curricula and for contributing your valuable time to this study.

Abstract

Learning and instructional designers in higher education frequently assist subject matter experts with curriculum design and development of courses and programmes. Development teams often comprise three to seven individuals that need to work collaboratively under the guidance of an expert in pedagogy, curriculum, and/or learning technologies. In many environments, however, hierarchical management, rigid processes and strict timelines are often prioritised over supportive leadership, flexibility and individual empowerment. These traditional project management techniques frequently result in missed deadlines and failure to meet goals due to a strict adherence to traditional waterfall management approaches. Project managers seeking to adopt more human-centric approaches that cater to changing project environments and the achievement of shared team goals often embrace agile frameworks.

Therefore, this research study reports on the benefits of using Scrum as an Agile project management framework to enhance the social interactions of curriculum development teams. The COVID-19 pandemic resulted in participants working remotely to design programmes collaboratively for a South African higher education institution. A qualitative research approach was used, with reflective email, small group, and individual interviews as some of the main data gathering strategies. Both inductive and deductive techniques were required to analyse the data. The findings revealed that Scrum pillars, principles, events, artefacts, values and team roles contribute to people-centric and organisation-centric management outcomes. Instructional designers looking to strengthen social interactions such as communication, coordination and collaboration to achieve e-learning project goals may benefit from implementing an adapted version of Scrum. Recommendations for an orientation sprint and more engagements of a social and personal nature to form emotional bonds and strengthen remote team relationships are made.

Keywords: e-learning; social interactions; agile Scrum framework; project management

Language Editor Verification

Member South African Translators' Institute
www.language-services.online

P.O. Box 3172
Lyttelton South
0157
10 November 2022

TO WHOM IT MAY CONCERN

The thesis "Using Scrum as a project management framework to promote social interactions in elearning projects" by Eugenie Wolff has been proofread and edited for language by me.

I verify that it is ready for publication or public viewing regarding language and style and has been formatted per the prescribed style.

Please note that no view is expressed regarding the document's subject-specific technical content or changes after this letter's date.

Kind regards

Anna M de Wet

SATI MEMBER 1003422

BA (Afrikaans, English, Classical Languages) (Cum Laude), University of Pretoria.
BA Hons (Latin) (Cum Laude), University of Pretoria.
BA Hons (Psychology), University of Pretoria.

List of Abbreviation

AS	Activity Systems
APM	Agile Project Management
AT	Activity Theory
COVID-19	Coronavirus Disease of 2019
DTM	Development Team Member
HE	Higher Education
HEI	Higher Education Institution
HEQC	Higher Education Quality Committee
ICT	Information Communication Technology
ID	Instructional Designer
IDMs	Instructional Design Models
LD	Learning Designer
LMS	Learning Management System
PC	Programme Coordinator
PM	Project Management
PO	Product Owner
SAQA	South African Qualifications Authority
SM	Scrum Master
SME	Subject Matter Expert
TPM	Traditional Project Management
4GAT	Fourth Generation Activity Theory

Table of Contents

List of Figures

List of Tables

1 Chapter One: General Orientation

1.1 Introduction

The field of higher education (HE), and the demands placed on universities, continue to change rapidly (Bebbington, 2021). Takagi (2018) reports an operational shift in the higher education (HE) sector, forcing universities to become progressively more competitive. Posselt et al. (2019) maintain that the pressure placed on universities to digitise and provide graduates with specialised knowledge stems from the fast-paced integration of new technologies and shifts in the global markets. Curriculum innovation and transformation, flexibility in modes of provisioning, staff development in online pedagogy, entrepreneurial endeavours, and obtaining higher research rankings are just some of the strategies many universities must employ to remain in demand (Bebbington, 2021; Posselt et al., 2019; Takagi, 2018). Accordingly, faculty roles are changing, with many now needing to lead and manage traditional and non-traditional institutional projects that require engagement with numerous stakeholders in remote areas (Takagi, 2018).

Similarly, the roles of instructional designers (IDs) have become increasingly complex, as administrative, curriculum, pedagogical and technological support must be offered to faculty through collaborative partnerships (Lowell & Ashby, 2018; Richardson, Ashby, Alshammari et al., 2019). Xie, Gulinna, Rice and Griswold (2021) refer to IDs as essential change agents when providing quality online learning. Slagter van Tryon et al. (2018) propose training IDs in communication and collaboration strategies that support learning design in dynamic environments and culturally diverse workplaces. The instructional designers should therefore be experts in support, inclusion, and humanism, knowing how to build socio-culturally aware relationships and involve team members in every aspect of learning design (Xie, Gulinna, Rice, & Griswold (2021). This requirement poses new challenges for instructional designers who are still coming to terms with many of the human-centric and social aspects of team management expected in this ever-growing field (Wang et al., 2021; Williams van Rooij, 2013).

While some higher education institutions (HEIs) have distinct roles for curriculum development instructors (CDIs) and instructional designers (IDs) (Troxel & Inge, 2020), other institutions, combine the CDI and ID roles (Hirumi, 2021), referred to as a learning designer (LD). In all instances, however, the successful collaborative efforts of these individuals with subject matter experts (SMEs) involved in e-learning curriculum design and development requires some form of project management. Soft skills required by these team managers include excellent interpersonal communication, relationship building, leadership, coaching, and organisational skills (Wang et al., 2021). According to Xie, Gulinna, and Rice, “although instructional designers are employed by HEIs to support the teaching faculty, there is not always clear guidance to either group about how

to build strong collaborative working relationships" (Xie, Gulinna & Rice, 2021, p. 73). Scrum agile management emphasises support, empowerment and communication as critical roles of project managers (Lavalle & Casale, 2020), above traditional roles of control, supervision and administration (Steyn et al., 2016; Tabatabaei et al., 2019). Therefore, this study aimed to determine to what extent learning designers could adapt Scrum to enhance social interactions among e-learning programme design teams.

1.2 Problem Statement

As employers and students demand a higher education (HE) experience that provides flexible learning opportunities and the practical skills required to contribute effectively to the workforce, universities are increasingly adopting online competency-based learning curricula (Zimmerman, 2019). While some universities enter into partnerships with online programme management organisations, such as GetSmarter, 2U and Academic Partners, others invest internally to manage the e-learning project (Zimmerman, 2019). Instructional designers (IDs) are often tasked with projects requiring the support and encouragement of academics to adapt their in-person, contact courses for online presentation or to develop new online accredited learning programmes (Xie, Gulinna, & Rice, 2021). Challenges faced by the IDs in such projects include that academics sometimes discredit the advice offered on pedagogy and design because there is a misconception that IDs are not as highly educated or informed about current research as faculty members (Miller & Stein, 2016). Further power struggles erupt when IDs and academics often feel the need to be in control rather than drawing on the strengths that all role players bring to a project (Halupa, 2019). This viewpoint speaks of traditional project management (TPM) approaches where the team environment is highly formal, roles are closely monitored, and individuals seek to control (Cram & Marabelli, 2018). A breakdown in such social interactions, especially regarding communication (Dempsey et al., 2022), coordination (San et al., 2019) and collaboration (Matthews et al., 2018), is often attributed to the failure of project management success.

To strengthen social interactions, many project managers transition to agile project management (APM) approaches (Ciric et al., 2020). Agile project management is well suited to small multidisciplinary teams that are required to work collaboratively (Agbejule & Lehtineva, 2022). In emerging fields where prompt responses to changing environments are required, teams need higher levels of motivation, trust, adaptability and autonomy (Sharma et al., 2022). Through informal observation, the researcher found HE curriculum design teams to fall within the parameters of the teams mentioned above. This is because many individuals in traditional contact universities were new to developing fully online qualifications and were very uncertain about the technology and pedagogy requirements. Therefore, the problem under investigation was how Agile Scrum strategies could be adapted to promote social interactions among programme development team members across the different stages of an e-learning project in a HE context.

1.3 Rationale

Various individuals are involved with e-learning teams working on one or multiple stages of project completion, including analysis, design, development, implementation and evaluation (Khan, 2004). Each stage in the life cycle of an e-learning project is dependent upon another, making a wide network of collaboration between individuals essential (Vandenhouten et al., 2014). The researcher has observed a disconnect between members in various e-learning teams. In the researcher's opinion, e-learning team members often did not understand the goals, individual responsibilities, deliverables, and timelines of an e-learning project. Poor communication, unstructured coordination and ineffective collaboration were the most prominent contributing elements, in the researcher's view.

Understanding team members' roles and facilitating frequent communication between members is critical (Clapp, 2017). A lack of proper communication results in overlooked tasks, missed project deadlines, overspending, and heightened project risks (Steyn et al., 2016). Rad and Kermanshachi (2018) emphasise the importance of having a system in place which allows for easy information exchange and communication. Scrum, as an agile PM approach, entails the implementation of principles for enhanced communication, transparency and high involvement (Papke & Wagner, 2017). By conducting this study, the researcher adopted an Agile Scrum framework to explore its effectiveness in promoting social interactions in various stages of the life cycle of e-learning projects.

1.4 Purpose of the Study

This study aimed to investigate how a basic Scrum framework could be adapted to promote social interactions among novice higher education e-learning project team members. The researcher sought to establish whether social interactions, in particular communication, coordination and collaboration, could be enhanced if teams adhered to Scrum methodology.

By chance, this study took place during the COVID-19 pandemic, resulting in all teams working fully remotely. The findings, therefore, provide unique insights into curriculum design teams working in a remote context. An effort was put into documenting the challenges experienced by instructional designers and subject matter experts, as well as adaptations made to the framework for higher education (HE), to share recommendations for future implementation and research. The research highlighted the importance of human-centric leadership and an emphasis on building relationships with team members to maintain individual motivation and commitment. The data collected through this study could contribute to the shared understanding of the coordination techniques necessary for value-laden participation within e-learning project teams.

1.5 Research Questions

The scope of this study included the analysis and design phases of the curriculum and instructional design process, as this was where the bulk of social interactions among Scrum team members took place. The first two phases required whole team involvement to thoroughly conduct a needs analysis, negotiate the project parameters, and conceptualise the programme and storyboard modules (Quigley, 2019). Building course content, implementation (facilitation) and evaluation were beyond the scope of this study. During these latter phases, development team members started to focus on individual modules, which mostly included interactions with the instructional designer (Scrum master), and no longer the remaining Scrum team members. The research questions integrated the elements of Activity Theory (see Section 2.6), focusing on the tools, rules and division of labour, the subjects, their community, and reaching the project objectives.

The primary research question guiding this study was, therefore:

> To what extent can a Scum framework be used to promote social interactions in the analysis and design phases of an e-learning project in the higher education context?

The following secondary question was asked to support the primary question:

> How can the Scrum framework be implemented to promote *communication, coordination* and *collaboration* in an e-learning activity system?

1.6 Core Concepts

Throughout this study, the researcher used several core concepts prominently. Although similar to those of other authors, their meanings also have unique nuances due to the study's context. The reader is urged to familiarise themselves with these concepts early in the writings (refer to Appendix A for further clarification of central concepts used in this study).

Development team members: This refers to a small team (3-7 members) of individuals responsible for developing curriculum products (known as increments) throughout the life-cycle of an e-learning programme. The development team members in this study included programme coordinators and full-time and part-time academics as subject matter experts; however, Scrum does not recognise these titles and simply refers to members as the development team (Schwaber & Sutherland, 2017).

E-learning: In this study, e-learning refers to any combination of technology-enhanced learning incorporated into a programme (Makani et al., 2016). Depending on the extent of technology enhancement, programmes may be classified as contact, blended, hybrid, distance or fully online modes of provisioning. Incorporating learning and teaching technologies often ranges from computer-integrated to internet-supported and internet-dependent offerings. Therefore e-learning

is also referred to as virtual education or education via the web (Yuksel Oktay, 2016). Universities often use learning management systems (LMS) to host learning content, activities and assessments in conjunction *with,* or *without* a physical classroom. Students can study asynchronously, semi-synchronously, and synchronously at any place, time, and pace, depending on the extent of internet integration (Nortvig et al., 2018). When referring to entirely internet-dependent, remote e-learning, the researcher uses the terminology, *fully online learning*.

Project management (PM): This refers to the practice of effectively coordinating groups of individuals through various means of communication to realise specified task objectives (Hamzane & Abdessamad, 2019). Various processes, including "initiating, planning, executing, monitoring and controlling and closing" (Williams van Rooij, 2011, p. 140) form part of PM. In this study, PM will entail the oversight and support of Scrum teams as they embark on developing fully online learning programmes.

Scrum framework: An Agile project management framework for teams involved in complex development projects, where enhanced creativity and productivity is required. The framework maximises opportunities for self-organisation of teams, as well as feedback from stakeholders and team members. Scrum is ideally suited for the management of small teams who must collaboratively share knowledge and expertise to design, develop, implement and sustain a product. This framework provides transparency, flexibility and adaptability as teams work iteratively and incrementally (Schwaber & Sutherland, 2017). In this study, the Scrum framework was implemented to manage e-learning teams from various departments that are involved in the development of fully online HE programmes.

Scrum master: Scrum masters support development team members to understand Scrum values and practices. By acting as a servant-leader, the Scrum master assists stakeholders and development teams in optimising knowledge transfer through social interactions. The Scrum master practices agility, facilitates Scrum events, serves as a coach and helps the team self-organise, become cross-functional and develop high-value products (Schwaber & Sutherland, 2017). In this study, the learning designers (also referred to as instructional designers) fulfilled the role of Scrum master to the development teams responsible for fully online qualifications.

Social interactions: Social interactions include knowledge-sharing elements such as communication, coordination and collaboration, which contribute to forming a dynamic web of relationships and information exchange between people, technology and the environment (Spencer et al., 2011). The role of a project manager is to facilitate and balance these social interactions as they continually transform and evolve among role-players in the learning journey of designing, developing and implementing programmes (Rozkwitalska, 2020).

1.7 Social Context

South African universities have been no exception to the demands of an increasingly tech-savvy society, with many managers relying on Agile methodologies (Seale & Cross, 2016) and information and communication technologies (ICTs) (Johnson, 2021) to manage university structures, processes and practices better. Institutions underestimate the magnitude of responsibilities required to transition to digital innovation, not realising that the organisational culture, leadership capabilities, existing structures, and ethical implications for employees must be considered (Tahirkheli & Ajigini, 2022). Often employees, especially academics, are not yet convinced of the usefulness of technology integration, especially online teaching and assessing (Dassanayaka et al., 2022). In the case of managing e-learning curriculum design teams, an added challenge is prevalent, with many academics having disciplinary knowledge but little online pedagogical and curriculum design knowledge (De Matos-Ala, 2019; Hrivnak, 2019).

In addition to the aforementioned contextual implications, this study took place during the worst waves of the COVID-19 pandemic. On the 23rd of March 2020, President Cyril Ramaphosa made the first of many lockdown announcements that would drastically impact the lives of all South Africans.

> *From midnight on Thursday the 26th of March until midnight on Thursday the 16th of April, all South Africans will have to stay at home". "In the days, weeks and months ahead, our resolve, our resourcefulness and our unity as a nation will be tested as never before. I call on all of us, one and all, to play our part. To be courageous, to be patient, and above all, to show compassion. Let us never despair. For we are a nation at one, and we will surely prevail. May God protect our people.* (Pres. Cyril Ramaphosa, 2020, p. 12)

For nearly two years, due to different variants of the Coronavirus causing waves of infections, South African academics and students were exposed to various levels of lockdown, requiring emergency remote teaching (Nkoala, 2022). While some students enjoyed online studies, others experienced great challenges with resource limitations and difficult psycho-social conditions, such as caring for younger siblings or experiencing domestic abuse in their home environments (Pillay et al., 2021). Cormier et al. (2022) found that educators experienced higher rates of anxiety, depression, emotional exhaustion and stress during the pandemic as they transitioned their contact classes to emergency remote teaching. Given the context within which this study took place, the researcher sought a project management framework that could provide flexibility while, at the same time, potentially strengthening social interactions among the remote teams.

Scrum was selected as the PM framework due to its popularity among novice teams transitioning to agile project management for its ease of use compared to other frameworks such as Extreme Programming and Adaptive Software Development (see Section 2.4. Scrum, for a comprehensive

explanation of the framework). Flewelling (2018) notes that start-up teams use Scrum because it allows for an adaptive planning style, encourages iteration, makes use of short time-boxed events and clearly explains the roles, artefacts, and events needed for project success. Teams looking for flexibility in projects where time frames, requirements, and technology are subject to change often implement Scrum because it draws on the strengths of self-directed teams (Brewer & Dittman, 2018). The researcher believed these to be essential attributes for the nature of the curriculum design projects being investigated and the context within which the participants worked.

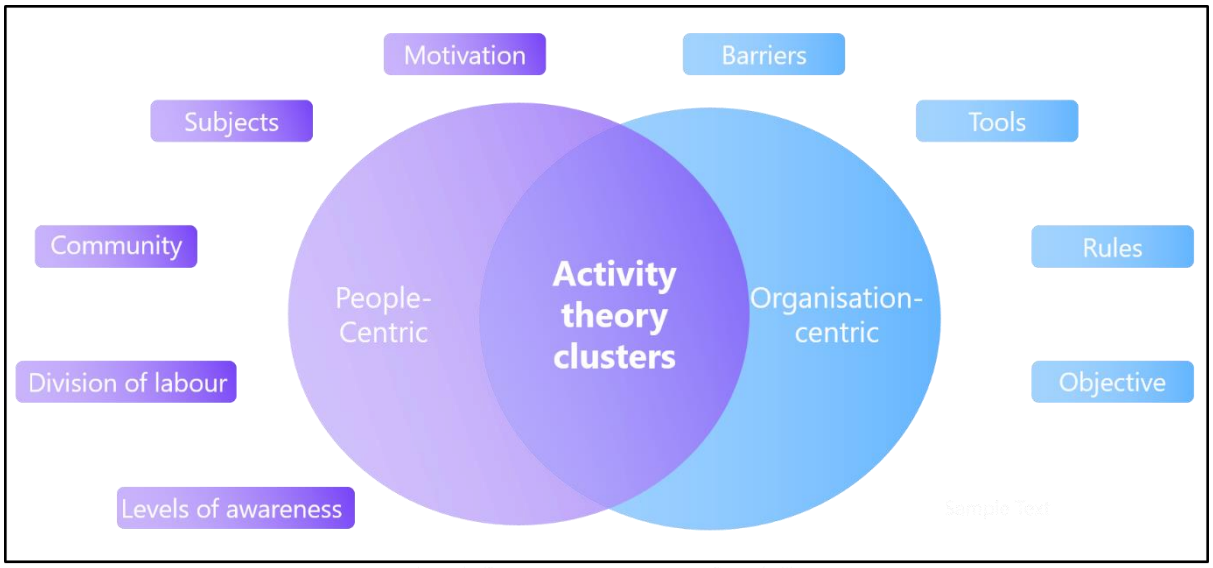
1.8 Theoretical Framework

Activity Theory (AT) was used by Wu et al. (2022) as an analytical tool when investigating the relationships, social interactions and collaborative goals of a curriculum design team. Similarly, the researcher used AT as a theoretical framework in this study after establishing that Garraway and Winberg (2020) also found it very useful as a structuring tool when needing to understand relationships between project elements where educators are working collaboratively to solve problems or create innovative solutions. As was the case in the study of Bleakley (2021), the researcher of this particular study used AT as the guiding framework to study both the concepts and activities incorporated in curriculum design, including material objects, social forces and human interactions. The researcher, therefore, used AT to ensure that all of the activity system elements were incorporated into the data-gathering instruments and as a structuring principle for the writing up of the findings. Activity theory (AT) is discussed in greater detail in Section 2.6.

The researcher divided the Activity Theory elements into two clusters of people-centric elements and organisation-centric elements (see Figure 1.1), which also resulted in Chapter 4 and Chapter 5 being representative of the findings related to these respective elements. The people-centric cluster included the subjects, their community and how labour was divided among them. In contrast, the organisation-centric cluster included the tools, rules and objectives governing the e-learning project work. As the researcher used the 4th generation of AT (Khayyat, 2016), motivation and levels of awareness also formed part of the elements studied as people-centric components, while the influence of barriers was studied along with the organisation-centric elements.

Figure 1.1:

Activity Theory Clusters



Adapted from Khayyat (2016)

1.9 Methodology

Through an interpretive lens, the researcher openly explored diverse participants' subjective perspectives on lived experiences of social interactions among Scrum team members (Mutekwe, 2020). Interpretivist viewpoints were well suited to this qualitative study, as it focused on understanding the complexity of a smaller number of participants' views (Soundy & Heneghan, 2022). Throughout the chapters, the researcher attempted to signify the importance of the participants' contexts, knowing how greatly it impacted their interpretations and experiences as e-learning project team members (Bruno, 1975). Acknowledging the subjective nature of truth, the epistemological assumptions of the researcher lead her to use diverse participants as information sources over a minimum period of six months and in more than one form of data gathering (Hudson & Ozanne, 1988). This approach was to crystallise the data so that easily observable experiences and more subtle nuances could be captured on Scrum as the project management framework to provide a holistic interpretation of its impact on social interactions (Ellingson, 2009). Finally, the researcher continued providing a background to her position as change agent in this study (Spencer et al., 2014) so that readers were informed of her involvement and motivations that inform her axiological assumptions.

1.9.1 Research Approach and Design

A qualitative research approach was implemented as qualitative research is naturalistic and allowed the researcher to fully immerse herself in this study (Yin, 2003). As is often seen in case studies (Baxter and Jack, 2010), a very small element of quantitative research by means of a survey, was incorporated, to assist in the clarification of some of the qualitative data, using visual

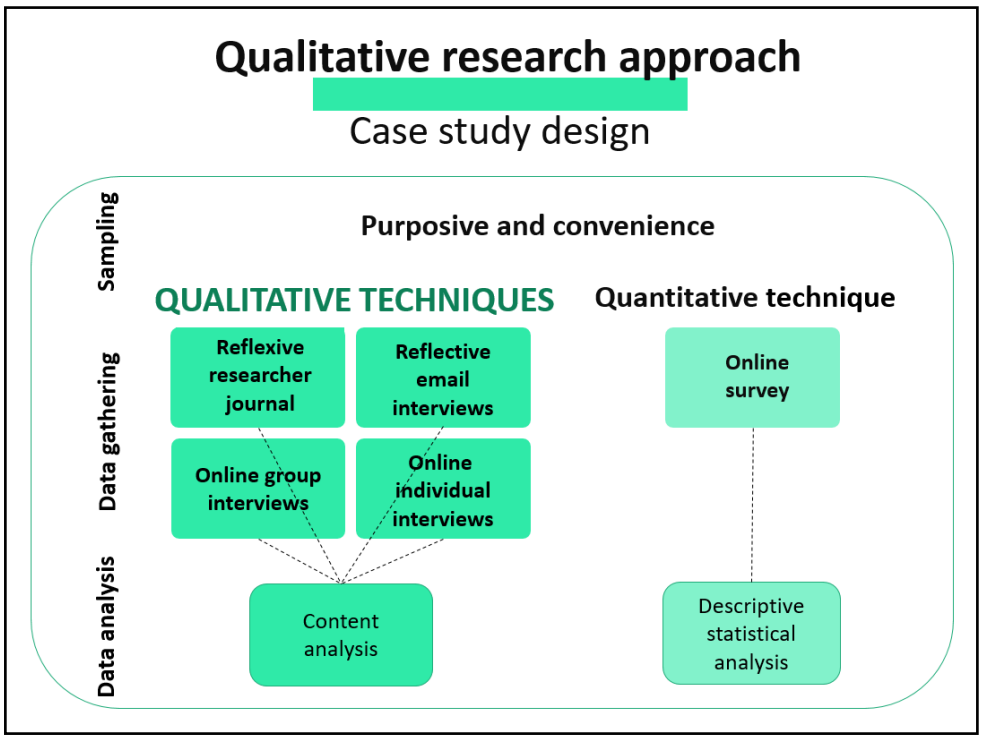
summaries through basic descriptive statistics[1] (Van de Schoot & Miočevic, 2020). Using a single case study with embedded units allowed for the intensive, in-depth analyses of the development of the e-learning programme design teams, including individual participants, their social units and their project processes (Ebneyamini & Moghadam, 2018). Taylor and Søndergaard (2017) maintain that case studies are well suited to research studies where researchers aim to understand phenomena better, focusing on relaying the context-bound experiences of their participants, as was the case in this study.

1.9.2 Sampling

Both purposive and convenience sampling were used to establish identification and selection criteria for participants with rich information and relevant experiences related to this particular study focus (Patton, 2015). While the researcher initially contacted 20 individuals to participate in this study, a total of ten individuals willingly consented to form part of this study. Three learning designers from a newly established directorate supporting the development of fully online programmes performed the roles of Scrum masters (SMs), while seven subject matter experts from various faculties participated as development team members (DTMs). The researcher herself fulfilled the role of product owner (PO), supporting and monitoring learning designers as they interacted socially with their curriculum teams. A summary of the research methodology has been provided in Figure 1.2.

Figure 1.2

Summary of Research Methodology



[1] The researcher wishes to acknowledge that due to the small sample size, the quantitative data gathered bears no statistical significance, other than aiding in the clarification of some of the qualitative data.

1.9.3 Data Gathering Techniques

Throughout the three-year study, the researcher documented her reflexive processes as part of contemporary journaling to capture her thoughts, decisions, concerns and observation notes (Meyer & Willis, 2019). The main qualitative data-gathering techniques, however, included four group interviews (Warner et al., 2021) with the three Scrum masters, dispersed over several months after various phases of Scrum implementation, and individual interviews (Ward & Delamont, 2020) with the seven development team members, once programme analysis and design were near completion. Four semi-structured asynchronous email interviews (Amri et al., 2021) dispersed to all the Scrum masters over several months after Scrum training occurred were also conducted. Finally, an online survey (Beatty et al., 2019) was distributed to development team members at the same time arrangements were made to schedule individual interviews. As this study took place during lockdown (when South African universities could not offer contact classes and staff were not allowed on campus due to COVID-19 regulations), all data gathering took place virtually. While online data gathering holds the benefits of saving on traveling time and giving participants the freedom to determine a physical environment in which they are most comfortable participating, there are also some challenges, such as technological disruptions, including a loss of internet connection (Van Zeeland et al., 2021). The researcher overcame these challenges by allowing participants multiple attempts to complete the survey during interviews, clarify or correct any incorrectly captured data due to poor connectivity, and contribute insights via chat tools or revisit interview transcripts.

1.9.4 Data Analysis

Content analysis (Schreier, 2014) was mainly used to interpret communicative language captured in the email interview responses and interview transcript texts. The presence, relationships and meaning of participant's words were established to organise the raw text into concise key results (Erlingsson & Brysiewicz, 2017). It was an iterative process of inductive and deductive analysis during which the researcher, using ATLAS.ti, took note of similarities and differences in the text (Nieuwenhuis, 2011a). Starting this process, the researcher took note of emerging codes (referred to as inductive coding), which were categorised as relationships and patterns were sought. Later, a priori coding (referred to as deductive coding) using activity theory and Scrum constructs were used. Codes were eventually categorised and themed, with the researcher mainly using verbatim participant quotes[2] to most accurately portray participant voices. Descriptive statistics were used, reporting the frequency, mode, standard deviation and variance of participant responses to analyse the closed-ended questions forming part of the survey.

[2] Where necessary, grammatical edits of interview transcripts were done. The edits were of such nature that they did not impact on the original meaning of the participant quotes.

1.10 Quality Assurance

The trustworthiness of the data and findings was enhanced through the implementation of credibility, transferability, dependability, confirmability and reflexivity measures (Guba & Lincoln, 1981). A pilot study of the questionnaire was conducted to ensure that the questions were clear and contributed valuable data as part of validity and reliability measures (Fraser et al., 2018). The credibility of the analysed data, findings and conclusions was enhanced through the crystallisation of responses captured through multiple data collection methods from multiple data sources, i.e. comparing findings from the researchers' reflection notes with the Scrum masters' reflection email responses and group interview responses, to individual development team member interview responses, and their survey responses (Stewart et al., 2017). In addition, the participants were asked to validate the draft research findings through written feedback to enhance the credibility of the findings (Morrow, 2005; Nieuwenhuis, 2011a). To enhance the transferability of the results to similar studies in different contexts, the researcher provided thick descriptions of the research context, data-gathering methods and participant demographics (Creswell & Creswell, 2017). Dependability measures were implemented by thoroughly documenting the research procedures and explaining the data analysis strategies in detail (Korstjens & Moser, 2018). Finally, the researcher used contemporary journaling as an audit trail to record her preconceptions, ideas and the decisions made during this study, to enhance confirmability and reflexivity (Guba & Lincoln, 1981).

1.11 Ethical Considerations

As Farrugia (2019) recommended, when conducting mainly qualitative studies, the researcher considered ethical considerations for each phase of the study, as ethical practices should not be viewed as fixed formalities but instead as evolving practices used to protect the participants' rights. Ethical clearance for data collection was obtained from the Faculty of Education's Ethics Committee, while the Survey Coordinating Committee approved the data-gathering instruments of the University. Researcher transparency, responsibility and respect for participants underpinned the ethical considerations of this study (Neufeld et al., 2019). All potential participants received a consent letter (see Appendix B: Consent letters) detailing the study purpose, data-gathering strategies, and participant requirements so that individuals could make informed decisions about their voluntary participation in this study (Harrison, 2000). The researcher upheld ethical standards of conduct, including protecting participants from harm and maintaining anonymity and confidentiality (American Psychological Association, 2017).

1.12 Structure of this Thesis

The thesis is structured according to the processes followed to conduct this study. The researcher commenced with an extensive literature review and investigation of Activity Theory as a theoretical framework, which is documented in Chapter Two–Literature review. Thereafter, the

researcher mapped out the methodology required to conduct this research, as captured in Chapter 3. Attention was paid to the alignment of the research approach, design and sampling process, and the data-gathering instrument design and analysis techniques. After data collection and analysis were completed, the findings were documented in Chapters 4, 5 and 6, respectively, focusing on the subjects, their community and division of labour, the tools, rules and objective of this study, as well as the study's outcome. In the final chapter, the researcher shares her concluding remarks and recommendations for future research

.

2 Chapter Two: Literature Review

2.1 Introduction

The increase in the number of e-learning programmes offered by higher education institutions (HEIs) has gone unmatched by growth in studies on the management of curriculum and instructional design teams designing and developing these programmes (Fito-Bertran & Martinez-Arguelles, 2019; Gardner et al., 2018). At the core of successful e-learning project management is maintaining social interactions between team members through communication, building relationships, empowering, motivating individuals and using interpersonal skills (Gardner et al., 2018). Scrum, an Agile project management framework, has been increasingly used in projects where teams working on innovative projects need to work on smaller increments of work, with rapid feedback, more stakeholder involvement and the ability to make adaptations as the need arises (Turley & Rad, 2018). The framework improves communication, transparency and focus through time-boxed sprint processes such as daily stand-ups, sprint retrospectives and sprint reviews (Kerzner, 2018). In the HE context, Scrum, as an Agile project management framework, has largely been implemented as a teaching strategy especially in software development courses, with much success in increasing student communication, collaboration and project coordination (Söderback et al., 2016). This study, therefore, sought to determine to what extent a Scrum framework could be used to promote social interactions in the analysis and design phases of an e-learning project in the HE context.

In this study, the researcher implemented writing conventions where proper nouns, copyrighted material titles, professional organisation titles and professional titles are capitalised. Scrum-related terminology for individual roles, processes and documents, such as Scrum master, sprints and product backlog, were not capitalised for readability purposes (Layton & Morrow, 2018).

2.2 Higher Education and Instructional Design of E-learning Programmes

2.2.1 E-learning Defined

When COVID-19 became a global pandemic in 2020, it took only a few months for higher education (HE) to undergo its most rapid reformation yet on a global scale (Nepal & Rogerson, 2020; Romero-Ivanova et al., 2020). Both public and private contact universities were forced to convert their curricula to a fully online, distance mode in record time. However, even before the pandemic, designing and developing e-learning curricula had proven to be challenging due to a lack of both guidance and coordination provided to e-learning development teams, as well as academics' limited knowledge and experience in this field (Fito-Bertran & Martinez-Arguelles, 2019).

Countless publications on e-learning and online learning exist, yet the distinctions between the two have become increasingly blurred. Stauffer (2020) uses e-learning and online learning

interchangeably, stating that both can be conducted when students and university teachers are together, using the internet and other technologies. The author instead distinguishes between online and distance learning. However, in the researcher's opinion, this argument is flawed as distance learning also uses e-learning. Jay Cross (2004) first coined the term e-learning in 1998, explaining that e-learning involves learning via the internet but that it would be short-sighted to restrict e-learning to solely computer-based learning. Similarly, Hubackova (2015) maintained that e-learning forms part of both contact and distance mode education when using several combinations of electronic resources, the internet and/or face-to-face instruction. E-learning, therefore, includes using the internet, amongst other technologies, for learning purposes but does not imply that students and teachers must necessarily interact remotely. As Nickholson (2007, p. 2) maintains, e-learning "is not only focused on online contexts, and includes the full range of computer-based learning platforms and delivery methods, genres, formats and media such as multimedia, educational programming, simulations, games and the use of new media on fixed and mobile platforms across all discipline areas."

Conversely, Elliot Masie defined online learning in 1997 as "the use of network technology to design, deliver, select, administer and extend learning" (as cited in Cross, 2004, p. 104). Correspondingly, Lee (2017) maintained that online learning excludes face-to-face instruction as web technologies mediate the interaction between educators and students who teach and learn at a distance. Again, the researcher disagrees with Lee's statement as students often use the internet to learn online in the presence of educators (e.g. live synchronous online sessions). To remedy this dispute regarding what online and e-learning entails, some authors go as far as specifying the percentage of learning time spent online. Allen and Seaman (2003) explain that online learning includes those programmes in which a minimum of 80% of the content is delivered via the internet. In the researcher's view, Sener (2015) best captures the relationship between e-learning and online learning. He uses e-learning as an umbrella term to cover a spectrum of technology-enhanced offerings tailored to suit students' needs, thus using e-learning as the programme delivery environment. On the one extreme of the e-learning spectrum, lie programmes which are predominantly onsite and used face-to-face with limited computer usage, while on the other extreme are fully online programmes, which are entirely online, remote but may include online synchronous sessions or asynchronous learning (Sener, 2015). In recent years, flexible mode or HyFlex (hybrid and flexible learning) e-learning programmes have been offered, where students can choose any combination of e-learning delivery modes to suit their lifestyle preferences (Malczyk, 2019; Sener, 2015).

In this study, e-learning was used in the broadest sense to include any combination of technology-enhanced contact, distance, computer-integrated and internet-supported or -dependent learning

programmes. In cases referring to entirely internet-dependent, remote e-learning, the researcher used the terminology *fully online learning*.

2.2.2 The History of Fully Online Learning

The origins of online learning seem to date back to 1989 (see Figure 2.1) when the University of Phoenix began to offer online degrees to students (Kentnor, 2015). With the World Wide Web entering the e-learning realm in 1991, online programmes via the internet started being offered (Kentnor, 2015). Seven years later, the first fully online universities, such as Touro University International, opened (Neumann & Neumann, 2016). By 1995, web-based training consisted of content delivery via the internet but included little to no online interaction (Nickholson, 2007). Students worked through the content asynchronously and in isolation, without online facilitation or peer interaction. PDF text files were often used to convey content (Akansha, 2016).

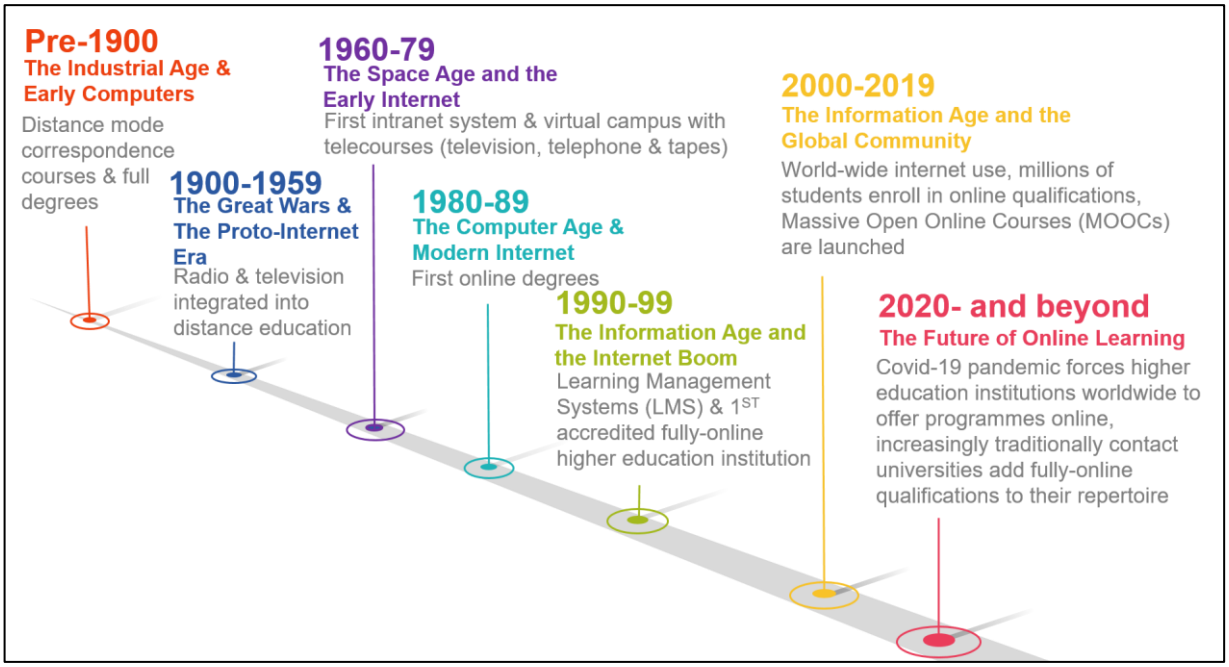
From 1995 up to 2005, online programmes became more interactive, with multimedia being incorporated and internet technologies allowing users to communicate remotely both synchronously and asynchronously (Nickholson, 2007). In particular, in 1998, a rise in online education by traditional contact institutions was observed (Kentnor, 2015). Towards the end of 2003, many universities using online e-learning were offering programmes on learning management systems (LMS), which included extensive use of PowerPoint presentations, to a lesser extent, videos, graphics, and game-based learning, and in some cases, social media integration (Akansha, 2016). By 2006 more than 1 billion people were using the internet, and companies were struggling to meet the training demands of their staff (Bach et al., 2007). The need for full online short courses for professional development was rising. The next five years marked a period where online e-learning was no longer an anomaly. Mobile learning, e-books, augmented and virtual reality, podcasting, and learning analytics are just a few of the technological innovations that enabled the ‘ease’ of offering online short courses and full programmes during this rapid development timeframe of 2006-2010 (Akansha, 2016).

Around 2011, massive open online courses (MOOCs) became increasingly popular. By 2012, platforms such as Coursera and edX offered free and open online courses to remote students worldwide (Yuan & Powell, 2013). Only six years later, chatbots emerged as smart online apps that could provide students with quick, succinct answers to simple questions (Suresh, 2017). Interactive video-based learning, social learning, micro-learning and personalised learning were also rising in 2018 (Suresh, 2017). Then, in 2020 the COVID-19 pandemic resulted in the closure of most contact in higher education institutions (HEIs), and academia raced to get their programmes fully online (Hedding et al., 2020). Universities worldwide were speed-training academic staff in online learning pedagogy and basic instructional design required to work on online learning platforms (Hedding et al., 2020; Taylor et al., 2020). A number of these institutions relied on ADDIE (Analysis, Design, Development, Implementation and Evaluation) as an

instructional design model to create their fully online modules (Akasha & Elsayegh, 2020; Winaldi et al., 2020).

Figure 2.1

The History of Online Learning



Adapted from Ferrer (2019)

2.2.3 Instructional Design Models (IDMs)

Instructional design models (IDMs) are frequently used to guide development teams through creating curricula and implementing them through various modes of technology integration (Sharif & Cho, 2015). These models can be classified as either *procedural* or *conceptual* (Lee & Jang, 2014; Seel et al., Podolskiy, 2017). Procedural models, such as ADDIE, originate from systems theory and strongly correlate with project management strategies (Seel et al., 2017). With procedural models, flow charts and illustrations are frequently used to depict the instructional design process's phases, sequence or steps to convey operational aspects (Lee & Jang, 2014; Seel et al., 2017). In contrast, conceptual models focus on understanding 'why' certain strategies are used for instructional design and relate strongly to psychological learning theories (Seel et al., 2017).

IDMs can further be subdivided based on their orientation (Seel et al., 2017). Firstly, *systems-oriented* models are typically used by teams wanting to design an entire curriculum for courses or programmes (Gustafson & Branch, 1997). Multiple rounds of revision take place with these long-lasting instructional projects, and one or more team members are highly skilled instructional designers. Secondly, *classroom-oriented* models are often used by individuals wanting to select

instructional resources for a few hours of instructor-led instruction (Gustafson & Branch, 1997). Usually, little revision is required with classroom-oriented models, as much of the programme and module-level conceptualisation, design and development have already taken place. Finally, product-oriented models are usually implemented by teams who prefer to develop instructional resources that can either be used during self-directed or facilitator-supported learning (Gustafson & Branch, 1997). High levels of instructional design expertise is often required as teams must use technology optimally to create resources for modules or courses.

2.2.4 Procedural Models

Although many instructional design models (IDMs) have been conceptualised, created and adapted, ADDIE (Analysis, Design, Development, Implementation and Evaluation) remains one of the most commonly known procedural, systems-oriented IDMs (Piña & Sanford, 2017; Seel et al., 2017). Since its creation in the mid-1970s, the ADDIE model has been used in various educational and training fields (Seel et al., 2017). While some individuals view ADDIE as a linear model to be followed step-by-step, others use it as "a guide for gaining direct intuitive insight into a problem" (Clark, 2015, n.p). Seel et al. (2017) and Sharif and Cho (2015) maintain that ADDIE is commonly integrated into various ID models, with generic phases being present.

Phase 1 starts with *analysis*, which requires the team to define what should be learned and why. This phase includes doing a needs assessment and creating a student profile (Cheung, 2016; Shelton & Saltsman, 2006). The goal is to have a clear purpose for the learning programme and overarching learning outcomes in mind before embarking on the design phase (Sharif & Cho, 2015). Once the development team understands their intended audience, the gaps which the programme will fill locally, nationally and internationally and what mode of offering is best suited to the students, they are ready to move onto the next phase.

Phase 2, *design,* entails creating a storyboard or blueprint of the learning journey (Cheung, 2016). Development teams map how students will be guided to achieve the intended outcomes through the learning experiences and assessments provided (Shelton & Saltsman, 2006). The programme is unpacked into modules, which are then broken down into 'lessons' in terms of the best-suited resources, media and assignments to scaffold students in achieving the intended outcomes (Sharif & Cho, 2015). It is very important to be cognisant of the mode of delivery during the design phase as it has many pedagogical and developmental implications (Durak & Ataizi, 2016).

During Phase 3, *development*, the actual learning materials are created, which may include producing videos, writing assessment instructions and adding content and rubrics to an LMS (Durak & Ataizi, 2016). Although decisions may initially have been taken regarding the design of the LMS, some teams may decide to rework matters of navigation, accessibility, interface design, and the like during the development phase, as they get a real feel for how the learning

environment will be experienced. Pilot testing is sometimes used towards the end of this phase as a quality assurance mechanism before the learning intervention is implemented with the intended students (Aldoobie, 2015; Cheung, 2016).

Phase 4 entails *implementation* once the actual learning and teaching commence. Teachers must usually first receive training on learning technologies, especially in online courses (Sharif & Cho, 2015). Students engage with the teacher, content and peers during this phase.

Although *evaluation* is placed last in the list of phases, it should be noted that it takes place continuously. *Evaluation* forms part of the quality enhancement mechanisms and can occur at any stage in the process for any number of times. Development teams can evaluate raw or more polished outputs or tasks, while internal and external reviewers must conduct evaluations before implementation commences. These are formative evaluations (Aldoobie, 2015; Sharif & Cho, 2015). Students also have the opportunity to provide feedback as part of the summative evaluation phase (Sharif & Cho, 2015). Summative evaluation can be regarded as Phase 5. The most important aspect of evaluation is not obtaining the feedback but using it to improve the learning programme (Cheung, 2016).

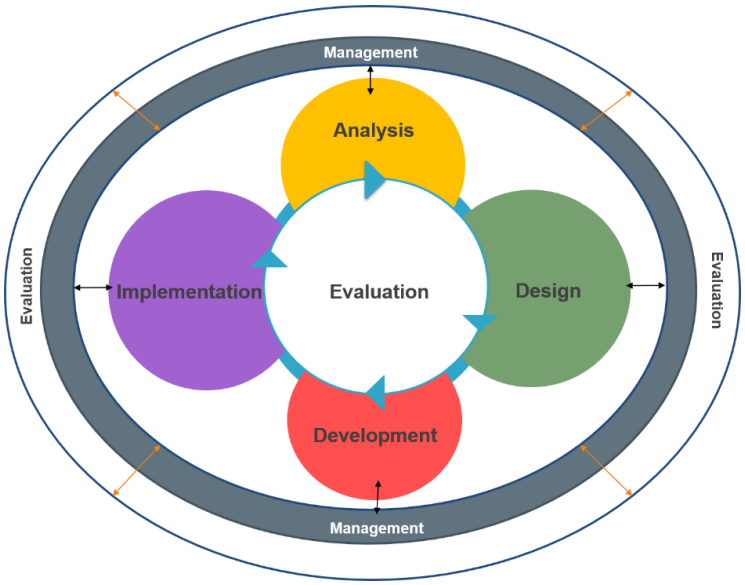
Several authors have critiqued ADDIE for not being an actual instructional design model. Brown and Green (2016, p. 7) refer to ADDIE as an "illustration of the conceptual components of many instructional design/development models", while Morrison et al. (2019, p. 15) call it "a colloquial label for a systematic approach to instructional development." Seel et al. (2017, p. 69) also mention the uncertainty whether ADDIE is "an independent ID model or only an umbrella term for the ID models of [the] first generation". In this study, the researcher holds the view that ADDIE is indeed one of the first ID models, as argued by Clark (2015, n.p.). The latter stated "a model is a simplified abstract view of a complex reality or concept"; therefore, ADDIE is nothing less than a *model* within a group of Instructional System Design models.

The ADDIE model has been revised numerous times over the years as instructional design practice evolved, requiring frequent iteration and more flexibility to meet user demands (Clark, 2015). PADDIE includes the integration of a *plan* phase, and preceding analysis (Armstrong, 2004; Jeffery & Bratton-Jeffery, 2011), while PADDIE+M adds on a *maintenance* phase which helps ensure the scalability of programmes for increasingly wider audiences (Branstiter, 2019). The U.S. Army, who were the first users of ADDIE, revised the model from the initial waterfall representation used in 1975, to a more accurate reflection of the agile nature of the instructional design (as seen in Figure 2.2) Piskurich, 2015; U.S. Army, 2011). With the increased realisation of project management's important role in instructional design and development, many instructional designers now include it in the model (Piña & Sanford, 2017). While the previous iterations were systems-oriented adaptations of ADDIE, classroom-oriented

models, such as the Morrison, Ross and Kemp design model, have also been created (Gustafson & Branch, 2002).

Figure 2.2

The ADDIE model

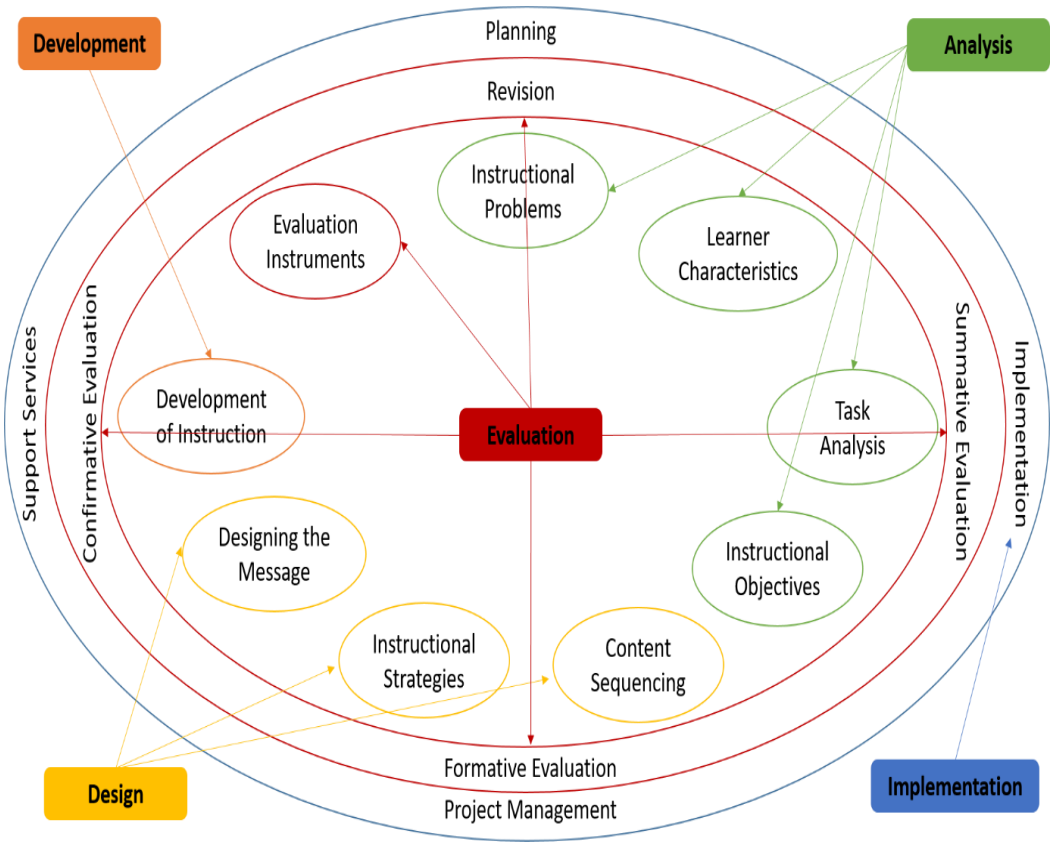


Adapted from the U.S. Army (2011)

The Morrison, Ross and Kemp Instructional Design Model (Morrison et al., 2019) is an example of a procedural, classroom-oriented IDM where ADDIE phases are present in a flexible and more detailed manner (Sharif & Cho, 2015). The Kemp model or MRK (as it is also referred to) consists of nine steps to be implemented in any sequence (see Figure 2.3) (Brown & Green, 2016). The first step, *instructional problems*, requires teachers to engage with a client, manager or supervisor to identify students' needs, instructional goals, and/or possible issues depending on whether it is a new instructional intervention being selected, or an existing one being enhanced (Morrison *et al.*, 2019). The second step relates to *learner characteristics*, where extensive information is gathered on the student profile to appropriately plan instructional experiences or interventions (Kurt, 2016; Morrison et al., 2019). *Task analysis* occurs next, during which the teacher identifies content and tasks in alignment with the instructional goals. Task analysis is a very important step as the information and activities selected must scaffold students towards reaching the goals (Morrison *et al.*, 2019). Step four focuses on the *instructional objectives*. Teachers must define specific, measurable, achievable, realistic and timely (SMART) objectives along with constructively aligned learning outcomes so that the students know exactly what should be mastered. These objectives determine what kinds of instructional activities and assessments will be designed and developed to assist students towards achieving the intended outcomes (Kurt, 2016).

Figure 2.3

The Morrison, Ross and Kemp IDM



Adapted from Morrison et al. (2019)

Content sequencing takes place fifth, when logical ordering of content is done to assist students in understanding how concepts, principles and practices relate to each other. After that, step six entails the design of *instructional strategies* when teachers decide how to present the module materials creatively and engagingly (Kurt, 2016). As part of step seven, *designing the message* requires teachers to plan the diction, style, voice and tone of writing instructional messages, considering the delivery mode. The use of typographical design (e.g. italics or bold), pictures and graphics to enhance learning, provide context and ensures student representation is also an important aspect of this phase (Morrison *et al*., 2019). Step eight, *development of instruction*, "involves putting all the parts together to produce instructional materials such as video recordings, web pages, print materials, or audiotapes" (Morrison et al., 2019, p. 18). Finally, step nine, *evaluation instruments*, entails the creation of formative and summative evaluation instruments to assess students' achievement of the learning outcomes (Kurt, 2016), but may also include the development of evaluation instruments to determine how the instructional intervention can be improved.

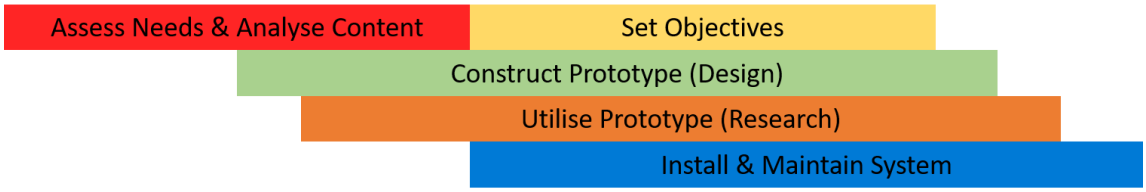
In addition to the nine steps of Kemp's model, eight ongoing processes form part of any instructional project (Avcu & Er, 2020). *Planning and project management* can take up a sizable portion of time and effort depending on the project scope (Morrison et al., 2019). Next, resources in the form of instructional design *support services* must be considered. Some institutions do not have video producers, graphic artists and script writers as part of their instructional design departments and must outsource these functions to produce high-quality materials, if they cannot be sourced (Morrison et al., 2019). The evaluation and revision process takes place in different formats, with some being *formative* or *summative* (Avcu & Er, 2020). *Confirmative evaluation*, which takes place after implementation to ensure that the intervention is still relevant, can also be done (Kurt, 2016). Finally, *implementation* is not a once-off event but rather a process which stretches throughout a lesson or several implementation iterations of a course.

Critique against Kemp's model, and other systems approach models in general is that implementation of these models is overly time-consuming (Gordon & Zemke, 2000). Gordon and Zemke (2000) refer to instructional systems design models as outdated because of the rigid project management systems they rely on and their lack of emphasis on constructivist principles. Gibbons (2013) mentions that an over-emphasis on procedural aspects leads to functional and structural elements of the instructional experience being overlooked. Therefore, the concept of rapid prototyping was introduced to the instructional design field to quickly and agilely produce functional instructional products (Jones & Richey, 2000) and challenge traditional systems-based project management (Wilson et al., 1993).

Rapid prototyping is an example of a product-oriented model used to rapidly develop exemplars or trial products early in an instructional design project (Reiser, 2001; Tripp & Bichelmeyer, 1990). Successive tryout sessions and revision cycles are then implemented to produce a usable end product. Tripp and Bichelmeyer (1990, p. 37) further explain that rapid prototyping is more about "learning from actual situations" than instructional planning. Contrary to the models mentioned above, rapid prototyping is focused primarily on the development of aspects such as media, navigation, data flow and interactivity of especially computer-based learning interventions (Piskurich, 2015; Wilson et al., 1993). That is not to say that only development takes place. When rapid prototyping is applied, a portion of the learning intervention will go through the ADDIE process, while other portions remain un-designed (see Figure 2.4) (Piskurich, 2015). A prototype may include creating the look and feel of an entire module before having decided on the learning outcomes, content, or assessment, or it could entail completing an online weekly learning unit with full functionality without having developed any other aspects of the module (Piskurich, 2015; Wilson et al., 1993).

Figure 2.4

Rapid Prototyping



Adapted from Tripp and Bichelmeyer (1990)

Critics of rapid prototyping have pointed out its substantial reliance on technology tools such as multimedia creation software and testing tools (Gustafson, 2002). These tools can be expensive and may require a lot of time and expertise to master. Further, Seel et al. (2017) maintain that most procedural models place too little emphasis on supporting students in constructing mental models. Therefore, many instructional designers use conceptual models in conjunction with a procedural model to provide both structure to the instructional designer and ensure sufficient focus on the student.

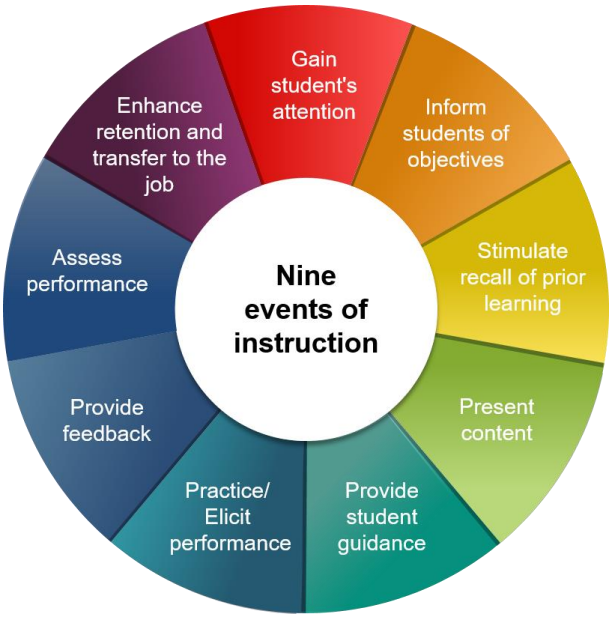
2.2.5 Conceptual Models

Conceptual models place students and learning at the centre of instructional design. Where procedural models focus more on the steps to be followed to create good instruction, conceptual models focus on understanding the relationships between instructional events, the student and learning (Lee & Jang, 2014). Conceptual models often have multiple orientations (classroom-, systems- and/or product-oriented), depending on the user's needs. Authors of conceptual models attempt to explain *why* it is necessary to do instructional design in a particular manner rather than elaborating on *how* (Hawkins, 2014).

Gagné's nine events of instruction (Gagné, 2005) is an example of a multi-oriented conceptual model (Abubaker, 2018; Gustafson & Branch, 1997; Seel et al., 2017). Based on principles of behaviourism, Gagné identified nine mental conditions that instructional designers need to create for students to learn (see Figure 2.5). First, teachers must *gain a student's attenti*on, through a compelling story, visual or question to get emotional buy-in which starts the process of learning retention (Hawkins, 2014). Thereafter teachers should *inform students of objectives*, so that they know what they can expect from the learning intervention and what is expected of them to be successful (Seel et al., 2017). The third step is to *stimulate recall of prior learnin*g by encouraging students to share existing knowledge so that it can serve as the platform on which new knowledge will be built (Gökdemir et al., 2013). These three steps comprise the *preparation* of the *learning* phase (Gagné, 2005).

Figure 2.5

Gagné's Nine Events of Instruction



Adapted from Gagné (2005)

Step four requires the teacher to *present the content* in chunks so that students can internalise information more readily by working with smaller amounts of content simultaneously (Seel et al., 2017). To further support students, step five requires *providing student guidance* through supplemental materials such as discussion boards, engaging activities, reflection videos or case studies (Hawkins, 2014). Finally, as part of the second phase, teachers must *elicit students' performance* by providing them with stimulating activities which require low, middle and higher-order reasoning skills (Gagné, 2005). These three steps form part of the *acquisition and performance* phase (Seel et al., 2017).

The final phase in Gagne's events of instruction is where the *transfer of learning* takes place (Gagné, 2005). Steps which teachers need to implement, include *providing feedback* in a timely and appropriate manner so that learning is reinforced, and *assessing students' performance* is assessed by measuring the students' learning outcomes according to assessment criteria (Seel et al., 2017). Finally, teachers should ensure that the learning cycle continues by implementing step nine, *enhancing retention and transfer*. This step entails referring to the newly learnt content in future learning interventions (review) and providing additional opportunities for students to practice real-life integration of the knowledge learnt (Hawkins, 2014).

In a study conducted by Martin et al. (2007) to determine which of the nine events had the greatest impact on student performance and attitude, *practice and feedback* were deemed the most influential. Apart from presenting the content, the remaining events (such as review) were found

supplementary or even redundant. Listing objectives has been critiqued by a few researchers for not contributing to student performance (Clark, 2006; Hannafin, 1987). However, Martin et al. (2007) still find value in objectives from the instructional designer's perspective. Instructional designers wishing to reduce the number of instructional events to a few core principles often prefer using Merrill's First Principles of Instruction.

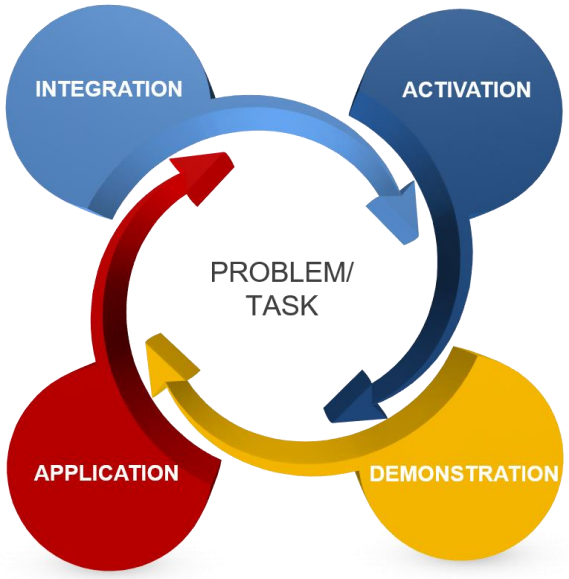
David Merrill's First Principles of Instruction (FPI) (Merrill, 2002) also strongly focuses on students' learning experiences (see Figure 2.6). This multi-oriented conceptual model starts by placing a real-life, relatable, challenging scenario, question or problem as the focal point for the student's learning experience and engages students in tasks which require increasing levels of unfamiliar and complex problem-solving. This is known as the *task-centred principle*. The *activation principle* requires learning designers to stimulate students' use of prior knowledge and experience, as this will serve as the foundation on which new knowledge will be scaffolded (Klein & Mendenhall, 2018). Once prior knowledge has been activated, the module or course should expose students to several ways to digest the information. Videos, images, narratives or diagrams can be used when following the *demonstration principle* to assist students with internalising and retaining information. Attempting to cater to diverse student needs is an important aspect of this principle. Students should be required to apply the newly learnt knowledge in various activities to promote deep learning (Klein & Mendenhall, 2018). Once the *application principle* has been implemented, the *integration principle* should be applied as it requires students to integrate the newly learnt knowledge into their own context. Examples of integration activities include reflections on using the new knowledge in daily work through discussion forums or presentations (Klein & Mendenhall, 2018). It should be mentioned that FPI has been critiqued for being "easy to understand yet difficult to apply" (Klein & Mendenhall, 2018, p. 107), depending on the context of the learning intervention.

Besides the models mentioned above, numerous conceptual models have emerged as different theories on learning are explored. The ARCS (attention, relevance, confidence and satisfaction) model, which emphasises the motivational appeal of learning interactions (Keller, 1983), as well as the 5E instructional model (engage, explore, explain, elaborate and evaluate), which engages students in inquiry-based learning (Bybee, 2014), are but two such examples. Further elaboration on these and other models is beyond the scope of this study. Instructional designers should carefully consider the full scope of projects before deciding on a single model or combination of models to implement (Rothwell et al., 2015). Significant to take note of, is that multiple studies have found elements such as the nature of the project (Klein & Mendenhall, 2018), time constraints (Rothwell et al., 2015; Wedman & Tessmer, 1993), instructional design experience of team members (Klein & Mendenhall, 2018; Rowland, 1992) and quality of training (Klein &

Mendenhall, 2018; Rowland, 1992) impact how successful instructional design models are implemented.

Figure 2.6

Merrill's First Principles of Instruction



Adapted from Merrill (2002)

Given the complex nature of this research study, with its focus on Scrum, instructional design, social interactions, and project management, the researcher argues that ADDIE was a suitable ID model to follow in structuring the process for the development of fully online programmes. Authors such as Gibbons (2013), Piskurich (2015) and Piña and Sanford (2017) have argued that given the complexity of instructional design, it is often better to use the "tried-and-true" ADDIE model, which forms a foundation for other ID models. As a procedural systems-oriented model, ADDIE is well suited for this study, as this study was conducted by teams of experienced instructional designers and inexperienced academics creating accredited programmes (Gustafson & Branch, 1997; Piskurich, 2015). Studies in which ID project managers use ADDIE to structure the course design process are well documented (Abdous & He, 2008; Conrad & TrainingLinks, 2000; Rothwell et al., 2015).

2.3 Project Management Overview

The Project Management Institute (2017, p. 10) defines project management (PM) as "the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements." Delving deeper into project management (PM), Khaldi and Erradi (2019) explain that PM requires a working methodology and executing it through a structured development process. Spencer et al. (2011, p. 157) similarly explain that a thorough understanding of more formal PM methodology is required as the "daily practices and orchestrated processes of team-

building, facilitation, leadership and management impact significantly on design, development and user engagement." In technology-rich collaborative HE work environments, PM provides an efficient way of designing, developing and implementing innovative services and products (Fernandes et al., 2020; Vinopal, 2012). It is, therefore, regrettable that Austin et al. (2013) found PM to be an often overlooked element in the delivery, efficiency and effectiveness of service and product delivery in HEIs.

Even before fully online programme development, contact universities started employing instructional designers (IDs) to manage e-learning projects; however, many IDs were not disciplined in PM methodology, practices and standards (Williams van Rooij, 2011). Although much has been written on closing the instructional design and project management gap, the problem of proper management of instructional design initiatives in HEIs persists (Brandon, 2004; Schuit, 2019). In some cases, instructional designers with project management experience focused too much on meeting budgets and deadlines to the extent that pedagogy and desired learning outcomes were overlooked (Torrence, 2019). Eby and Yuzer (2013) explain that online learning project managers need to be cognisant of several PM approaches and implementation models, including communication, human resources, responsibility assignment, time and cost, quality assurance, implementation, and risk management.

Various project management (PM) approaches and tools have been developed to aid project managers in achieving project success (Akhmetshin et al., 2019). Fernandes et al. (2020, p. 820) maintain that the approach to PM "leads to values in the form of greater communication, more efficient use of resources, higher customer satisfaction, easier knowledge sharing and improved future possibilities". This study will draw on software development for PM approaches as there are many commonalities with e-learning programme development (Brandon, 2004; Nicolettou & Soulis, 2014). Software development, like e-learning development, is a constantly evolving field due to the close connection with technological advancements and meeting user experience demands (Almeida, 2017). Further, both e-learning programme development and software development have become increasingly commercial, demanding shorter project deadlines with project outputs appealing to larger user audiences (Almeida, 2017; Williams van Rooij, 2011). The dominating PM methodologies in software development and instructional design have been Waterfall (also known as Traditional) and Agile (Almeida, 2017; Minaya, 2020; Torrance, 2019).

The Waterfall approach is considered a more traditional PM method due to the linearity and sequential design of project plans (Almeida, 2017). Project teams follow prescriptive documentation and are directed to complete a current phase, before moving on to the next (Muslihat, 2018). This approach provides structure and allows new project members to enter the project seamlessly; however, it often leads to high project costs and prolonged timelines (Aston, 2019). Stakeholders are involved in initial consultations and upon project completion, resulting in

very little stakeholder feedback impacting the final product (Muslihat, 2018). Due to the inability of Waterfall approaches to adapt to frequent change, project managers often transition to more Agile approaches (Aston, 2019; Muslihat, 2018).

Agile approaches provide project teams with flexibility and responsiveness to changing needs (Almeida, 2017). Almeida (2017) explains that Agile practitioners embrace not knowing all the project requirements from the onset but instead guide teams through small, manageable chunks of development. This approach allows seamless integration of new requirements with little impact on project timelines and cost. Frequent interaction between stakeholders and development teams strengthen the integration of people's perspectives on project outputs, allowing feedback to be continuously integrated (Maassen, 2018). Lavalle and Casale (2020) propose implementing an Agile approach to project management as it values individual contributions, interactions, collaboration and change management. Therefore, Agile project management has increasingly been employed, as it is well known for its ability as a PM methodology to foster social interactions (Aston, 2019). Agile methods are recommended in projects where team motivation, support and accountability determine the success of collaborative efforts among members who have little to no prior experience in developing the outputs they are expected to design (Muslihat, 2018).

Extreme Programming, Crystal methods, Adaptive Software Development, Feature Driven Development, Scrum, Kanban and Lean are project management frameworks based on Agile principles (Kapitsaki & Christou, 2014). Challenges reported when implementing some of these Agile techniques include inadequate training, a lack of formal guidelines, and organisational resistance to adopting a new project management approach (Vijayasarathy & Turk, 2008). Similarly, a survey conducted by VersionOneSurvey (2010) revealed Agile adoption failing because of a shortage of knowledge and experience in implementing Agile approaches, in addition to company culture not being conducive to implementing a new approach. Scrum, however, has risen in popularity among Agile methodologies (Bhavsar et al., 2020; Kapitsaki & Christou, 2014), with Schwaber and Sutherland (2017) developing a Scrum guide, to provide clearer guidelines on values, roles, workflow, and artefacts which form part of the Agile framework.

Scrum is "a framework within which people can address complex adaptive problems while productively and creatively delivering products of the highest possible value" (Schwaber & Sutherland, 2017, p. 3). Given that Scrum supports communication and collaboration among team members according to a structured process which still allows for flexibility (Söderback et al., 2016), the researcher explored the project management framework further in the section below.

2.4 Scrum

When projects demanding innovation are conducted within organisations, Scrum is often recommended as an Agile project management framework (Lavalle & Casale, 2020;

Papke & Wagner, 2017). Scrum has been defined as a lightweight, agile framework that encourages transparency, communication and collaboration to generate greater project value based on practitioners' unique needs (Agh & Ramsin, 2021). Scrum has three empirical pillars that inform the control of processes, namely transparency, inspection and adaptation (Schwaber & Sutherland, 2017). Transparency ensures visibility and a shared understanding of processes and products required by responsible individuals, while inspection entails reviewing scrum processes and artefacts to provide timely feedback (Azanha et al., 2017). Finally, adaptation refers to processes or artefacts being adjusted by the team to meet newly communicated goals (Schwaber & Sutherland, 2017). The pillars mentioned above can only be executed through effective social interactions, which ensure that all role-players understand the project purpose, share common goals, and contribute to decision-making (Lavalle & Casale, 2020).

Azanha et al. (2017) have found that Scrum contributes to increased motivation amongst project teams and greater staff satisfaction with the managerial support provided. Papke and Wagner (2017) explain that Scrum is based on six important managerial support functions, i.e., role-player empowerment, improved communication, transparency, reflection, high-involvement practices, and regular feedback opportunities. These functions are very different from traditional PM roles of control, supervision and administration (Steyn et al., 2016; Tabatabaei et al., 2019). What also makes Scrum unique is the emphasis on using specific terminology for Scrum roles, processes and tools. Waltmunson (2011) explains that infant adopters of Scrum may find the initial use of the terminology artificial; however, its continued use will lead to operational and mental shifts in PM. Scrum language helps shape how teams understand their roles and provides a highly structured process for engagement (Friess, 2019).

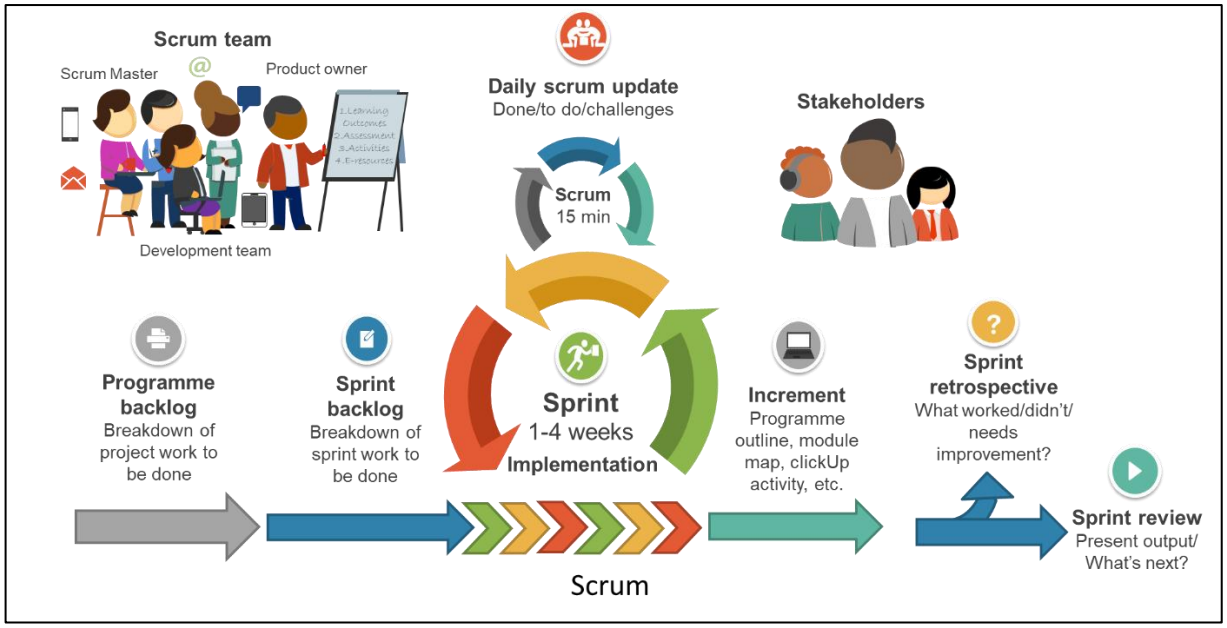
Scrum, as an Agile project management framework, "advocates distributing the responsibilities of the traditional project manager role among the team members, with an appointed Scrum master serving as the team's guide and facilitator" (Lavalle & Casale, 2020, p. 56). Waltmunson (2011) maintains that Scrum development teams are generally kept small (7 +-2 members) and should always be equipped and encouraged to self-manage to achieve a distributed workload. Scrum masters assist development teams in optimising knowledge transfer through social interactions (Muslihat, 2018).

Scrum interactions are guided by the product backlog, which clarifies the plan for product development (Fowler, 2019). The framework consists of several time-boxed events, called sprints, during which all other Scrum events occur (Fowler, 2019). Sprints are 1- to-4-week-long development events during which useable items, called the sprint increment, must be created. In addition, 15-minute daily Scrums are recommended, during which the development team discuss what they did, are going to do, and potential impediments (Schwaber & Sutherland, 2017). Once a sprint has been completed, a sprint review takes place to present the increment to key

stakeholders. The intention is to encourage collaboration and elicit feedback (Muslihat, 2018). Finally, a sprint takes place retrospectively to provide the Scrum team with a platform to self-reflect, be transparent and adapt ways of working together (Fowler, 2019). See Figure 2.7 for a depiction of the Scrum process.

Figure 2.7

The Scrum Framework



Adapted from Schwaber (2004)

Accordingly, Aurisch et al. (2021) found Scrum to be so well structured that it improved the organisational skills of the entire team, allowing for the timely identification of problems, and improved project outputs due to frequent reviews. Schwaber and Sutherland (2020) reported that Scrum improved communication and reduced task time as teams frequently report progress, identify impediments, and incorporate stakeholder feedback into their product designs. The Scrum framework has often been attributed to its ability to reduce the complexity of projects as team members can focus on individual tasks in which they have the expertise while still working towards a shared goal (Lies, 2020). Self-reported benefits of implementing Scrum include people-centric practices, increased team productivity, and reduced time spent on the task (Azanha et al., 2017; Kapitsaki & Christou, 2014). In addition, better knowledge transfer and learning due to transparent communication strategies (Petersen & Wohlin, 2009), increased flexibility in responding to change (Kapitsaki & Christou, 2014), and an appreciation by development teams and stakeholders in receiving frequent feedback (Kapitsaki & Christou, 2014; Petersen & Wohlin, 2009) have been reported.

For the past decade, the implementation of Scrum in the HE context has occurred in numerous ways (Sakulvirikitkul et al., 2020). Research in this regard focused mainly on using Scrum as a teaching strategy for project- and problem-based learning among students enrolled in software development and professional writing courses (Mahnic, 2012; Ovesen, 2013; Pope-Ruark, 2012). Avila et al. (2022) report that there is an abundance of literature available on the use of Scrum in software engineering education to improve student learning, communication and team cohesion. Scrum has been used in project management education to develop soft skills, such as negotiation and motivation, required among project management students (Farooq et al., 2022). Parsons and MacCallum (2019) also report that Scrum methodology has increasingly been used for educational purposes to structure self-regulated learning.

Vogelzang et al. (2020) found Scrum to be beneficial in providing scaffolding to students undergoing learning processes that require complex and overwhelming projects. Scrum enhanced peer-to-peer and student-to-facilitator collaboration and improved reflection among students and teachers. In a unique study involving student partnerships, Owen and Wasiuk (2020) used Scrum to guide a curriculum development process for an online short course. Söderback et al. (2016) and Persson et al. (2011) emphasise a lack of research on Scrum in HE online contexts. The researcher has also identified a dearth of academic literature on Scrum use among development teams involved in fully online HE programme development. E-learning content developers such as Hogle (2017), Scanlon (2019) and Winstead (2021) have, however, written several practice-oriented blog posts on the value of Scrum and Agile practices for e-learning instructional design teams.

Expansive literature searches for articles on Scrum use for HE qualification design produced results such as the paper published by Van Zyl et al. (2020) on academic managers' and curriculum designers' role in involving students as co-creators of the curriculum in HE. Unfortunately, management frameworks for the leadership of curriculum design teams were not discussed. Similarly, He and Liu (2018) researched the design and management of higher education (HE) programmes; however, the focus was on cultural differences' impact on transnational collaboration efforts. Hrivnak (2019) provided a personal reflection on the curriculum design of management education programmes, focusing on the design decisions rather than the management of the development teams. This study, therefore, sought to investigate the extent to which Scrum could be used as a project management framework for e-learning curriculum design teams, with a particular focus on enhancing their social interactions.

Criticism against Scrum, however, includes the challenge for stakeholders to be present for Sprint retrospectives throughout the project duration, complexities with inter-team communication, and a lack of training in Scrum methodologies (Petersen & Wohlin, 2009). Costa et al. (2022) noted that product backlog items sometimes lack sufficient detailed information for the development

teams to infer exactly what must be developed within the sprint. Further, Aurisch et al. (2021) cautioned that Scrum teams sometimes over-commit to the number of backlog tasks that can be completed during a sprint. This tendency is often amplified by poor product backlog management due to a lack of experience. Changes in development team members also proved challenging to Maulana and Raharjo (2021) as new members had to be brought up to speed, while maintaining planned sprint momentum. In addition, part-time staff members had difficulty committing fully to Scrum's stringent routine. Marsden et al. (2021) found that certain aspects of Scrum and individual biases reinforce stereotypes and contribute towards discriminatory practices such as gender inequality. In highly technical professions, women have been pushed into roles of Scrum masters (SMs) due to their perceived empathetic, cooperative and supporting natures, while men were given technically challenging roles as development team members. Yet another problem encountered with Scrum was that it was found to be challenging to implement initially, and teams underestimated the effort required to implement Scrum (Mahnic, 2012). In addition, Andrei et al., (2019, p. 134), participants disliked the "high number of meetings and the fact that they induced a routine."

Despite the challenges mentioned above, Bellis et al. (2022) maintained that Scrum offered a framework that encourages a change in management to ensure leadership styles that emphasise the building of collegial relationships in wholly digital environments. Mahnic (2012) reported improvement in Scrum implementation after the third sprint, and encouraged the researcher's presence as a participant observer. This presence allows close monitoring of the study, better collection of participant feedback and identifying areas for improvement. Finding better ways of explaining Scrum concepts and steering teams to focus on the strengths of Scrum, i.e. improving teamwork and internal communication, leads to greater project success (Mahnic, 2012). Thus, despite the criticisms of the Scrum framework, the researcher was curious to see whether Scrum could be adapted for the management of e-learning programme development teams due to its proclaimed promotion of social interactions.

2.5 Social Interactions

Bawa and Watson (2017) stress a research gap exists in understanding instructional design project communication and collaboration, particularly in terms of stakeholders' perceptions thereof. Often, e-learning project managers face complex communication management and team coordination associated with managing multiple projects (Vasilache et al., 2018). Although some researchers view team building, relationship facilitation and maintaining stakeholder relations as non-traditional ID tasks (Stefaniak, 2017), the importance of these PM roles cannot be overemphasised. Burrows (2020) reports that the management of project teams often suffers because proper communication and collaboration methods are lacking. When project managers cannot facilitate individual interaction, uncoordinated role-player collaboration follows, leading to

a lack of collective decision making of team members, which may result in project failure (Bhalerao & Ingle, 2020). Accordingly, Porter (2019) and Burrows (2020) identified communication *with,* and relationship management *of* the people who form part of project teams as the most important elements driving project success.

Mishra et al. (2012) have found that communication, collaboration and coordination amplify the success of Agile projects. Spencer et al. (2011) term these elements "social interactions" as communication, coordination, and collaboration drive successful e-project management. According to Brown (2022), communication is most effective when it is clear, complete, concise, correct, concrete, courteous and coherent. Communication, in turn, aids in effective coordination, which ensures that all project elements are organised to function optimally so that every member's individual efforts are utilised towards collectively achieving the project goal (Wilson & Corr, 2018). Further, collaboration ensures that an enriched final product is produced due to multiple expert team members sharing ideas and finding creative solutions (Patrucco et al., 2022). Social interactions contribute to building trust, rapport and a sense of shared responsibility between all involved in projects, particularly in projects involving programme development, where instructional designers and academics must work closely together to create an end product where many parts (modules) from part of a greater whole (programme) (Richardson, Ashby, Alshammari et al., 2019). Martin et al. (2016) maintain that analysing exchanges between individuals working on the same project should be done sequentially. First, communication should be reviewed, thereafter coordination, and finally, collaboration efforts should be focused on to improve the social interactions of project teams as a whole.

The Project Management Institute (2017) defines communication as the intentional or voluntary exchange of information, such as instructions, ideas or even emotions. In project communication, information may be a complex concept, with physical, electronic, face-to-face and remote interaction taking place in media, written texts, or spoken word. Various dimensions of communication require managerial oversight, such as internal and external, formal and informal, and hierarchical, be it downward, horizontal or upward, as well as official and unofficial communication formats. There has also been a shift in project communication management to increasingly include a representative stakeholder in project meetings and increment reviews. PM communication strategies increasingly draw on technologies and social computing to accommodate diverse stakeholder communication cultures, and allow collaboration that "not only support information exchange but also build relationships accompanied by deeper levels of trust and community" (Project Management Institute, 2017, p. 364).

Olaisen and Revang (2017) explain that communication among e-project team members should contribute to developing shared knowledge with intrinsic, contextual and actionable quality. Intrinsic knowledge quality refers to highly accurate, reliable and timely knowledge, while

contextual knowledge quality relates to appropriate, relevant and valuable knowledge fulfilling a professional function within a particular context. Finally, actionable knowledge quality refers to knowledge being easily applied, expanded and adapted by users to complete tasks (Olaisen & Revang, 2017). In the context of curriculum change, open communication allows for decision-making that considers all stakeholders' opinions, thus breaking down the barriers created by notions of ranking, position or power (Alkahtani, 2017). In addition, Mishra et al. (2012) point out that good team communication significantly influences product progress and quality, both of which are linked to project coordination. A failure in communication often results in project coordination failure (Martin et al., 2016).

Coordination entails adjusting individuals' efforts to focus on working together to reach a common goal or vision through team efforts (Mishra et al., 2012). It is vital to project coordination to ensure that all team members understand their roles, task timelines and how individual efforts contribute to the greater whole (Mishra et al., 2012). Well-coordinated projects enhance team efficiency and eliminate inactivity or duplication of work (Mishra et al., 2012). Coordination entails creating a project plan, dividing project components into smaller, more manageable tasks, putting collaborative project processes in place and connecting professionals to share expertise and resources (Martin et al., 2016; Mazer et al., 2020). A shared and enhanced project vision is created when collaboration is both actively encouraged and guided towards interdisciplinary learning (Spencer et al., 2011).

Collaboration requires more than individuals cooperating on a project together. Martin et al. (2016) define cooperation as working alongside another, often with limited interaction or occasional teamwork. True collaboration implies that interactive group work frequently occurs within a project, such that complex problems are solved by integrating the ideas of numerous individuals (Mishra et al., 2012). Often collaboration takes place in projects of long-term duration, where individuals are required to adapt to a fast-paced working environment (Richardson, Ashby, Alshammari, et al., 2019). Part of the adaptation requires developing a shared comprehension of the project language and actively contributing to the team's culture. Individuals in collaborative projects understand that they are accountable to each other (Troxel & Inge, 2020). Haaskjold et al. (2019) describe the relationships formed and maintained through collaborative efforts as an alliance or partnership due to the interdependency of individuals working jointly to achieve a common goal.

Social interactions in this study were constituted by all the communication, coordination and collaboration exchanges that took place between the researcher (as product owner), the learning designers (as Scrum masters) and the subject matter experts (as development team members), working towards developing a fully online programme (Espinosa-Curiel et al., 2018; Rozkwitalska, 2020; Rush & Connolly, 2020). In the HE context, "collaborative environments offer an optimal

medium for rich discussions and sharing of diverse and often inter-disciplinary knowledge and expertise aimed at improving the quality of the learning experience for students" (Richardson, Ashby, Alshammari et al., 2019, p. 857). Online education teams wanting to implement Scrum to improve collaboration should consider that elements such as individual motivation, community culture, and tools used for communication also play a vital part (Erickson, 2018). Accordingly, the researcher used Activity Theory as the theoretical framework to keep her conscious of the various elements that make up the activity system, such as the subjects, tools and rules governing engagement.

2.6 Activity Theory

The researcher identified multiple commonalities between Scrum and Activity Theory (AT), which will be addressed in this section. Scrum was "built on an extensive theoretical base that ranges from systems analytics to team interactions and human behaviour" (Fowler, 2019, p 9). Similarly, Hashim and Jones (2007, p. 1) maintain that Activity Theory (AT) is ideally used when attempting to understand human interactions better in contexts where "the participants, their purposes and their tools are in a process of rapid and constant change." Activity theory (Leont'ev, 1978) has been used to study virtual teams communicating via electronic means as early as the 1990s (Foot, 2001). Spinuzzi and Guile (2019) maintain that AT is frequently used for case study analysis where communication is studied in cooperative education settings and computer-supported work. The AT framework is implemented to aid participants in cyclically transforming their practice by continually identifying developmental impediments or tensions across and within elements (Zahedi et al., 2017). Consequently, AT was used to guide the research methodology and interpretation of data.

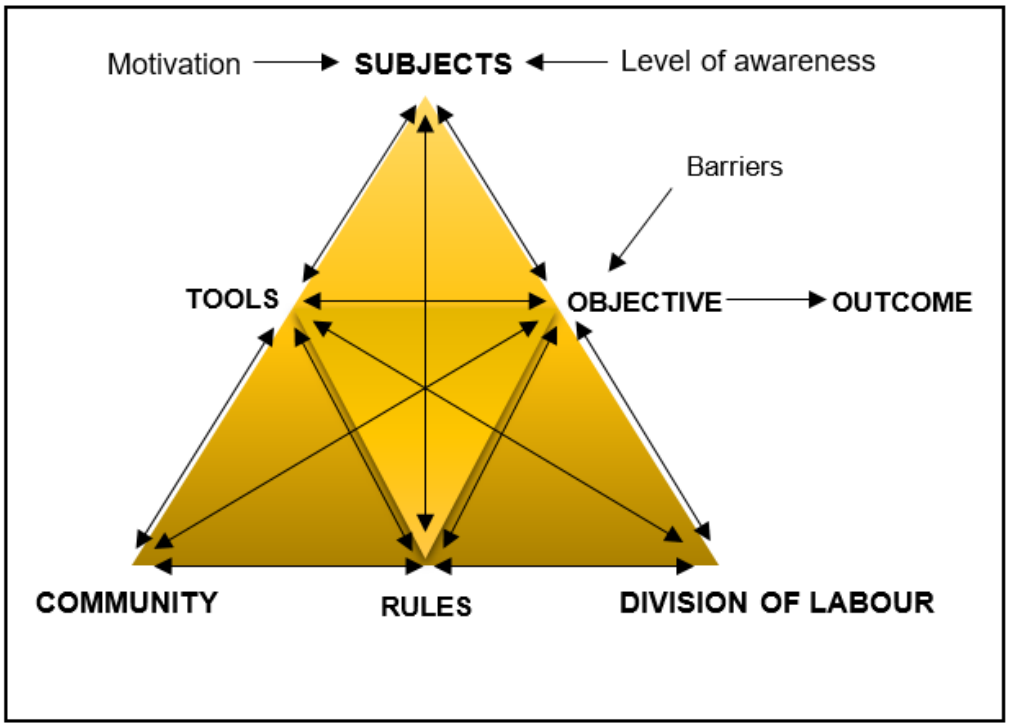
Activity theory (AT) is a well-known social sciences framework used to study human interaction through tools and artefacts (Hashim & Jones, 2007). Activity theory considers individuals' complexity, social reality, and community interrelations by analysing activity systems (AS) (Engeström, 2001). The AS comprises an interaction between six related elements: Firstly, the **subject** (Scrum team members engaged in the process of programme design) working towards the **object(ive)** (completed e-learning programme). Secondly, **tools** (Scrum workflow, scrum concepts, artefacts and technology used to conduct work) are used according to governing **rules** (Scrum values and guiding principles on how team members work and act). Finally, **division of labour** (roles and responsibilities of the Scrum team) establishes accountability in the **community** (Scrum team with all its social interactions), all geared towards achieving a specific **outcome** (a constructively aligned, pedagogically sound, fully online qualification designed by a team with enhanced social interactions) (Engeström, 2015).

The framework is currently in its fourth generation (see Figure 2.8) as activities become increasingly interconnected, emergent, iterative (Spinuzzi & Guile, 2019), social and peer-

oriented (Engeström, 2009). An analysis of existing literature on the fourth generation of Activity Theory (4GAT) revealed an emphasis on adapting AT to focus on self-empowerment, co-creation of knowledge, and interdisciplinary collaborations (Spinuzzi & Guile, 2019). Khayyat (2016) drew on several studies regarding 4GAT to include elements of motivation, awareness and barriers. Focusing on these three additional elements in research aids in gaining a better understanding of what drives participants or hinders them in their attempts to achieve project outcomes. The fourth generation of activity theory helps teams to identify effective interventions that will lead to improved outcomes. These interventions may include adapting elements such as the division of labour or tools or rethinking the objective (Spinuzzi & Guile, 2019).

Figure 2.8

Fourth Generation Activity Theory Model



Adapted from Khayyat (2016)

In this study, AT was used to design data-gathering instruments fit to research multidisciplinary teams' social interactions when designing HE e-learning programmes following Scrum. The interactions of Scrum team members and their use of tools were analysed to identify enabling elements and tensions in communication, collaboration and coordination. In addition, social interactions as facilitators of understanding and implementing rules and division of labour were analysed. Finally, social interactions' contribution to participant motivation, or the creation of barriers to achieving the objective, was studied. Activity theory thus directed the development of data gathering instruments and data analysis techniques to determine the extent to which Scrum could promote social interactions in an e-learning project.

2.7 Conclusion

There is a drive towards collective sense-making in the workplace (Van der Hoorn & Killen, 2021). Managers face complex changes brought on by information and communication technology (ICT) integration and societal demands, which compel them to re-evaluate their identities as managers, particularly in HE (Degn, 2015; Lucia et al., 2019). Similarly, academics must make sense of their new roles as curriculum creators and facilitators of ICT-intensive learning innovations (Reyes et al., 2021). These changes have led to emphasising the "human aspects of project work" including interpersonal skills and social interactions in PM. In the researcher's capacity as project manager, she sought to find and, if needs be, adapt (Van der Hoorn & Killen, 2021, p. 1) a project management framework with both the "human aspects", as well as the structure and principles to deliver on project goals at its core. The literature has shown that Scrum is as much a framework for empowering teams as it is for timely delivery of quality-enhanced products (Fowler, 2019; Magana et al., 2018; Papke & Wagner, 2017). Therefore, the next chapter will deal with the methodology implemented in this study when investigating to what extent Scrum could be used to promote social interactions among team members creating fully online programme

3 Chapter Three: Methodology

3.1 Introduction

"Research focused on discovery, insight, and understanding from the perspectives of those being studied offers the greatest promise of making a difference in people's lives."

(Merriam & Tisdell, 2015, p. 1)

Hitchcock and Hughes (1995, p. 21) maintain that "ontological assumptions will give rise to epistemological assumptions which have methodological implications for the choice of particular data collection techniques." Accordingly, Cohen et al. (2007) caution researchers that research methods should not be viewed as mere technical exercises that simply relate to how one understands the world. Research methodology assists the researcher in understanding the inquiry process by describing philosophical principles and paradigms, and their influence on research approaches (Kaplan, 1973). In contrast, research methods relate to procedures and techniques used for data collection such as conducting experiments and doing observations (Kaplan, 1973), or interviewing participants to interpret, infer, predict or explain phenomena (Cohen et al., 2007). This chapter will elaborate on the ontological and epistemological assumptions the researcher applied as well as their methodological implications. Thereafter, the data collection and analysis methods that were used will be unpacked. As Kaplan (1973) recommends, the researcher will describe the methods, discuss their limitations and clarify her presuppositions.

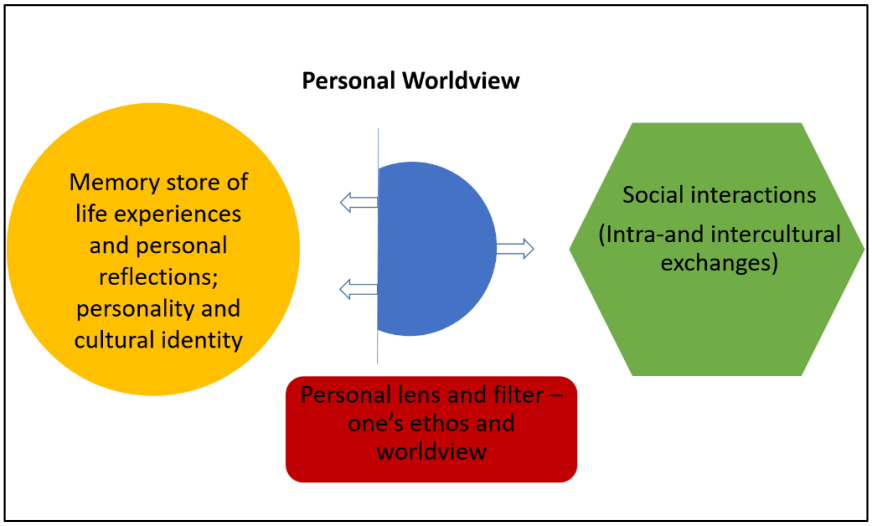
3.2 Research Paradigm

When deciding on the correct research paradigm to apply to a study, "fitness for purpose" should guide the researcher (Cohen et al., 2007, p. 3). As this study aimed to discover to what extent Scrum could be used to promote social interactions in an e-learning project, the researcher sought a paradigm which allows for the interpretation of human activities within real-life social contexts (Swann & Pratt, 2003). The researcher sought not to generalise her findings to all programme development teams who have begun to adopt a new project management framework but rather for the findings to be transferable to similar contexts where value can be found (Cohen et al., 2007; Walford, 2001). Stewart et al. (2017) explain that interpretivist research contributes to a richer understanding of phenomena, as the researcher can openly and holistically explore each participant's unique interpretations and environment. Therefore, the researcher holds an interpretivist worldview, assuming that reality is socially constructed through shared meaning, consciousness and language (Thanh et al., 2015). Taking an interpretivist perspective allowed the researcher to hone in on the participants' subjective experiences and interactions with each other (Ryan, 2018). Nieuwenhuis (2011b) maintains that interpretive research is applicable to

studies that explore a phenomenon's complexity, depth and richness. Saldana (2011) provides a very accurate portrayal of the interactive process of worldview development (see Figure 3.1).

Figure 3.1

A Process Diagram for Personal Worldview



Adapted from Saldana (2011)

3.2.1 Ontological Assumptions

Researchers are required to take a stance on how they view reality. Levers (2013) maintains that a longstanding debate continues among scholars as to whether reality exists through our experience and within consciousness or independent of human perception. The researcher believes that reality is socially constructed, depending on individuals' perceptions. Therefore, she believes that multiple realities exist as each individual's subjective experience of the world determines what is true or real to them (Guba & Lincoln, 2005). Therefore, the ontological assumptions underpinning this study were relativist (O'Grady, 2002) by nature. As such, the researcher believes that the cultural context in which the study took place greatly impacted the participants' experiences, views and behaviours. Therefore, the researcher acted as a cooperative participant-observer for her to observe the development teams on an individual, group role, and cultural level, as recommended by McDonald (2010).

3.2.2 Epistemological Assumptions

Epistemology relates to our beliefs about how truth and knowledge can be found (Ryan, 2018). In other words, our epistemological assumptions help us determine what measures we should use to know the world better. A subjectivist epistemological view aligns with the interpretivist paradigm adopted by the researcher (Levers, 2013). Therefore, knowledge was seen as constructed within individuals, and consequently, the researcher sought to understand social life through the meanings that participants assign to their experiences (Saldana, 2011). For that reason, individuals taking part in this study were requested to share their views on the social

interactions within programme development teams during online interviews and an online survey. Green et al. (2006) explain that interpretive researchers focus on multiple angles of data they wish to explore to obtain a holistic view of phenomena. Accordingly, the voices of individual participants in this study were valued greatly and opposing opinions reported on, rather than collating participants' voices into a combined experience and omitting conflicting beliefs. As interpretivists view knowledge as both context-dependent and time-bound, the researcher sought to include the views of contextually diverse participants who participated in e-learning projects over a minimum period of six months (Hudson & Ozanne, 1988).

3.2.3 Axiological Assumptions

Axiological assumptions relate to the ethical and moral use of knowledge produced through data gathering (Green et al., 2006). Spencer et al. (2014) ascertain that some qualitative researchers take up the position of change agent, and therefore their experience becomes central to the research process. This is necessary if the researcher hopes to achieve the study's aims (Spencer et al., 2014). Green et al. (2006) emphasise that researchers within the field of education, in particular, should report on their moral reasoning given the interests of the populations they represent. In practising reflexivity, the researcher did introspection and wished to acknowledge the study's value-laden nature, and her subjectivity in decisions taken throughout this study, which naturally led to her views being embedded in the research process (Denzin, 1989). Reflexivity requires a researcher to gain greater awareness of her personal perspectives, becoming transparent about her perceptions and how they impact relationships and interpretations, thus transcending her biases (Rashid et al., 2019). The researcher used the reflexive questions (see Figure 3.2) suggested by Patton (2015) throughout the study to practice reflexivity.

The topic chosen for this study relates directly to the researchers' working environment, being employed for the first time in a managerial position for a newly established directorate for fully online learning design at a higher education institution (HEI). The researcher had extensive (close to ten years) experience as a curriculum development practitioner and some experience (less than five years) as an instructional designer. However, she had little experience (less than one year) leading a team of learning designers in managing their own programme development teams. Therefore, the framework chosen for investigation was selected after extensive literature reviews on Project Management (PM) frameworks used in HE contexts, where social interactions between team members proved to be a challenging hurdle. The researcher often acted as product owner and transitory Scrum master for three programmes; therefore, the findings represent the interpretation and experiences of the researcher as much as that of the participants (Creswell, 2013). In Section 3.5.2, the researcher further addresses the reflexive question responses about the participants of this study.

Figure 3.2

Reflexive Questions: Triangulated Inquiry

Adapted from Patton (2015)

3.3 Research Approach

Swann and Pratt (2003) and Thanh et al. (2015) maintain that researchers using the interpretivist paradigm strive to gather data on individual perceptions and experiences through predominantly qualitative methods. Saldana (2011) defines qualitative research as those methods used to study social life in its natural state. Similarly, Van Maanen (1979, p. 520) explains that qualitative research includes numerous interpretive data-gathering techniques aimed at discovering meaning through “description, decoding and translating” of natural social phenomena. In research on project management, qualitative studies have historically focused on work experience, relationships within projects, the impact of PM frameworks, the nature of management and managerial identity (Cassell et al., 2006). This study included several focus areas mentioned before, looking at the experiences of e-learning programme development team members as they naturally interact socially. A focus on the nature of management is also included through the participation of the product owner and Scrum masters who lead the development teams. Table 3.1 provides a summary of the role-players involved in the study.

Table 3.1

Summary of role-players

Role-players	Description
Product owner (PO)	Identifies stakeholder needs, management of backlog, maximises product value, invested in product and team effectiveness
Scrum master (SM)	Scrum process keeper, link between PO & DT, servant leader of DT, protects DT, removes impediments, invested in team efficiency
Development team (DT) member	Subject matter experts, designs and develops curriculum, self-organises, invested in product quality

Merriam and Tisdell (2015) emphasise that, generally, qualitative research is underpinned by four defining characteristics. Firstly qualitative research focuses on understanding and making meaning of individual experiences. Qualitative research is, therefore *emic*, drawing on the participant's (insider) perspective rather than that of an outsider (such as an objective researcher) (Azungah, 2018; Cohen et al., 2007). Accordingly, Patton (1985) maintains that a qualitative researcher should faithfully report their findings based on the true interpretations of the participants in their unique setting. Therefore, the researcher will attempt to describe the development team's meaning-making processes as they interacted to design curricula rather than focusing on analysing the end product of their collaborative efforts (Merriam & Tisdell, 2015).

Secondly, qualitative researchers act as primary data-gathering and analysis instruments. As qualitative research is representational, it is acceptable that a researcher is involved and immersed in the data-gathering process (Yin, 2003). Merriam and Tisdell (2015) maintain that qualitative researchers can be more responsive and adaptive in their research methods. With emergent qualitative research, the researcher can decide on the design as the study progresses (Gupta & Awasthy, 2015).

In this study, the researcher soon realised that the aims of this qualitative study could more readily be achieved if the design remained dynamic and evolving. Accordingly, flexibility in data gathering strategies was maintained, allowing modification of the data collection strategies and instruments based on the data gathered. Adaptations to the data-gathering strategies are discussed in Section 3.5.3, Data Gathering. Further benefits of a researcher as a primary instrument include that understanding of phenomena is deepened through observation of nonverbal communication (Saldana, 2011), while information can be processed immediately. The researcher is uniquely positioned to instantly clarify matters with participants or probe unexpected responses (Merriam & Tisdell, 2015).

Thirdly, qualitative research often follows inductive-dominant processes to construct concepts or build on theories (Cohen et al., 2007). That is not to say that only inductive methods occur, as both inductive and deductive techniques are often used simultaneously. Armat et al. (2018) warn that using the two analysis labels as if they were entirely opposing and separate is an outdated tradition, as most qualitative content analysis studies employ both approaches with different dominances. Frameworks are therefore informed by what is inductively learned in the natural and unique setting (Merriam & Tisdell, 2015), deductively known to the researcher based on prior knowledge of the research topic, and guided by the research questions (Azungah, 2018). Cohen et al. (2007) maintain that inductive-deductive combinations are often used when researchers wish to move back and forth between the two to benefit from both strengths. Document analysis, observations and interviews consequently serve as very specific data sources from which more general categories and themes can be generated. Saldana (2011) explains that textual and visual materials of reflexive nature are most often used for data collection in studies of a more qualitative nature.

To this end, the researcher made use of a personal contemporary reflective journal, reflective email interviews, online group interviews, and online individual interviews as her main data collection strategies. Further, because multiple data sources are used in qualitative research (Yin, 2013), the study included an online survey better to inform the instrument design of the individual interview protocols. Due to COVID-19, all data gathering took place virtually (Lathen & Laestadius, 2021). The researcher, as many other researchers who gathered data during the pandemic, had to rely on “reflexivity, responsiveness, adaptability and flexibility” to ensure the continuation of the study (Rahman et al., 2021, p. 1).

Topping et al. (2021) recommend that researchers consider accessibility, costs, technical difficulties, time and the interview environment when conducting online studies. Richard et al. (2021) maintain that online data collection offers results of equal quality to face-to-face studies at a fraction of the cost. Recruitment of participants for online studies is often easier than for face-to-face data collection, as individuals can participate from any environment convenient to them (Richard et al., 2021). For this study, data collection took place a year after the COVID-19 pandemic started, resulting in extreme social distancing processes with several levels of lockdown implemented (Rahman et al., 2021). All the participants, therefore, had the necessary resources, stable internet connection and ICT skills required to participate in the online study, as they were accustomed to working on their fully online programmes in an online environment.

Finally, data in qualitative studies is reported through rich descriptive texts (Cohen et al., 2007) to provide realistic accounts (Saldana, 2011). In other words, comprehensive details are shared of the study's context, the participants from whom data is gathered, and descriptive quotes on

their lived experiences (Merriam & Tisdell, 2015). Reporting on data requires using the participants' language and taking excerpts from documents such as reflective notes to provide holistic findings. Of note is that qualitative samples are often smaller in size when compared to quantitative studies (Dworkin, 2012). Bobby (2016) maintains that sample size is often based on the context of the study. He further states that samples might consist of one single case, such as in medical research (Bobby, 2016), whereas Dworkin (2012, p. 1319) proposes anything between 5 to 50 participants concluding that “it depends”. Most researchers argue that theoretical saturation is a suitable guide to determine sample size (Malterud et al., 2016). Please see Section 3.6, Quality Criteria for a further discussion on data saturation.

Given the small sample size of this study comprising a total of 10 participants (excluding the researcher), data captured through the survey, was not seen as providing results of statistical significance, nor was it the researcher’s intention to generalise the findings (Benjamin et al., 2018). Rather the descriptive data was used to contribute to the richness and understanding of the qualitative data by providing numerical representations of what was conveyed in the participant quotes (Palinkas et al., 2011). Drew et al. (2008) confirm that descriptive statistics can be useful in describing group behaviour or experience by providing central tendency and dispersion scores such as means, modes and standard deviation.

3.4 Research Design

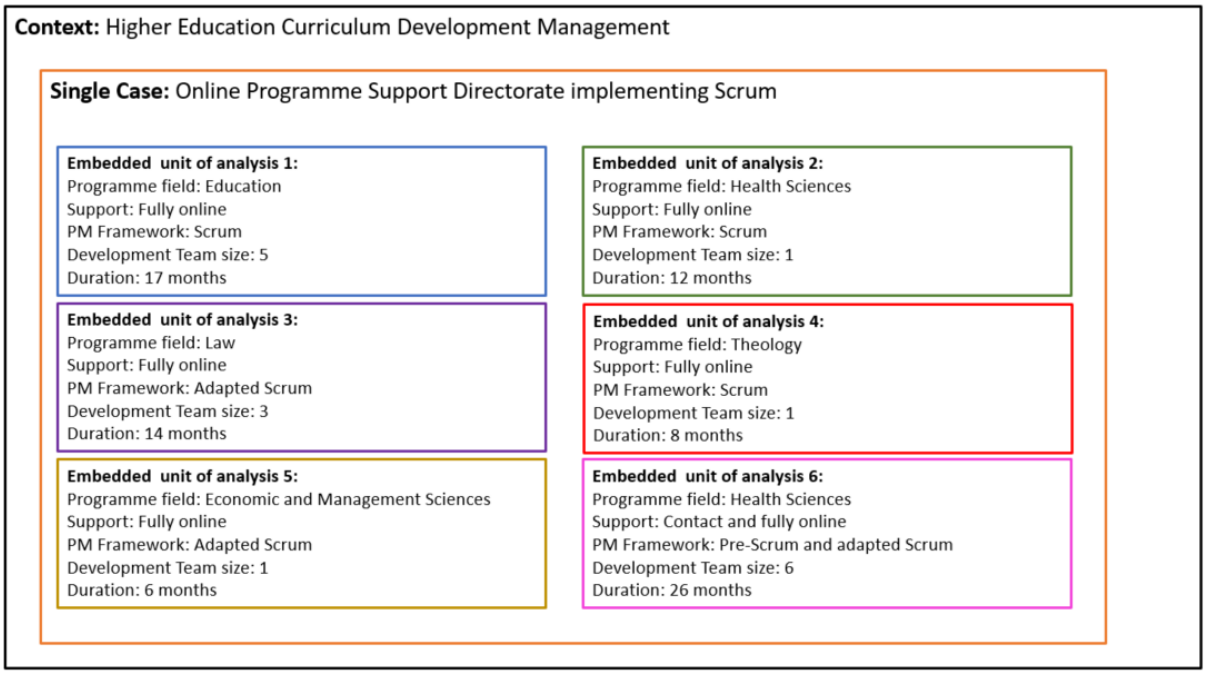
Ebneyamini and Moghadam (2018) maintain that research in the management field, especially where changes in methods, technology and innovation are eminent, often requires a field-based design, such as case study research. Case studies clarify research decisions and holistically portray their processes by addressing questions on why (rationale), how (implementation), and what (results obtained) to add to the understanding of social phenomena (Schramm, 1971). The researcher believes case study research was best suited for this particular study because it aims to fully understand participant interactions and how they relate to and make meaning of the situation being studied (Nieuwenhuis, 2011c). Bonoma (1983, p. 86) emphasises that case study design is particularly suited to “sticky, practice based problems where the experiences of the actors are important, and the context of action is critical”.

Yin (2020) specifies that the phenomenon under investigation should be current and closely investigated within its context. Kothari (2004) further explains that case studies are often used when a restricted number of cases (or units within a case) that have experienced certain processes over a prolonged period are available for analysis. The researcher views the phenomena under investigation as the social interactions between Scrum team members who are conceptualising and designing fully online programmes in a HE context. The case, including its complex functioning units, as Johansson (2007) refers to them, comprises the various Scrum teams being supported by a learning design directorate. Since this study takes place within one

HEI, it is viewed as a single holistic case study, including embedded units (Baxter & Jack, 2010) (see Figure 3.3). The embedded units are distinguishable based on the Scrum masters assigned to the departments and the unique fully online programmes with which the teams were engaged.

The researcher sampled cases involved in the curriculum design and development process for at least six months, as the number of teams exposed to Scrum was limited, and participants with more experience would potentially contribute richer data. Studying sub-units embedded in a holistic case allows for data to be "analysed *within* the subunits separately (within-case analysis), *between* the different subunits (between case analysis) or *across* all of the subunits (cross-case analysis)" (Baxter & Jack, 2010, p. 150). In case study research, both participants and the researcher develop cases through their relationships and interactions (Ebneyamini & Moghadam, 2018; Stewart et al., 2017). Thus, through case study design, the researcher could continuously adapt the Scrum framework to the HE curriculum design context because of the daily interactions with development team members and feedback from Scrum masters involved in the various projects.

Figure 3.3
Single Case with Population of Embedded Units



*Note: *pre-Scrum* refers to a time when the directorate managing fully online programme design did not yet have a project management (PM) approach or framework. The learning designers (Scrum masters) worked in any manner they deemed fit, based on previous experience and personal preference. *Adapted Scrum*, instead, refers to managerial practices where the learning designers (Scrum masters) implement the agile principles and Scrum values with development teams and implemented other aspects of Scrum, e.g. Scrum terminology and events, to varying degrees. Finally, in programmes where *Scrum* is indicated as the PM framework, the Scrum

master attempted to stick as closely to Scrum practice as could be accommodated in the HE curriculum design and development context and unique development team dynamics.

Exploratory case design was implemented because research on the system of action, i. e. using Scrum as a project management framework in e-learning contexts, is still in its formative stages and requires several cases to refine the theory and practice (Benbasat et al., 1987). As is characteristic of exploratory case studies, this study was conducted using multiple data-gathering techniques to allow the complexity of e-learning communication, coordination and collaboration strategies to come to light in a real-life e-learning project setting (Yin, 2020). Data gathering and analysis were not seen as two separate steps but took place concurrently to enrich upcoming data-gathering events (Baxter & Jack, 2010). Once the data had been analysed and results reported, a conclusion was drawn, together with a list of recommendations that could potentially be used to improve future Scrum implementation in e-learning projects, as is characteristic of many case studies (Benbasat et al., 1987).

Case study research is not without its limitations. Issues regarding applying findings to a broader population have been raised (Ebneyamini & Moghadam, 2018). Huberman and Miles (1994) argue that case studies are too often conducted by sole researchers, who are more inclined to report on their findings, rather than providing a rich account of the data-gathering strategies and analysis procedures used to draw conclusions. Benbasat et al. (1987) drew similar conclusions about case studies, concluding that researchers should provide in-depth information about their research plans, why they selected certain cases and how data collection and analysis took place. Yin (2003) proposes that transparency about research decisions and practices can resolve matters of validity and reliability.

To ease the interpretation of how the study took place, the researcher will unpack the process according to multiple phases. However, the phases were iterative and ongoing, with most procedures in each phase being continuously revised as new insight was gained. First, a Scrum framework with accompanying artefacts was designed according to the literature and continually adapted to fit the HE e-learning context. Second, the framework was applied, to varying degrees, in six e-learning programme development projects, as multiple experiences across different teams needed to be investigated (Yin, 2003) (see Section 3.5.1). Third, data gathering and analysis took place (see Table 3.2 for a summary of research methods).

Table 3.2

Summary of research methods

Electronic methods	Data source	Data gathering strategy	Instruments	Data analysis
Method 1: Contemporary journal	Researcher (x1)	Reflexive observations (for the duration of the study)	Contemporary journal with observation & reflective notes	Content analysis
Method 2: Reflective email interviews	Scrum masters (x3)	Asynchronous, reflective emails over 15 months	Open-ended email questions on Scrum-related training (Appendix C)	Content analysis
Method 3: Online group interviews	Scrum masters (x3)	4 x 60min semi-structured group interviews over 6 months	Group interview protocol (Appendix D)	Content analysis
Method 4: Online Survey	Development team members (x7)	Ten min Online Questionnaire	Closed-ended questionnaire (Appendix E)	Descriptive statistical data analysis
Method 5: Online individual interviews	Development team members (x7)	Sixty min semi-structured individual interviews	Individual interview protocol (Appendix F)	Content analysis

3.5 Research Process

Once the researcher had identified the general study area of project management related to curriculum design and development teams in a HE context, she spent some time observing her environment and refined the research to focus on social interactions. After months of reflecting on personal experience in the field, talking to colleagues from various HEIs, and reading literature on topics related to agile project management, e-learning and social interactions, to name but a few, the researcher began to formulate a research plan (Oliver, 2010b). At the same time, the researcher was managing an online learning design directorate; therefore, the theory impacted her practice and vice versa. Gupta and Awasthy (2015) affirm this practice, stating that studies of a mostly qualitative nature entail greater immersion into the investigated phenomenon rather than following rigid steps. No project management frameworks were yet in place, so the knowledge gained through literature searches was actioned as emerging processes, roles and artefacts. The research questions and purpose were drafted and aligned with the activity theory model (Oliver, 2010a). A suitable methodology was determined considering the researcher's paradigmatic views

and the nature of the study. Appropriate sampling procedures were established, and the data-gathering instruments were designed and piloted before being refined. Data gathering, and shortly after that, data analysis, commenced. Both data gathering and analysis took place simultaneously for a couple of months. Throughout this process, the literature continued to be consulted to enhance the researcher's practices and enrich the overall study findings (Mizock & Harkins, 2014). Finally, the results were interpreted, and findings reported. The sections below provide greater details on the research process.

3.5.1 Adapting and Implementing Scrum

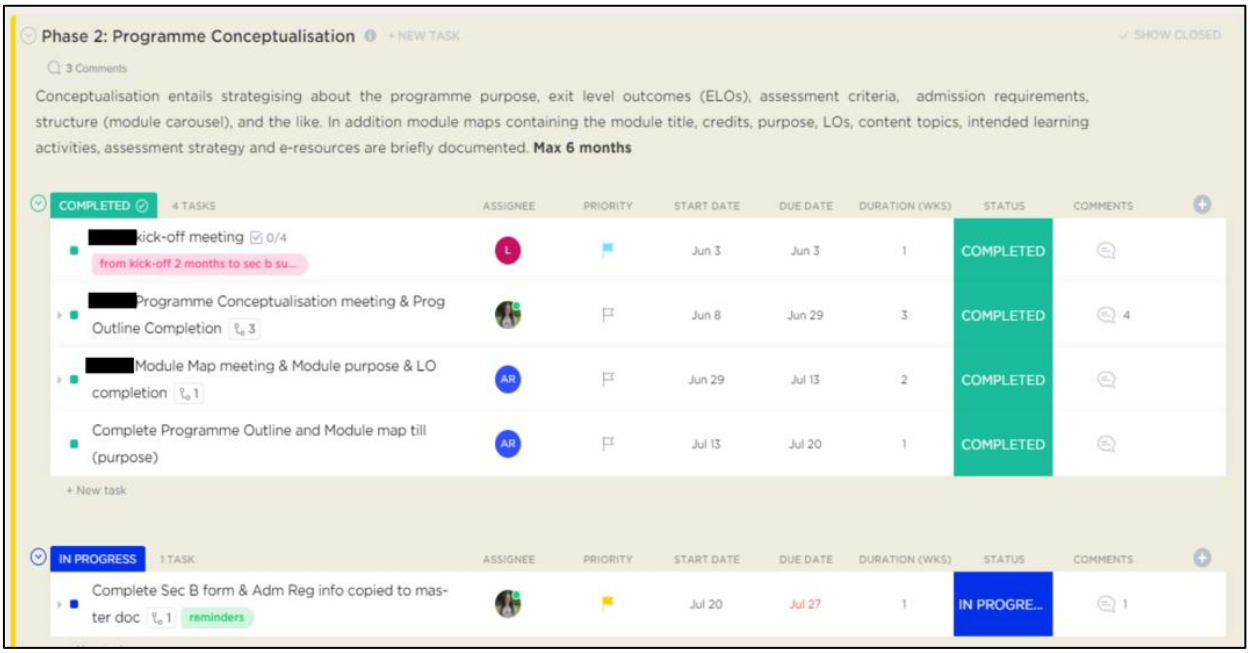
The researcher started by investigating several Agile project management frameworks before honing in on the Scrum framework due to its emphasis on aspects of social interaction (Azanha et al., 2017). An initial starting point was to become familiar with the Scrum Guide by Schwaber and Sutherland (2017), the founders of Scrum. The researcher spent a number of months investigating the Scrum framework's strengths, weaknesses and application within and beyond software development. She relied heavily on academic journal articles to determine how Scrum had been used in a HE context and what recommendations and pitfalls in implementation had been documented. Further investigative strategies included reading e-books, and more informal blog posts, as well as watching a number of tutorial videos of a practical nature. The researcher also completed short courses on Scrum to better understand the framework. Once a thorough understanding was obtained of the principles, values, role players, processes and artefacts of Scrum, the researcher proceeded to integrate Scrum as PM (project management) framework into the practices of the online learning design directorate. This gradual process took place over several months and remained ongoing after the completion of the study. The researcher consciously attempted to uphold the empirical process control pillars of transparency, inspection and adaptation throughout the implementation process (Schwaber & Sutherland, 2017).

To commence integration, the researcher determined the activities required to conceptualise, design and develop a fully online programme. It took several months to document the phases and tasks required to ensure that all requirements known to form part of the programme conceptualisation and design were captured. Programme conceptualisation and design of an accredited qualification require that many internal and external approvals take place; thus, many role players had to be consulted (Council on Higher Education [CHE], 2014). A product backlog (see Appendix G) was created as a living and ever-evolving document, including descriptions of tasks, their ideal order, time estimates, and priority (Schwaber & Sutherland, 2017). Initially, the product backlog was captured as a Google Doc (see Google Suite, for an explanation of all the Google applications) on which Scrum masters could make recommendations. As the Scrum masters and product owners began establishing the minimum criteria required for programme design, an online PM (project management) software site was sought, where multiple projects could be tracked. Morin (2020) recommends the use of communication technologies when

implementing Scrum as a means to facilitate collaboration. The team made use of ClickUP, as a project management tool. Figure 3.4 contains a screenshot from the actual ClickUP template used for all programmes to track progress.

Figure 3.4

Tasks to be Completed in the Conceptualisation Phase



Once the product backlog had been created, the third step included the development of introductory materials such as PowerPoint presentations and videos. The researcher started introducing the concept of Scrum to one development team as part of a series of virtual meetings about online programme development, project milestones and Scrum processes. For example, the first meeting was used to orient team members towards online programme design and included discussions on pedagogical differences, scale design, funding, and the like. In the second meeting, the team was introduced to ADDIE and the major milestones related to internal programme approval and external programme clearance, accreditation and registration. In the third meeting, Scrum was introduced as a project management framework, emphasising the principles and values and introducing the Scrum events. From the fourth engagement onward, sessions took on a workshop-type format, where aspects related directly to curriculum design, such as writing exit-level outcomes or implementing continuous assessment, were addressed. The different phases of analysis, conceptualisation, design, development, implementation and evaluation (Piña & Sanford, 2017) were broken down into sprints of 1 to 4 weeks.

The product backlog was used to guide the entire process. The development team was updated on what needed to be done each week and could get a glimpse of what still lay ahead. Each week consisted of a workshop session, and a Scrum (weekly stand-up) session to report on what was

done, what needed to be done, and to identify where assistance was needed. The entire team was given access to a programme-specific Google Drive folder (see Google Suite for an explanation of the Google apps used) which contained sub-folders on guiding documents, helpful resources, templates and so forth (Morin, 2020). The team worked together on one programme curriculum using Google Sheet, consisting of a programme outline tab and multiple module tabs.

Initially the researcher, in her capacity as Scrum master, together with one junior learning designer (acting in an observational and brainstorming-partner role), led one development team, for more than six months, through the Scrum processes. Patanakul and Rufo-McCarron (2018) note that many institutions commence with piloting Agile methodology on a smaller scale before taking on the challenging task of implementing it on a larger scale. It was with this development team that the first sprint backlog emerged. After that, she shared the role of Scrum master with two senior learning designers in two more programme development teams for a period shorter than six months before handing over to the Scrum masters and assuming her role as Product Owner. For the remaining three programmes, she functioned as Product Owner, as the Scrum masters had each had an opportunity to observe and provide inputs on how Scrum was being implemented, to manage the curriculum design process, and the development team support.

All the Scrum masters were asked to complete numerous Scrum-related learning initiatives over 15 months. Learning interventions included completing two short courses on Scrum, watching tutorial videos, reading the Scrum Guide and Agile Manifesto, and the like. Through this process, all the Scrum masters became well-versed in the principles and practices of Scrum. They began to implement Scrum as a project management framework, each with different adaptations unique to their PM styles and contexts.

3.5.2 Population and Sample

The researcher implemented purposive and convenience sampling as non-probability sampling methods (Nieuwenhuis, 2011c). Purposive sampling is used in exploratory research studies where smaller sampling sizes are selected based on defining characteristics (Tracy & Hinrichs, 2016). Etikan et al. (2016) explains that purposive sampling entails selecting information-rich cases where participants willingly share their reflections on experiences relevant to the study at hand. Similarly, convenience sampling is used in exploratory research where participants are selected based on their easy accessibility (Nieuwenhuis, 2011c). The researcher agrees with the recommendation made by Malterud et al. (2016) when they suggested that information power be used to guide researchers using a largely qualitative approach in determining sample size. Information power resides in the amount and richness of information a sample holds, thus the more relevant information is held by the participants, the lower the number of individuals required to participate, becomes. Mcgrath et al. (2018) advise caution researchers to include only the

necessary number of participants to share their experiences, as there are ethical implications to consider, such as keeping participants from their daily tasks.

The population from which the participants were sampled consisted of a total of six Scrum teams across five Faculties. These Scrum teams were considered for the study because they had been exposed to Scrum as a project management framework. Only participants from programmes that had been in curriculum conceptualisation for more than six months were considered. Of the six programme development teams contacted for participation in the study, four programmes were represented by at least one team member who voluntarily participated.

The sample for this study included ten participants (excluding the researcher), drawn from the six e-learning projects where Scrum was used as the PM framework (see Table 3.3 for a summary). The researcher, a female, between the age of 30-35 acted as project owner. Three female Scrum masters, one a learning designer and two senior learning designers between the ages of 35-60, participated in the study. Seven development team members, five male and two female, formed part of the sample. The development team participants ranged from ages 30 to 60, with five lecturers, one a senior lecturer, and one an associate professor. All the participants working on developing the online programmes were contacted via email and asked whether they would be interested in contributing their views, experiences and opinions to this study. Participants who responded positively were asked to sign a consent letter indicating their willingness (voluntarily opting in) to partake in this study based on the information revealed on the study purpose, data gathering methods, use of data and participant rights.

Table 3.3

Participant overview

	Researcher (Product owner)	Learning Designers (Scrum masters)	Subject Matter Experts (Development team members)
# of participants	1	3	7
Gender	1F	3F	5M/2F
Age range	30-35	35-60	30-60
Level of appointment	1 HoD	1 LD/2 Snr LDs	5 Lecturers/1 Snr Lecturer/1 Ass Prof
Highest qualification	1 Masters	3 Doctorates	5 Masters/2 Doctorates

3.5.3 Data Gathering

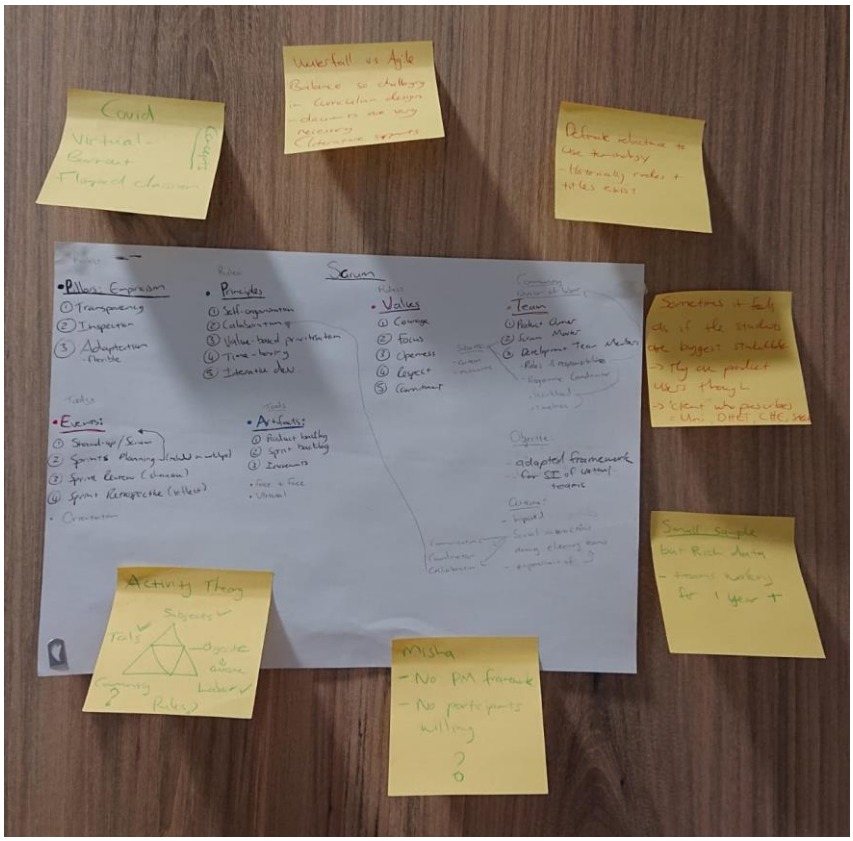
Data crystallisation was sought to gain a richer understanding of the extent to which the Scrum framework could be used to promote social interactions. Crystallisation in interpretivist qualitative research, entails using numerous data-gathering techniques to enhance the credibility and trustworthiness of findings (Stewart et al., 2017). As is characteristic of case studies, the researcher served as the primary data collection tool (Stewart et al., 2017). Through immersion in the research case, the qualitative researcher gathered rich real-life data (Yin, 2003). The role of Product Owner and, in three cases, for a brief period, co-scrum master, was consequently fulfilled by the researcher. Nieuwenhuis (2011a) emphasises the importance for qualitative researchers to be conscious of their biases and to constrain them through data crystallisation. To this effect, the researcher sought to gather data from numerous data sources and enhance the validity of research findings through participant checks.

The first data-gathering technique entailed researcher observation and note taking in a contemporary reflexive journal. The contemporary journal did not consist of neatly packaged writings in a notebook. Instead, it was a compilation of WhatsApp voice notes, handwritten reminders, pages in OneNote, post-its on a study wall (see Figure 3.5 as an example) and hand-drawn mind maps of how different aspects of the evolving study tied together. Stevens and Cooper (2009) maintain that journaling allows journal keepers to gain better insights into observed phenomena. As thinking processes are documented, records can be kept on changes made, observation notes can be revisited, and personal beliefs studied in greater detail. Both anecdotal and running records were made as some situations called for short verbatim notes on what was observed. In contrast, others required detailed descriptions with self-reflection on the situation and context (Nieuwenhuis, 2011c). The researcher attempted to capture both what happened and her thoughts on the meaning thereof. The researcher observed how development teams reacted to the introduction of Scrum as project management framework. Observations were also made of how the Scrum masters reacted to their directorate adopting Scrum. After that, Scrum teams were observed to determine how Scrum impacted the social interactions between Scrum masters and development team members within the bounds of the Scrum project management framework. In addition, the researcher reflected on the research process and her own decisions taken.

The second form of data collection entailed email interviewing with the three Scrum masters after four training interventions. Email interviews are an asynchronous form of interviewing that allows participants to reflect autonomously on their responses to questions (Topping et al., 2021). Not only do participants have more time to respond, but researchers also have more time to analyse the responses, consult literature and improve their follow-up email questions.

Figure 3.5

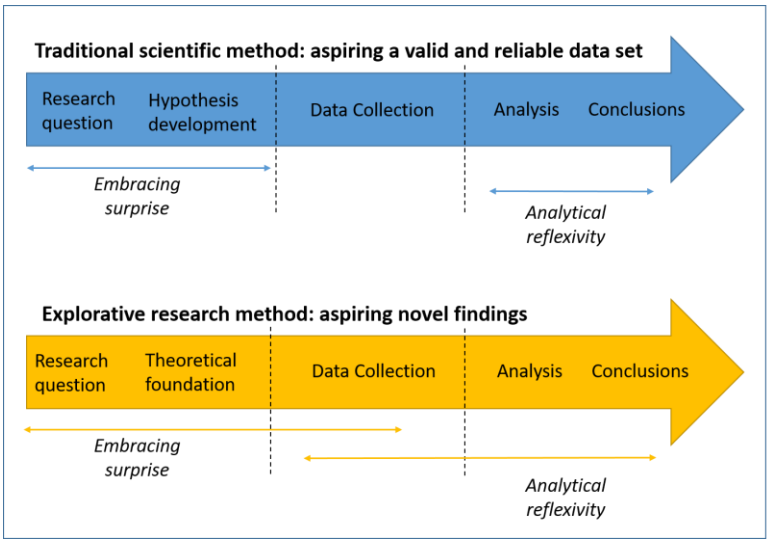
Reflective notes on Scrum, AT and constructs with which the researcher grappled



Dahlin (2021) explains that email interviewing allows the researcher to minimise the time lapse between *embracing surprise* and *analytical reflexivity* (see Figure 3.6 for a depiction of surprise and analytical reflexivity organisation). In more traditional research practice, there is no overlap between *surprise* and *reflexivity,* making it nearly impossible to clarify further and probe unexpected and significant findings. Email interviews combined with explorative interviews (in this case, four online group interviews) allowed the researcher to cross-fertilise interview questions of an individual's email interview responses and group interview responses, but also between different individual's responses. Dahlin (2021, p. 3) defines cross-fertilisation as "connecting and synthesising information from different interviews—making multiple interviews interact". Email interviews are often used with technologically savvy participants who use digital platforms as a preferred form of communication (Bampton & Cowton, 2002). Therefore, the researcher was comfortable using this data-gathering technique with the Scrum masters who work with development teams to design fully online learning programmes.

Figure 3.6

Surprise and analytical reflexivity in traditional and explorative research



Adapted from Dahlin (2021)

Third, online group interviews were conducted with the three Scrum masters via BlackBoard Collaborate. Increasingly, researchers are using videoconferencing software to conduct interviews during the COVID-19 pandemic (Lathen & Laestadius, 2021; Rahman et al., 2021; Richard et al., 2021). Group interviews were better suited to this study than focus group interviews because of the limited number of Scrum masters and the benefits group interviews hold. Warner et al. (2021) maintain that group interviews enable researchers to frequently and directly interact with each participant, questioning and probing them. Focus groups often entail more interaction among participants having topical discussions rather than interacting with the researcher, who adopts a peripheral role (Nyumba et al., 2018). A series of four online group interviews took place over six months, during which the Scrum masters continued to work with development teams. A semi-structured interview protocol with guiding questions was developed (see Appendix D) to probe the Scrum masters' experience of the Scrum framework and its impact on social interactions (Mcgrath et al., 2018). The design of data-gathering instruments will be discussed in Section 3.5.4.

An online survey was used as the fourth data-gathering technique. Baxter and Jack (2010) maintain that, generally, surveys are unique to case study research, among other qualitative research designs. Survey data makes it possible to understand the context and participant experiences well, especially when analysed simultaneously with other data sources (Baxter & Jack, 2010). A questionnaire (see Appendix E) was created using Qualtrics, an online survey platform. Qualtrics allowed the researcher to design a self-administered questionnaire that participants could access anonymously via a link in the research participation email. Maree and

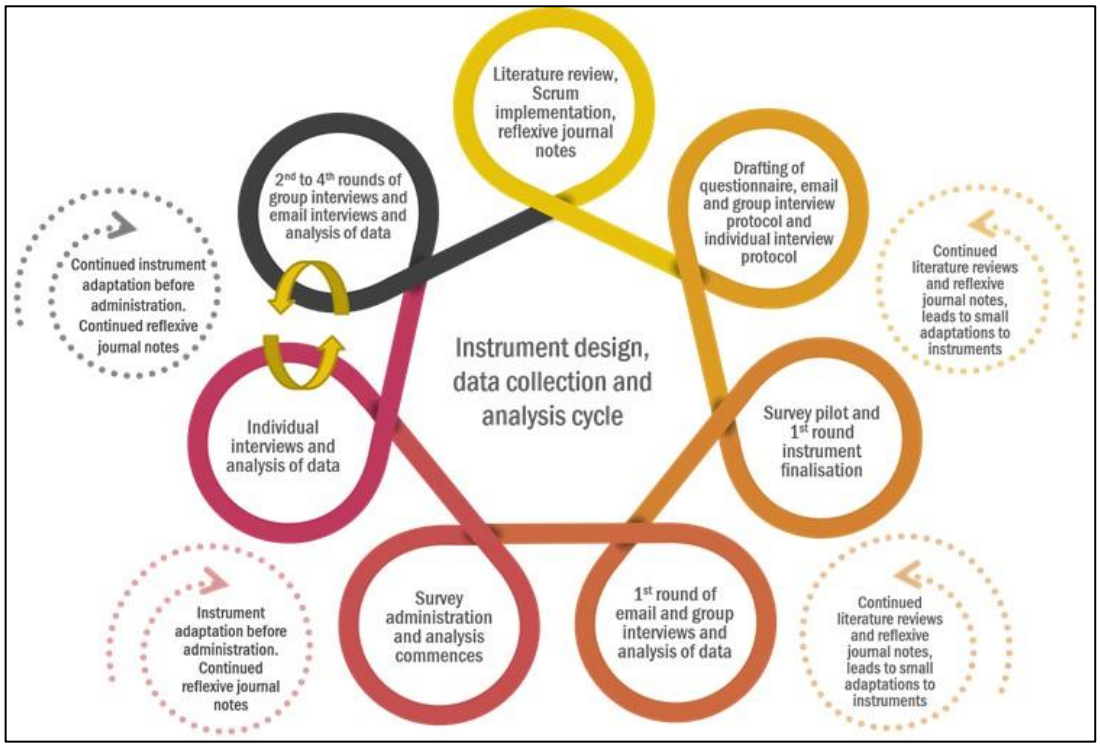
Pietersen (2011) explain that questionnaires are best used when attempting to gather data on participants' perceptions, attitudes, feelings and ideas. The survey was shared with 17 development team members, of which seven completed the survey.

Finally, online semi-structured interviews (see Appendix F) were conducted with seven voluntary individual development team members, using Blackboard Collaborate as a videoconferencing tool. Blackburn (2017) states that semi-structured interviews conducted with participants after their personal experiences produce data of enhanced validity and reliability compared to those on hypothetical scenarios. Interviews were viewed as more than a data gathering tool, rather being equated to a human encounter with multifaceted social phenomena (Dumay, 2011). Semi-structured interviews were chosen rather than structured or unstructured interviews due to the benefits the data collection technique holds. Semi-structured interviews provide the ideal balance between collecting meaningful data related to the study and having sufficient flexibility to probe participants further to obtain clarity and explore new lines of inquiry which emerge (Blackburn, 2017; Nieuwenhuis, 2011c). The interviews were recorded and later transcribed verbatim.

Although these data-gathering techniques were presented sequentially for ease of understanding, much of the data collection occurred concurrently, with some participants participating in group interviews or submitting email reflections while others were completing surveys or participating in individual interviews. See Figure 3.7 for a depiction of the iterative instrument design, data gathering and analysis process.

Figure 3.7

Iterative instrument design, data collection and data analysis process



3.5.4 Instrument Design

Designing the data-gathering instruments resulted from numerous methodological decisions and insights gained from data collected over extended periods (Dahlin, 2021). The researcher worked closely with the triangulated inquiry reflexive questions (see Figure 3.2) of Patton (2015) when thinking about how the instrument questions and possible responses would impact and be impacted by the researcher, the participants and the audience. Saldana (2011) explains that qualitative researchers begin with a provisional data collection plan and instruments, which is then regularly adapted due to the emergence of findings and personal reflections of the researcher while data gathering and analysis continue. The initial questions in the first drafts of the data-gathering instruments were formulated to address the primary and secondary research questions. Concepts related to the literature on project management, Scrum, social interactions and e-learning were integrated. Further, the activity system elements, namely, the subject, object(ive), tools, rules, division of labour, community, outcome, (Leont'ev,1978), barriers and motivation (Khayyat, 2016) were used as structuring principles to group questions together and to ensure that data related to the entire activity system were collected.

Once Scrum was implemented, the researcher started adapting the data-gathering instruments based on her personal observations and field notes captured in her contemporary reflexive journal records. The first round of email interviews, group interviews and survey data provided enriching insights, which led to further adaptations of the following email, group and individual interview protocols. Finally, as four email and group interviews were conducted, findings from each prior interview were used to adapt the interview protocols for the following interviews. As Merriam and Tisdell (2015, p. 196) very aptly explain, “You write a separate memo to yourself capturing your reflections, tentative themes, hunches, ideas and things to pursue that are derived from the first set of data. You note things you want to ask, observe, or look for in your next round of data collection.”

The researcher’s reflexive journal entries were documented in a handwritten notepad, on her home office pin-up wall with post-its, on WhatsApp in the form of voice notes and on *OneNote for Windows 10*, which is a digital notebook application (Microsoft, 2021). The contemporary journal entries varied from personal narratives of a few words to paragraphs and observation tables. The observation tables were based on the design of an observation template by Nieuwenhuis (2011c, p. 86). In cases where an observation table was used, the date, context, participants, actions observed, and reflexive notes were documented (see Figure 3.8 for an example).

Figure 3.8

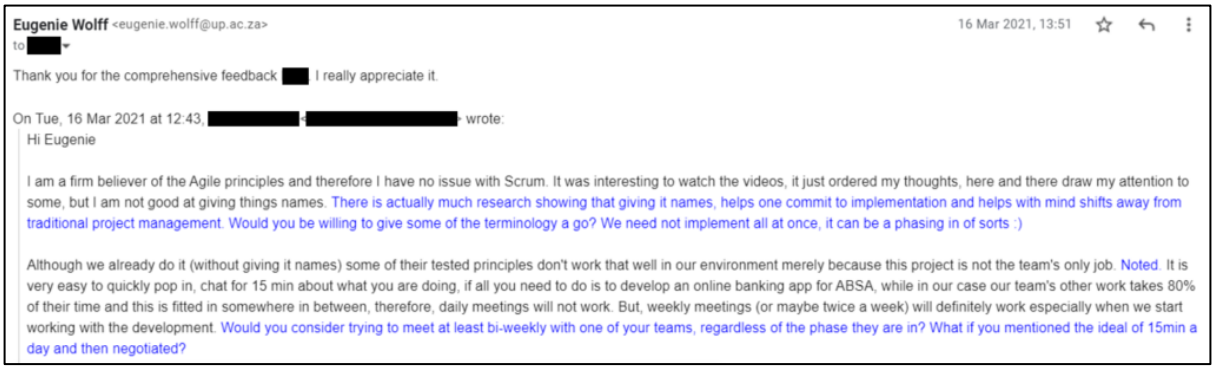
Observation table entry example

Date	Context	Participants	Actions observed	Reflexive notes
1 June	Virtual meeting with [redacted] to discuss ELOs and ACs	PO, with SM and PC	• PC openly shares concerns about workload with SM. • SM reassures PC, encouraging him and revisits their focus points for the programme. • Flexibility is provided by negotiating required outputs and timelines	I was happy to see how naturally the SM implements the Scrum values. She has a way of working with her development team members which extends beyond the professional to a more personal and caring demeanor. The PC was visibly relieved and had a renewed energy (dare I say hope) to still meet the major milestone deadline.

The design of the email interview questions was prompted by the need to gather reflective notes documented by the three Scrum masters on their training interventions. The Scrum masters were asked to complete Scrum courses, watch Scrum videos and read Scrum documents over 15 months, making reflective notes on their thoughts, feelings and beliefs at four specific points in time, as requested by the researcher via email interview questions. The Scrum masters started by viewing the introductory video to Scrum as PM framework, created by the researcher in her capacity as Product Owner, before reading relevant documentation on Scrum aspects such as Scrum team roles and responsibilities document and the product backlog. After that, the Scrum masters were asked to complete a self-paced course on basic Scrum training. Next, videos were viewed on the Scrum principles and Scrum values, where after, the Scrum masters were asked to read the Scrum Guide by Schwaber and Sutherland (2017) and the Agile Manifesto by the Agile Alliance (Beck et al., 2019). Finally, the Scrum masters were asked to complete a course on Agile Project Leadership, which proposed Scrum as PM framework. As with most interviews, the first email interview consisted of an introductory, descriptive, open-ended question (Dahlin, 2021), namely, "*What do you think about Scrum as project management framework in your context*?" Follow-up questions were asked stemming from the responses gathered in the Gmail conversations. Figure 3.9 is a snippet from one such email interview. Note the participant's text is captured in black, while the researcher's text is captured in blue.

Figure 3.9

Email interview example



A semi-structured interview protocol, with four distinct sections, one for each of the four group interviews with the Scrum masters, was designed (see Appendix D). The researcher decided to use one protocol rather than four separate protocols to enhance continuity with the interview questions. The first section of the protocol started with simple open-ended questions, such as "What do you like about Scrum?" and "What don't you like about Scrum?" to relieve participants of the idea that participating in an online interview will be difficult. The first group interview consisted of seven pre-planned questions and several follow-up questions stemming from the responses, lasting 45 minutes. The main focus of the first group interview was on the Scrum masters' attitudes towards Scrum.

The second group interview was conducted with three questions, stemming from the first interview, relating to Scrum roles, terminology and retrospectives. The remaining three questions, with sub-questions, are related to Scrum principles and values. The second group interview lasted 64 minutes.

The third group interview also consisted of two parts. Part one consisted of three questions from the previous group interview related mainly to the Scrum framework's influence on coordination. Part two consisted of three questions with sub-questions, focusing mainly on development teams. The interview lasted 56 minutes, with follow-up questions being asked when probing or clarification was required.

The final group interview consisted of 15 open-ended questions in part one pertaining to the Scrum master's overall experience of implementing Scrum as a project management framework over the last year. The researcher did not ask all 15 questions during the interview, as the participants covered some of the questions as they responded at length on certain topics. The second part of the interview consisted of four questions, mainly focused on Scrum coordination aspects, stemming from the individual interviews with the development team members. The final group interview lasted 63 minutes.

The researcher relied heavily on literature for the questionnaire design to guide the question formulation. The questionnaire consisted of 23 questions divided into five sections (see Appendix E). An introductory section with background information on the study and the researcher's contact details was included as the first section of the questionnaire, followed by a consent section requiring participants to indicate whether they agree or disagree with the voluntary participation terms indicated. The third section had nine multiple-choice demographic information questions relating to gender, age, level of appointment, highest qualification, and so forth. Next, section four consisted of 11 questions relating to e-learning project management experience in general and, more specifically, to communication, coordination, and collaboration practices experienced while being a development team member. Likert scale and rank order question types were used. The final section consisted of one open-ended question on recommendations participants wanted to

share to improve how the e-learning project was managed. The questionnaire took approximately 10 minutes to complete.

Finally, a semi-structured interview protocol (see Appendix F) was created for the individual interviews with the development team members. Several months were spent developing the first interview protocol, as adaptations continued to be made while knowledge was gained on project management, Scrum and social interactions (Dumay, 2011). The protocol was then adapted slightly before each individual interview based on the researcher's field notes, findings obtained from the survey and prior group interviews with the Scrum masters. Adaptations were required, particularly to collaboration questions, where some individuals worked in groups of five and others consisted of a single subject matter expert. Questions related to *communication* and *coordination* also differed for individuals based on the duration of their involvement in the e-learning programme design project, as some participants started prior to the COVID-19 pandemic and had a face-to-face interaction with their team members, whilst others joined during the pandemic, only experiencing online interactions. The semi-structured protocol consisted of 31 pre-determined open-ended questions, with interviews ranging between 33-53 minutes.

3.5.5 Piloting the Questionnaire

A pilot study was conducted to determine whether the questions captured in the questionnaire were appropriate for the intended audience and would contribute meaningful data to the study (Kothari, 2004). As explained in the sections above, all other data-gathering instruments were fluid and continuously adapted by the researcher based on new insights. As the questionnaire was only sent out once to respondents and no later adaptations were made, the decision was taken to pilot the questionnaire to enhance its validity (De Vos, 2002). Benbasat et al. (1987) maintain that in the case of exploratory case study research, pilot studies may be as small as one individual. Wanting to avoid the risk of an individual not completing the pilot questionnaire, the researcher sent the instrument to two programme coordinators who had recently been through the process of designing a fully online learning programme. The respondents were asked to indicate how long the questionnaire took to complete, the ease of its use (e. g., accessibility and navigation), appropriateness of questions (e.g., very personal or causes discomfort) and question ambiguity (De Vos, 2002). Both respondents indicated that the questionnaire took them no more than ten minutes to complete and that no questions were experienced as inappropriate or intrusive. The pilot respondents provided feedback which led to the enhancement of the questionnaire, as explained below.

Pilot respondent one recommended that all questions be numbered and suggested that respondents be allowed to select multiple titles that best suit their role, as development team members may be both programme coordinator and SME (subject matter expert). For questions requiring respondents to indicate their overall satisfaction with aspects such as project

management, communication, coordination and collaboration, pilot respondent one recommended that the researcher specify the role-players amongst whom these social interactions were being investigated. Finally, respondent one recommended that the terminology in the questionnaire should be understood by all respondents, regardless of the extent to which Scrum was implemented. As an example, she recommended rather using learning designer than project owner (PO) or Scrum master (SM), as these terms may have been confusing to academics.

Respondent two pointed out that the wording of one of the questions was assumptive. The recommendation was made to split the question into two, starting with a closed-ended (yes/no) question on whether tools were used to support social interactions and then adding a second question for the respondents who responded positively, which asks to what extent the tools were used. She also suggested that the questionnaire be enhanced by including a description of Scrum with question ten. Question ten was adapted accordingly. Once all the changes recommended during the pilot study were effected, the researcher sent out the survey link for data collection.

3.5.6 Data Analysis and Interpretation

Throughout the data gathering cycle, data analysis took place, as recommended by Merriam and Tisdell (2015) and Johnson et al. (2020) when conducting qualitative research. Corbin and Strauss (2015, p. 69) explain that interpretive data analysis involves constantly "identifying new properties and dimensions, and seeing new relationships between concepts." Maxwell (2013) advises researchers to allow the types of questions being asked in their data-gathering instruments to determine what data analysis strategies should be followed. Seeing as the researcher used mainly open-ended questions about individual experiences of social interactions as influenced by Scrum, a more pragmatic approach to analysis was applied (Roberts et al., 2019). In such cases, Elliott (2018) maintains that qualitative researchers often rely on both inductive and deductive inquiry. The researcher accordingly used inductive and deductive analysis to ensure that informant-centric themes arranged within researcher-centric themes could emerge (Azungah, 2018).

Content analysis of the reflective emails, group interview transcripts and individual interview transcripts was conducted using ATLAS.ti (version 9). The analysis took place through a step-by-step yet iterative process of transforming the raw textual data into organised summaries of the key study findings (Erlingsson & Brysiewicz, 2017). The literature recommends reading through the content numerous times to gain a comprehensive overview of the data, but more importantly, to start identifying the main participant ideas (Elliott, 2018; Erlingsson & Brysiewicz, 2017). While the process started inductively with *in vivo* coding, the researcher soon moved back and forth between inductive and deductive analysis before finally transitioning to *a priori* coding. Linneberg and Korsgaard (2019) maintain that inductive coding may result in a data analysis process which

lacks focus, therefore, deductive coding is included in theory-driven studies where framework constructs are considered important to reporting findings.

In vivo coding entailed using the language of the study participants to name the codes (Manning, 2017), while *a priori* coding entailed using activity theory and Scrum constructs for coding (Kruger et al., 2019). Saldana (2021) describes a code as a single word or brief phrase given to a segment of data to capture an attribute or the essence of what has been written, said or observed. He recommends having at least two coding cycles to analyse raw data better and synthesise meaning (Saldana, 2021). Once codes were determined, the researcher created categories as clusters of codes to eventually theme the data. Being a novice ATLAS.ti user, the researcher used code groups in ATLAS.ti as category groupings. Categorising aided the researcher in pinpointing relationships in the data (Erlingsson & Brysiewicz, 2017).

In the first cycle of inductive analysis, categories were assigned a label, description and example quotes.[3] Based on desktop searches, the researcher assumed that data analysis would be somewhat linear and clear-cut, as seen in the initial analysis planning captured in Figure 3.10. However, the second cycle of deductive coding (Figure 3.11) reflects the realities of how data analysis unfolded. Determining a clear hierarchy and grouping of codes proved challenging, with relationships often becoming more evident to the researcher when thinking about how to write up the findings (Linneberg & Korsgaard, 2019). Once categories were assigned, themes were used to summarise the major findings and report on various descriptive perspectives of individual cases and between different cases through participant quotes (Creswell & Creswell, 2017).

The intention behind assigning themes was not to generate new theories but to report on transferable findings that, although particular to this case study, could be seen in comparable prospective cases (Saldana, 2021). The analysed data was then discussed in relation to existing literature on Scrum theory and social interactions (Harrison, 2000). Although the process described may seem rapid, the researcher experienced it as messy and strenuous when immersing herself in the data for several months, going through cycles of reading and re-reading, coding and re-coding, and categorising and re-categorising before themes emerged (Stewart et al., 2017). Erlingsson and Brysiewicz (2017, p. 93) encourage qualitative researchers to remain open-minded and allow creativity when dealing with the complexity of data analysis, explaining that “experiencing chaos during analysis is normal”.

[3] Where necessary, grammatical edits of interview transcripts were done. The edits were of such nature that it did not impact on the original meaning of the participant quotes.

Figure 3.10

Planned first cycle of coding, categorising and theming of data

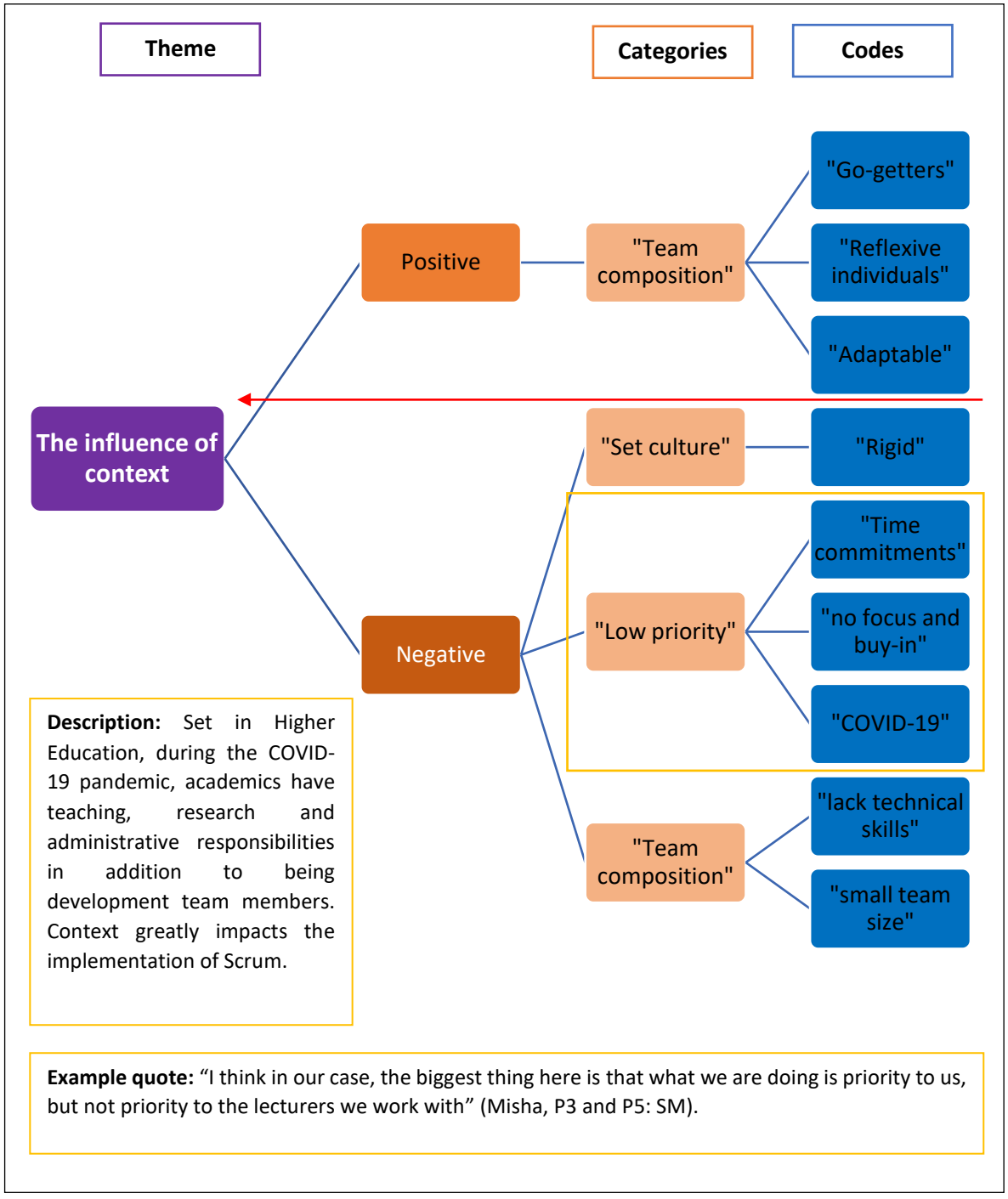


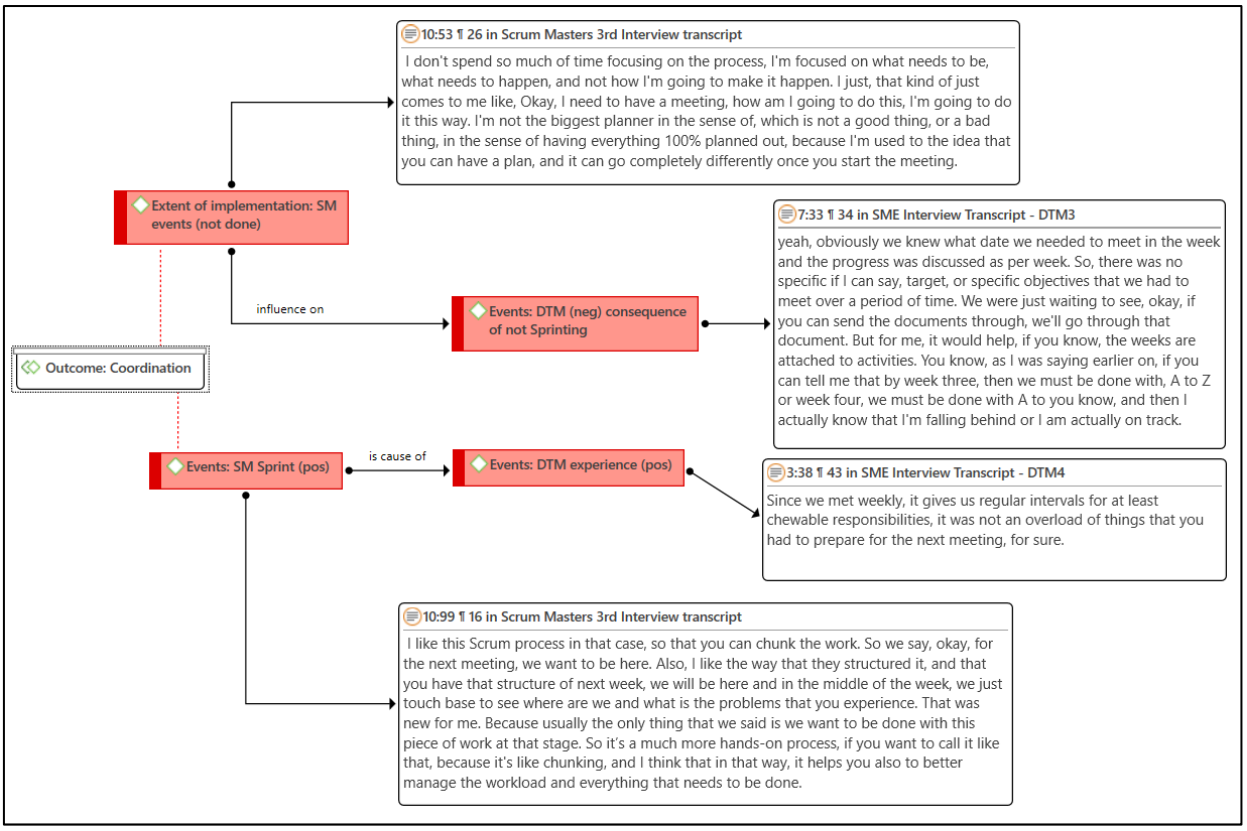
Figure 3.10 depicts the planned first cycle of coding, categorising and theming data. It shows an example of the researcher's envisaged progress from the raw data narratives to the outcome of a meaningful theme or pattern after her first round of inductive data analysis (Saldana, 2021). The example demonstrates how the researcher, in her initial reading of the transcripts, assigned verbatim codes such as "time constraints", "focus and buy-in" and "COVID-19" in the first round of coding. After that, the codes were categorised under "low priority". The theme emerged that

context had a major influence on the successful implementation of Scrum as a project management framework, and the social interactions among development team members.

Figure 3.11 depicts actual "messy" data coding through which the researcher captures how round two of *a priori* coding emerged. Knowing that she wanted to report her study findings according to the activity theory elements, she was guided by the research questions and data-gathering instrument questions when assigning codes (Linneberg & Korsgaard, 2019). A clear relationship emerged between the lack of implementation of Scrum events such as sprints, and a negative experience by development team members (DTM) of the coordination practices. Similarly, a relationship between sprint implementation and positive DTM experiences emerged. The findings thus suggested that Scrum events, in particular sprints, had a positive impact on the coordination experiences of some of the e-learning project participants.

Figure 3.11

Actual "messy" coding of data



In addition to the content analysis, descriptive statistical analysis[4] of the closed-ended survey questions was conducted to provide graphical and numerical data (Pietersen & Maree, 2011). Frequency distribution tables were used to summarise the nominal data, such as gender and age range (Larini & Barthes, 2018). The data generated from ranking questions were described in

[4] The researcher wishes to acknowledge that due to the small sample size, the quantitative data gathered bears no statistical significance, other than aiding in the clarification of some of the qualitative data.

terms of their location (mean) and spread (standard deviation and variance) in the distribution of data (Pietersen & Maree, 2011). Variance was reported to show how the values were dispersed around the mean value (Larini & Barthes, 2018). As this study was predominantly qualitative, with a sample size of seven participants completing the questionnaire, inferential statistics was not warranted.

Findings from the various data sources were used to make recommendations on how to adapt the Scrum framework for HE programme design and to provide implementation guidelines, as integrating participants' feedback on lived experiences contributes to the enrichment of frameworks (Yin, 2003). Numerous quality enhancement strategies were implemented to improve the trustworthiness of the findings reported in this study. Credibility, transferability, dependability, confirmability and reflexivity measures were put in place during data collection, data analysis and the reporting of findings (Korstjens & Moser, 2018). These quality criteria will be unpacked in the next section.

3.6 Quality Criteria

As a result of the subjective nature of qualitative studies, steps must be implemented to enhance the transparency of data gathering and analysis practices and to ensure that the findings are truthful and of high quality (Korstjens & Moser, 2018). In this study, the five trustworthiness criteria proposed by Guba and Lincoln (1981) for primarily qualitative studies were implemented: credibility, transferability, dependability, confirmability and reflexivity. With the questionnaire being the only quantitative data-gathering instrument, a pilot study was conducted to ensure content, face validity, and reliability (Fraser et al., 2018). Internal validity in quantitative studies is considered equivalent to credibility in qualitative studies as both measure truth-value (Lincoln & Guba, 1985).

Four credibility measures were implemented while collecting data: "prolonged engagement, persistent observation, triangulation and member checking" (Korstjens & Moser, 2018, p. 121). As mentioned in the previous sections, the researcher worked with the study population for a minimum of six months up to a maximum of two years (see Section 3.4), to establish trust with the participants and to deepen her understanding of their realities within the HE context (Lincoln & Guba, 1985). Persistent observation allowed the researcher to identify social interactions as one of the main challenges experienced among Scrum team members and also led to many adaptations being made to the data gathering and instrument design (Creswell & Creswell, 2017). Further, credibility of the analysed data, findings and conclusions, was enhanced through the triangulation (or in the case of this mostly qualitative study, crystallisation) of multiple data collection methods (see Section 3.5.3) with multiple data sources (see Section 3.5.2), from different departments and in different roles, working in different stages of the curriculum design and development process (Sim & Sharp, 1998). In addition, several participants were asked to

validate the draft research findings through verbal or written feedback to enhance the credibility of the findings (Maxwell, 2013; Morrow, 2005; Nieuwenhuis, 2011a).

For the results to be transferable to similar studies in different contexts, Creswell and Creswell (2017) recommend providing meticulous details on the research setting, methods and sample. Korstjens and Moser (2018) explain that thick descriptions of the context in which the study takes place, along with the experiences of both researcher and participants, help outsiders make meaning of the findings. As recommended by the literature, the researcher dedicated a lot of time to explain each stage in the research process, from how Scrum was adapted, to its implementation, providing insight into the setting of the study (see Section 3.5.1). The researcher also elaborated extensively on the study population, sampling strategy, sample size, and demographics (see Section 3.5.2). Finally, due to the iterative process, time was taken to explain research decisions when deciding on data-gathering techniques and changes made when designing the instruments.

The researcher kept an audit trail of decisions taken throughout the study to enhance dependability and confirmability (Creswell & Creswell, 2017). Korstjens and Moser (2018) equate dependability to consistency in data analysis strategies, and confirmability to the neutrality of the researcher, stating that researchers should clearly explain how data was managed and interpreted to allow findings to emerge. The research journal contains the researchers' preconceptions, ideas and decisions taken during the study to maintain high self-awareness levels (Guba & Lincoln, 1981). In Section 3.5.6, the data analysis strategies were unpacked in detail to provide an overview of how data was themed. Using Activity Theory to frame the data-gathering instruments also aided the researcher in looking at the data broadly rather than honing in on personal preferences.

As was explained in Section 3.2, the researcher reflected on her conceptual lens to determine how her world views would impact her research decisions (Korstjens & Moser, 2018), an essential aspect of reflexivity. Korstjens and Moser (2018) recommend supplementing analytical data with reflexive notes, including a description of the researcher's relationship with interview participants. Throughout this study, the researcher integrated reflexive thoughts along with participant data, which was essential to shedding light on her subjective views, which impacted the study findings. In addition to considering quality criteria to enhance the study's trustworthiness, the researcher also put recommended ethical codes of practice in place, as discussed below (Walford, 2005).

3.7 Reflecting on Ethical Guidelines

As prescribed by the University through which the researcher studied, the research proposal for this study was first successfully defended before the Department of Science, Mathematics and Technology Education ethics committee before serving at the Faculty level. The Faculty of Education's ethics committee granted ethical clearance to conduct the research study, with

reference number EDU177/20. Thereafter, the proposal and data-gathering instruments served before the Registrar and Chairperson for the Survey Coordinating Committee for final approval. These strategies ensure that the ethical principle of scientific merit is upheld by conducting methodologically well-designed studies (Jelsma & Clow, 2005).

Next, the Deans of the various Faculties where the data was gathered were notified of the researchers' intentions. All participants received an email regarding the researcher's intent to conduct the study with further details contained in an attached consent letter (see Appendix B for the consent letters of the Scrum master and the development team member. (Jelsma & Clow, 2005). Sanjari et al. (2014) emphasise the importance of informed consent as it empowers participants to make educated decisions about their participation. The consent letter contained information on the purpose of the study, data gathering techniques, voluntary participation, confidentiality matters, data use for a PhD thesis, conference presentations and publications (Harrison, 2000). In respecting the rights of the participants as autonomous persons, consent letters allow participants the right to information, free decision-making (voluntarily opting in or out), and withdrawal without prejudice (Orb et al., 2001).

In informing participants about how the results will be used, the researcher upheld the principle of beneficence. Orb et al. (2001) explain that beneficence relates to doing research that will serve the greater good of societies and prevent participants from coming to harm. Using pseudonyms and avoiding the use of identifiable personal details (Walford, 2005) are examples of how the researcher practised beneficence so that participants' true identities were not revealed.

The researcher further maintained ethical standards of conduct, including honesty, responsibility and integrity (American Psychological Association, 2017). Therefore, steps such as providing opportunities for respondent validation of findings and expert reviews of analysis techniques were taken to minimise misrepresentation and misinterpretation (Richards & Schwartz, 2002). Only the researcher and her supervisor accessed the raw data, that will be stored for 15 years in the UP repository (research data management system) to safeguard confidentiality (Richards & Schwartz, 2002), as prescribed by the Faculty of Education. Should anyone wish to access the raw data, permission must be sought from the Ethics Committee of the Faculty of Education at the University of Pretoria.

Finally, the principle of justice was upheld by the researcher, who actively attempted to eliminate feelings of power relations between participants and the researcher (Jelsma & Clow, 2005). Throughout the study, the researcher expressed her gratitude towards participants for their willingness to contribute to the study, thereby attempting to "flatten the power gradients" (Jelsma & Clow, 2005, p. 5). She attempted to place participants in an equal position to the researcher as participants were the holders of information and the only ones able to reveal the true state of

social interactions experienced. The researcher purposefully reminded participants of their ability to withdraw from the study whenever they desired.

3.8 Conclusion

This chapter dealt with the many aspects associated with qualitative research methods, starting from a philosophical perspective before progressing to a theoretical view and concluding with practical implications. What made this study's methodology unique was the reality of the study being conducted entirely online due to the COVID-19 pandemic, which started in 2020. Social interactions are increasingly mediated through digital or online platforms, requiring the researcher to implement innovative ways of implementing Scrum and collecting data (Gregory, 2018). The results and analysis of the gathered data will be discussed in the following chapter.

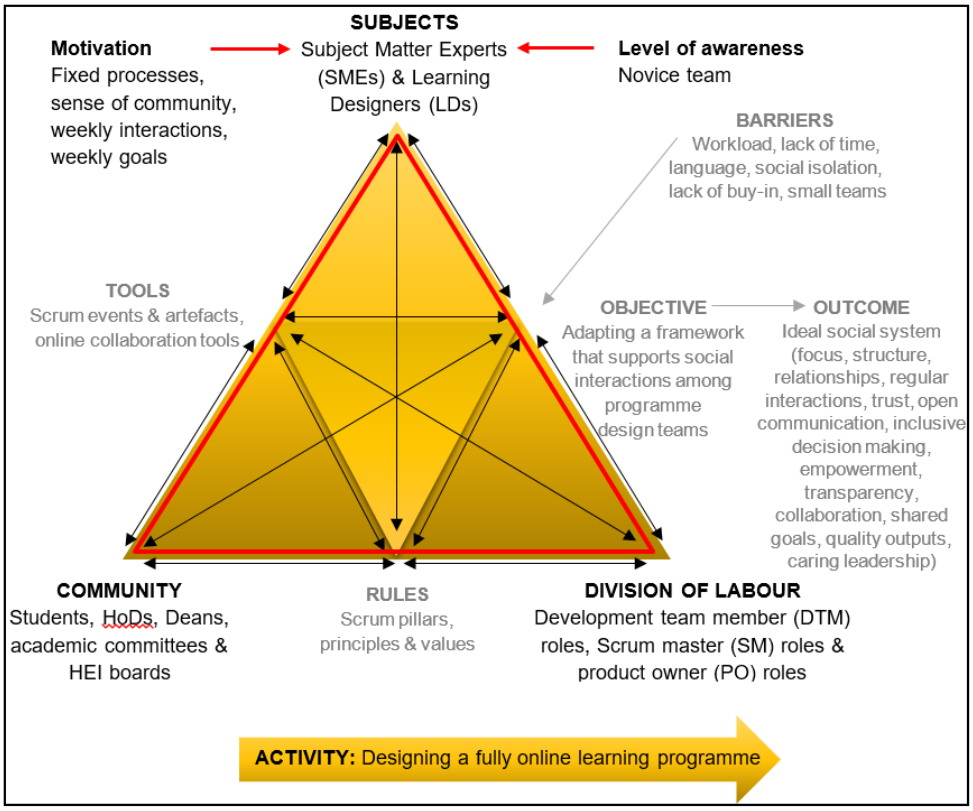
4 Chapter Four: The Subjects, their Community and Division of Labour

4.1 Introduction

Individuals must be brought "closer together" to manage projects effectively (Pritchard, 2013, p. 1). Their levels of awareness and motivation impact individuals' abilities to act and perform certain roles in their immediate communities and broader society (Khayyat, 2016). Strong social interactions, such as goal-driven communication, unite teams most in their working environment (Pritchard, 2013). Although frameworks outlining principles and processes for effective project management exist, Pritchard (2013) has found that social interactions, particularly communication, often depend on project managers' individual preferences and personalities. The researcher will therefore report on this study's findings by describing the context and subjects in great detail. Thereafter light will be shed on the subjects' motivation to work towards a shared project goal and the individuals' levels of awareness regarding Scrum and e-learning design. The final section will address the roles the subjects fulfilled in their communities. Figure 4.1 highlights the activity elements addressed in this chapter, pertaining to the people-centric aspects.

Figure 4.1

Scrum curriculum team's people-centric elements (subjects, community, division of labour)



Adapted from Khayyat (2016)

4.2 The HE Context

The study took place at a traditional contact university that established a new directorate for fully online education programmes. The online education team was appointed one year before the COVID-19 pandemic. While the project manager began to put structures and strategies for curriculum design and development in place, learning designers had no choice but to think on their feet as they led their programme development teams. Programme six (P6) was the only programme developed through both face-to-face social interactions in 2019, and fully online engagement from 2020 onwards (see Table 4 for a breakdown of the Scrum teams). Early in 2020, the first programme development team, P1, began to follow Scrum as their project management framework. This team only knew virtual engagement, as their project kicked off during South Africa's most stringent lockdown protocol, level five. They were soon joined by P2 and P3, who followed adapted versions of Scrum and similarly only engaged through internet-enabled communication. There were differing opinions about the impact of COVID on the working conditions of participants[5].

Table 4.1

An overview of the Scrum teams

Scrum masters	**Programme**	**Scrum implementation**		**Phase**	**Development team (population)**	**Development team (participants)**
MISHA	P3	Low	Online	Development	3	0
	P5	Low	Online	Conceptualisation	1	0
OLIVE	P6	Medium	F2F & Online	Development	6	Lethabo
	P2	Medium	Online	Conceptualisation	1	Alanzo
AMELIA	P1	High	Online	Design	5	Quintin Laurene Binita Bongani
	P4	High	Online	Conceptualisation	1	Noah

Quintin, a development team member (DTM) of the P1 team, explained that he started his journey during the full lockdown.

[5] Participants have been randomly assigned pseudonyms, and will be distinguishable by their pseudonym, programme/s and role, e.g. Olive, P2 and P6: SM.

> "Well, thinking about it, we started at a time when COVID hit hard, so we were in strict level five lockdown, or round about that time. So, the university was kind of closed at the moment" (Quintin, P1: DTM).

Lethabo, a development team member (DTM) but of programme six (P6), had experienced working on campus with Olive, a Scrum master (SM) for programme two (P2) and six (P6) for a little more than a year, before being forced to work remotely, and had some difficulty adjusting to the remote context.

> "It was also difficult because, you know, with this COVID situation at this point in time, things, I just want to say, were challenging" (Lethabo, P6: DTM).

Others, such as Noah (P4: DTM), who had worked remotely with Amelia, the Scrum master (SM) assigned to P1 and P4 to develop a fully online learning programme, experienced the COVID context in a more positive light.

> I'm only now familiar with the digital communication, and I'm not sure how you did it prior to COVID, whether you then had face-to-face meetings? But I can attest to the value of digital communication. I cannot imagine there's a better way of doing it than through digital, from an online perspective (Noah, P4: DTM).

In her final email reflection, Misha, the Scrum master (SM) who worked with P3 and P5, mentioned the impact of COVID on deadlines. Schedules were frequently adjusted owing to the changes in lockdown levels or because of the personal impact COVID had on DTMs, such as the loss of family members[6].

> "Over the last months, due to the pressures of COVID-19, deadlines have had to constantly be moved" (Misha, P3 and P5: SM).

> I had lost two family members within two to three months. So, that element, nobody asked me about that, and nobody said anything; they just wanted to move on, you know. And then I did report that I'm really not in a good shape at this point in time. But deadlines were there for me to meet, and we had to work (Lethabo, P6: DTM).

An element which contributed to the complication of the management of these e-learning projects in the HE context was the internal processes related to Faculty and Senate approval of programmes before they can be externally approved by HE councils and qualifications authorities. Olive (P2 and P6: SM) explained their challenge as Scrum masters (SMs) to deliver products with their teams according to predetermined schedules. Many universities have at least three quality

[6] The researcher would like to take this opportunity to express her condolences with the many development team members who lost family members due to COVID-19. Thank you for your dedication to this project during such trying times.

assurance checkpoints, the first being at the departmental level, then at the faculty level and finally at the senate. In many cases, the senate does not take place at frequent intervals.

> Looking at the entire process of the project, many of our deadlines are predetermined by faculty meetings and approvals. This means we have to constantly evolve or design and revisit our timelines and schedules to make sure we deliver on time. (Olive, P2 and P6: SM)

In the case of certain professions, such as accountants, engineers, nurses and statisticians, professional bodies impact project timelines by updating prescribed minimum curriculum standards and conducting quality assurance of programmes (Ballim et al., 2016). Lethabo (P6: DTM) indicated that his team had to stop at a stage of curriculum design, and redo much of the work due to new regulations which their professional council had published.

> So, I think for me, as much as she (*Olive)* tried, it was not her fault that things could not move because we also had quite a lot of other processes that had to be dealt with. Especially because, when we were still designing, we had to stop doing what we were doing and start attending to our council's accreditation requirements. Our council sent out documents when we had already started designing and when we were actually a bit far in the process. So, we had to start afresh, and start, you know, re-organising and start re-planning meetings, and that may have disorganised us a bit (Lethabo, P6: DTM).

Further, the HE field has a long history of widely shared terminology for various roles. Dean, head of department (HoD), programme coordinator (PC) and subject matter expert (SME), are just a few examples. These titles are accompanied by certain expectations of what an individual is anticipated to know and can do. In this study, four of the seven development team members (DTMs) were programme coordinators (PCs), as was revealed in the survey data. Although Scrum does not use titles for DTMs (Schwaber & Sutherland, 2017), the long-standing use of these terms was difficult to change. Throughout the interviews, various individuals, including the researcher, used these HE terms.

All DTMs referred to their Scrum masters as learning designers (LDs). Misha[7] (P3 and P5: SM) and Olive (P2 and P6: SM) were employed using the titles of senior learning designer, while Amelia (P1 and P4: SM) was appointed as a learning designer, and accordingly introduced themselves to the teams as such. Below are examples of the day-to-day terminology used.

[7] Reminder: Participant codes consist of an assigned pseudonym, the programme/s participants were involved in and the role they fulfilled in the study, e.g. Misha, worked as Scrum master with individuals developing programmes 3 and 5.

> "I would have never ever created a document that is on an appropriate level of quality was it not for the learning designer" (Noah, P4: DTM).

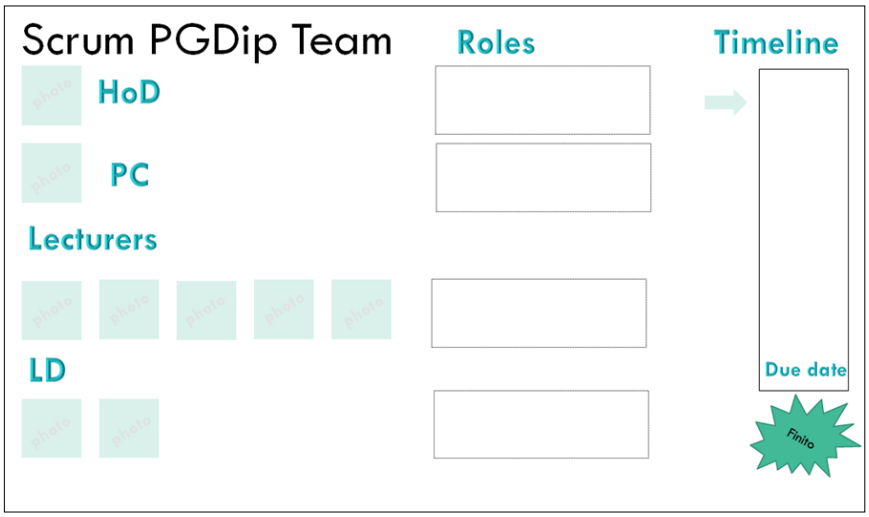
> "If I have a question, I send it to the learning designer, and she is so efficient that she comes back to me and tells me, okay, this is what you're doing, and so on" (Alonzo, P2: DTM).

> "Like, in one of my programmes, I definitely include the programme coordinator in every email communication, and it's something that she insists on with the SMEs" (Misha, P3 and P5: SM).

Olive (P2 and P6: SM) created a diagram (see Figure 4.2) for her third reflection email. Note how she uses the existing HE terminology to capture the Scrum team's details.

> "I am only going to start in the next month, but from the Scrum idea, I wonder if this *(Figure 23)* will not be a better commitment to get from the stakeholders" (Olive, P2 and P6: SM).

Figure 4.2
Olive's reflection on the Scrum team in Higher Education



It is within the context of COVID-19 uncertainties, where much of the world came to a standstill, and remote working was a foreign practice for most, that the Scrum teams had to build social bonds and take on the task of designing learning programmes. The HE community, with its internal quality assurance committees, boards, external departments, councils, and authorities, further impressed their own demands on the team. Being asked to use new Scrum titles for long-established roles within the institution seemed a trivial request against this backdrop, where much had to be learnt in working collaboratively in a fully online environment. However, the development teams were remarkably adaptable and willing to learn from the Scrum masters (SMs), as seen in the next section.

4.3 The Scrum Team in Academia

Scrum teams traditionally comprise a product owner, Scrum master and development team members. In this study, the development team members (DTMs), also known as subject matter experts (SMEs), were seen as the most important role players, followed by the Scrum masters (SMs), often referred to as learning designers (LDs). The DTMs were the academic staff from departments who served as the content creators and facilitators of the programmes. As with all teams, the individuals were exceptionally diverse and required unique approaches to managerial styles for the projects to be a success. In her second reflection, Amelia (P1 and P4: SM) echoed the importance of viewing programme development as a project to be undertaken by a team of committed experts.

> "Programme development is at its best a task for a team of dedicated experts in the field" (Amelia, P1 and P4: SM).

Olive (P2 and P6: SM) expressed the challenges of working with such a team, comparing it to a juggling act.

> "We need to juggle between people that are slow and fast, committed and not committed, and some of them that just doesn't have the skills" (Olive, P2 and P6: SM).

Linking to what Olive had stated, Lethabo (P6: DTM) described his fellow team members as quite introverted, explaining the necessity of understanding each group's professional culture.

> "In P6, you have quite a lot of people who are not going to be up there, out there and dominating. So you need to understand the professional culture of the group" (Lethabo, P6: DTM).

Similarly, Bongani (P1: DTM) explained that working in a curriculum development team implies working with different personalities, which requires unique approaches.

> It's not a one size fits all approach. It just really all depends on the kind of group, the personalities as well, but you just adapt different approaches along the way based on, really, the qualities, if I may put it that way, of your team (Bongani, P1: DTM).

The Scrum master (SM) role, or, in this context, learning designer (LD), was vital to supporting and leading the development teams. All the participants agreed that they would not have been able to design and develop their curricula were it not for the dedication of the learning designers.

> The whole process in my case would have been impossible, not difficult, impossible without a learning designer. I have to tell you that. For me, who is going into this kind of detail for the first time, if I didn't have the assistance of a learning designer, it would have been impossible. (Noah, P4: DTM)

Laurene (P1: DTM) particularly emphasised that she found it beneficial to have someone outside their department who took leadership and managed the project.

> It is important that we had a leader from, if I can put it, outside, that's part of the team. But that's not involved in the subject or in the course development. I think the leader quality was very, very well done in terms of moving forward, and I do think it did help the whole process so that coordination can be done from the outside. Otherwise, I don't think we would get through the process; that's lengthy. I think we will still be developing. (Laurene, P1: DTM).

Whereas Alonzo (P2: DTM) expressed that the energy and commitment shown by his LD, Olive (P2 and P6: SM) were characteristics he truly admired.

> I was lucky to have such an energetic learning designer; she is up to the task. She is working 24 hours, which is amazing." "Anything I do, I actually take to her, she always becomes like a partner on that. So, she is always supportive. (Alonzo, P2: DTM).

Finally, a product owner (PO), in this case, the researcher, formed the third role to contribute to the Scrum team. Section 3.5 on the research process explains in detail the extent to which the PO was involved. Quintin (P1: DTM) and Alonzo (P2: DTM) expressed their views on having a PO involved in the process.

> "I feel like you (*the product owner)* and Amelia were central to the team" (Quintin, P1: DTM).

> "I just couldn't do it without the support of the learning designer and the Product Owner, you know, you're (*the PO)* at the head" (Alonzo, P2: DTM).

There was, however, the Scrum masters (SMs) were somewhat uncertain about who the PO was and the PO's roles and responsibilities. This topic will be discussed in detail under Section 4.6, Division of Labour.

> I think, at this stage, I feel as if we are in the role of the Scrum master, because I think that we are between our teams, and actually, maybe you *(the PO)* as well, because you are reviewing all of our documents, our HEQC *(Higher Education Quality Committee Accreditation form)* and everything. So, if I have to say, I think that, that we are Scrum masters, and the product owner, well, in a way, we are certainly also product owners. But if we have to use this scheme, then I think that I would say that listen, you *(the researcher)* are the product owner. (Amelia, P1 and P4: SM).

4.3.1 The Development Team Members

The DTMs consisted of individuals employed as full-time staff members of the University and part-time staff members who had professional careers outside of the HEI. All of the DTMs mentioned that they had numerous roles to fulfil. Academics had full teaching loads, research responsibilities, supervision and the like, while part-time professional staff needed to practice in privately owned companies.

Laurene, a DTM of Programme 1 (P1), was a part-time staff member with her own company. She explained that being a lecturer was not her main profession but that she had a full-time profession outside of the university. Similarly, Alonzo (P2: DTM), a part-time staff member and medical professional, stated that he had many responsibilities outside his lecturing role.

> "You know, I'm not only a university worker; I have so many other commitments" (Alonzo, P2: DTM).

Lethabo (P6: DTM), who was employed as a full-time academic staff member, stated that his duties within the department were numerous and that the workload of curriculum development took up a considerable amount of time.

> We are full-time employees who have to also do other duties of the department that includes teaching, that includes supervision. We have to do engagement, we have to assess students, and we still have to now fit this new task or activity into our busy schedule, which also takes quite a lot of time. I mean, curriculum development itself should actually weigh about 20% of the current workload. (Lethabo, P6: DTM).

Correspondingly, Noah (P4: DTM), a full-time academic, reminded the researcher that curriculum design was a task in addition to his full-time job.

> "It's not my full-time job to prepare these documents and to plan this document" (Noah, P4: DTM).

As can be seen from the examples above, workload soon became a pressing issue for most DTMs. Their schedules were already extremely full, with the curriculum design of a fully online programme being added to their list of responsibilities. Most Scrum team members expressed their concern over the workload.

> "I mean, you just don't want to work every weekend. But yeah, we tended to catch up on this work on weekends, just to not fall too far behind" (Quintin, P1: DTM).

> "The lecturers are busy. A PC told me this morning that she worked herself into a heart condition" (Olive, P2 and P6: SM).

Finally, development team members were busy with their postgraduate studies in three cases. Lethabo (P6: DTM) expressed how challenging it was to focus on his studies while being part of the e-learning project.

> "It's only that for me personally because this was my PhD year, and I need to submit now. it was just something that I could not, you know, prioritise the development of these modules because the PhD also gave me my own problems" (Lethabo, P6: DTM).

4.3.2 The Scrum Masters

The three Scrum masters joined this project with very different backgrounds in HE and project management (PM). While all three Scrum masters completed various training interventions and were allowed to implement Scrum as a project management framework, some were more receptive to the framework than others. The researcher ranked their attempts to implement Scrum as either low, medium or high based on the self-stated claims about their implementation strategies during four group interviews and researcher observations spread over 15 months.

Misha (P3 and P5: SM) indicated that she joined this study without project management experience. She explained that her project management style, at the start of this project, was more akin to doing what needed to be done. Misha (P3 and P5: SM) further depicted herself as a rebel who follows her own framework. Finally, in the concluding group interview, she stated that she did not fully attempt implementing the Scrum framework. Taking these statements and the extent to which others had attempted to implement the Scrum principles, values, events and artefacts into account, the researcher ranked Misha's Scrum implementation as *low*.

> So, I just want to say, having started here at the Directorate, and now, well, I understand us to be the project managers. Because we manage the teams. I came with zero project management knowledge. (Misha, P3 and P5: SM)

> So, I don't even know now if I'm following the process, as everybody else is following it. I mean, I do what I think needs to be done at the time that it needs to be done. So far, it's worked for me, which could be wrong, I don't know. (Misha, P3 and P5: SM).

During the second interview, Misha humorously referred to herself as a rebel because she did not work in the same way as her colleagues.

> "I mean, I'm like the rebel over here..." (Misha, P3 and P5: SM).

By the third interview, Misha clarified that she was not following Scrum as a project management framework.

> "Look, I think, from the three of us, I'm the one that's, that's, well, I think I'm following my own framework at the moment" (Misha, P3 and P5: SM).

In the final interview, Misha concluded that she had not yet tried fully implementing Scrum with a team.

> "I can't say that I have tried it, you know the way I should have tried it with a proper team and done everything" (Misha, P3 and P5: SM).

Unfortunately, none of Misha's DTMs agreed to participate in the study, therefore, no insights can be shared on how her teams experienced her unique project management approach.

Olive (P2 and P6: SM) joined the study with several years of experience in a senior managerial position at an HEI. She had an understanding of Agile project management well before the study started. Since the first interview, she started adapting her project management strategies to suit her context better while aligning them with the principles of Scrum. Olive (P2 and P6: SM) admitted to disliking a lot of theory and detail but acknowledged the importance of paying attention to detail in the given context of online programme design. She summarised her implementation of Scrum as being useless as a Scrum master in some projects, but with others feeling highly successful. Taking these statements and the extent to which others had attempted to implement Scrum into account, the researcher ranked Olive's implementation as *medium*.

Olive (P2 and P6: SM) indicated in her first email reflection, which took place after a month of implementation, that she was a firm believer in the Agile principles and had no issues with implementing Scrum. In the same email reflection, Olive (P2 and P6: SM) stated that she was already adapting her practice to align more with Scrum as a project management framework. She, however. also mentioned that it was a process she intended to change, regardless of the directorate adopting Scrum.

> I have adapted how I am going to work with Alonzo to something that fits with the Scrum, calling it sprints and demos, reflect in between. But my reality is, whether I know Scrum or not, I would have already had the same process in place. Except the terminology is not used. Maybe one is not used, maybe two others are added. But we are still following the principle of having a list of things; then we have measurable outcomes, which is shared/submitted as we go along. (Olive, P2 and P6: SM).

In her second email reflection, Olive noted that she had a dislike of working with finer details, however, the Scrum principles have helped her in this regard.

> I like the idea that the principles are generic and can be applied to different environments. I personally like to rather work with the bigger, less detailed picture, but in our environment, I have to zoom in and out the whole time and that I struggled with. I am not good with details, so where I am the person taking the lead, I tend to overlook a lot of detail. (Olive, P2 and P6: SM)

By the third interview, Olive shared her feelings towards the Scrum framework, indicating that she does not care much about the theory or the terminology of the framework but rather that its operational aspects add value to her work.

> I don't really bother where the theory comes from as long as I can see the value of what I'm doing. But going forward, necessarily calling it by the terminology, example, remember we are typing now in the backlog. Why do you want to even name the document? You can tell them there is your document, it's on Google Drive, I will keep it up to date with every decision that we make. (Olive, P2 and P6: SM).

In the final interview, Olive concluded that she implemented Scrum very well with certain programmes and rather poorly with others.

> I think I am completely useless with the one team, so I will give myself a one. But with the other, I think I am highly successful, they are working, and I am guiding, so I am actually facilitating the process, and through that, they reach their goals. So for them, I will give myself a nine. So that give you an average of five; I have still a lot to learn in this environment. (Olive, P2 and P6: SM)

The final Scrum master, Amelia (P1 and P4: SM) joined the study, never having heard of Scrum before. She worked very closely with the researcher in her capacity as Scrum master and soon started implementing an adapted version of Scrum. Very early in the process, Amelia started making recommendations for improvement of Scrum implementation. She adapted Scrum to suit her development teams' unique needs. Amelia concluded that implementing Scrum has improved her project management approach, helping her to be more structured and transparent with her teams. Taking these statements and observed practice into account, the researcher ranked Amelia's implementation of Scrum as a project management framework as *high*.

In the first group interview, Amelia declared that she had no prior knowledge of Scrum.

> "I have to tell you that actually when you implemented that Scrum principles, that was the first time that I actually encountered it" (Amelia, P1 and P4: SM).

During the third interview with the Scrum masters, Amelia explained that there are components in Scrum that are much like any other project management framework. She, however, indicated that she finds the structuring principles and sprint backlog valuable but still feels adaptations per programme are necessary.

> The fact that I've done it together with you, the P1, that actually gave me a very good idea of how to implement it and I saw the value of it. So, but I think that it's actually something that I think a lot of people already do, but they just don't know

> how to call it, you know. So, I like the idea of the weekly meetings. We, in any case, have the weekly meetings. I use that backlog document or the sprint documents. I use it to keep track of the decisions that we've made, and I even put some extra information in there for my lectures, like you've seen. And well, in P4, we are working on that document at this stage for the module descriptors and everything. But I still keep track of what we are doing. So, I like the structure that you can get from the Scrum principles. But I do believe that you have to adapt it a little bit for each and every programme because I don't think that you can be rigid in your approach to employing it. (Amelia, P1 and P4: SM)

By the final interview, Amelia concluded that Scrum had helped her in her project management, especially with transparency.

> This approach helped a lot in structuring the process that we have to go through. But it's also very valuable for transparency because everyone knows exactly what is expected, and when it is expected. And then also, it's very easy to keep track of your progress and it's very visible, it's transparent so we can see we are on track or we are behind. So I think that this process actually bettered my abilities to manage projects, or it made it a little bit easier for me to manage the project. (Amelia, P1 and P4: SM)

4.3.3 The Product Owner

The researcher acted as product owner (PO), creating the product backlog in consultation with the learning designers during a three-day strategic planning session. As each programme development team progressed through the backlog, lessons were learnt about which increments to prioritise when aligned with the institutional governing board meetings. These inputs were discussed with the Scrum masters during weekly learning design meetings. The PO also participated in the kick-off meetings with new development team members to determine what the industry needs for the programme were. Initially, she attended all the kick-off meetings in person, presenting a live session on Scrum. As her workload increased and Scrum masters became more confident in their understanding of the requirements, the PO created a video that explained Scrum in the context of curriculum design to be shared with DTMs. Olive (P2 and P6: SM) indicated that she liked introducing teams to Scrum in this manner, giving academics a bit of background.

> I like the idea of when you (*the product owner)* have that kick-off meeting, to tell them this is the methodology that we follow. … We have that video that explains that. A little bit of background, because there are people that like to always know where do you get that. And I think in an academic environment, there are more people like that than I am like that. (Olive, P2 and P6: SM)

Upon request of the learning designers, the product owner would attend sprint retrospectives to provide insight on programme design aspects, ensuring that stakeholder needs were met. Stakeholders in this context related more to maintaining minimum standards of the University's Senate committee, the Department of Higher Education and Training, the South African Qualifications Authority, and the Council on Higher Education. The PO also reviewed student feedback on previous modules, encouraging teams to attend to student needs. In many cases, the PO was therefore seen as a curriculum expert rather than the traditional role of the product owner.

> You *(the PO)* felt always just an email away, always willing to help whether it was with a one-on-one meeting or just the general meetings we had, answering questions, and we always knew there was work that needed to be done and that you guys were on top of it. (Quintin, P1: DTM)

> For instance, like I'm working with my module, where I struggled to find appropriate resources for the content of that module and in this case, I felt that you're *(the PO)* very helpful in advising how to use the open resources, and providing suggestions on how to go about making use of those options or those tools, and also maybe speaking to the librarians to get further assistance (Binita, P1: DTM).

The PO and SMs were acutely aware of the challenges faced by DTMs in their roles as academics. Therefore, support was provided extensively to aid the team in achieving their project goals. When assigning roles and responsibilities, the SMs attempted to lessen the load of the DTMs by taking on a broad spectrum of responsibilities. The division of labour will be discussed in detail in the next section.

4.4 Motivations

"Motivation is the process that initiates, guides, and maintains goal-oriented behaviours. It is what causes you to act" (Cherry, 2022). As the previous sections show, working in higher education (HE) implies being tasked with numerous responsibilities, such as being part of a curriculum design team for an e-learning project. In such work-related settings, performing one's duties may have very little to do with motivation and everything to do with acting out of compliance. Lethabo (P6: DTM) expressed the same sentiment when speaking about the initial stages of joining this project.

> Sometimes it is also about our attitudes towards what we're doing. Sometimes I think me as a program coordinator; I tend to feel sometimes we do things because we have to do them and not because we're passionate about them at that particular point in time. (Lethabo, P6: DTM)

For Bongani (P1: DTM), having a fixed structure helped him to start with this process. From the outset, he felt motivated by knowing what the milestones, timelines, outputs and goals were for the e-learning project.

> You know, it's just one of those to say certain things must be fixed. And to allow all of you to start doing certain things and you know, that there are milestones, there are timelines, and there are outputs. And then that there are goals, of course, an objective that needs to be met. And that was firstly, that fixed process, again, a motivation for me, knowing when to do certain things and when really to submit certain things. (Bongani, P1: DTM)

Once Lethabo (P6: DTM) had accepted his role in the project, having a sense of community was what guided his goal-oriented behaviour. He strongly believed in the strength of companionship for motivation.

> Unfortunately, my team left, and I was the only one who was left. So, you can see that that sense of community was between me and the learning designer for about two months, two to three months. It was just she and I, and we had to try and keep pushing each other. And it's difficult, when you are only two, to keep each other motivated. Because I believe my input also would definitely help her to keep herself motivated and to want to have the energy to assist me. It's not about just me needing the support or the motivation from her. But I also, by doing my work, I'm somehow, you know, motivating her to say she's also helped me in the right direction. (Lethabo, P6: DTM)

Finally, Alonzo (P2: DTM) found that the consistency of weekly meetings with weekly tasks assigned to him helped him remain motivated.

> I myself try to really use that meeting to keep me motivated, positive and focused. Because if you don't, if you miss that meeting, you lose so many weeks after that. And if you don't have tasks to do on a weekly basis, I think this process would never end. So this weekly meeting, I think it must be, in my opinion, not the choice. It's mandatory, even if it is a small action, you know, it's like, you go, you make a diet or something like that, and you need that motivation and to keep the person on track. (Alonzo, P2: DTM)

The SMs' motivation lay in the goals they wanted to achieve as project managers. All three of the Scrum masters addressed aspects related to product-centric views, such as meeting deadlines and ensuring quality outputs, however, they also had people-centric objectives, such as building relationships and taking care of the DTM’s needs.

> "To finish the project as soon as possible, making sure it is of quality, well designed with pleasant student experience" (Olive, P2 and P6: SM).

> "To successfully complete the work in the time span allocated while being cognisant of people's needs and feelings" (Amelia, P1 and P4: SM).

> Lead by example. Only expect what I also give. My goal as a project manager is not only to meet the deadlines and complete the project but also make the process smooth, building relationships and create learning opportunities for them to develop and grow. (Misha, P3 and P5: SM)

Lee and Song (2021) found that the social conditions within which individuals found themselves played a major role in motivation. The more supportive an environment was, the more motivated individuals were. Linking to social conditions in the workplace, Steinbinder and Sinsneros (2020, p. 243) found that "caring leadership promotes meaningful connections at all levels and deepens trust with all members of the team". In particular, displaying self-awareness was one of the behaviours equated to good leadership. In the following section, the researcher will unpack the participants' levels of awareness and experience with curriculum design and Scrum.

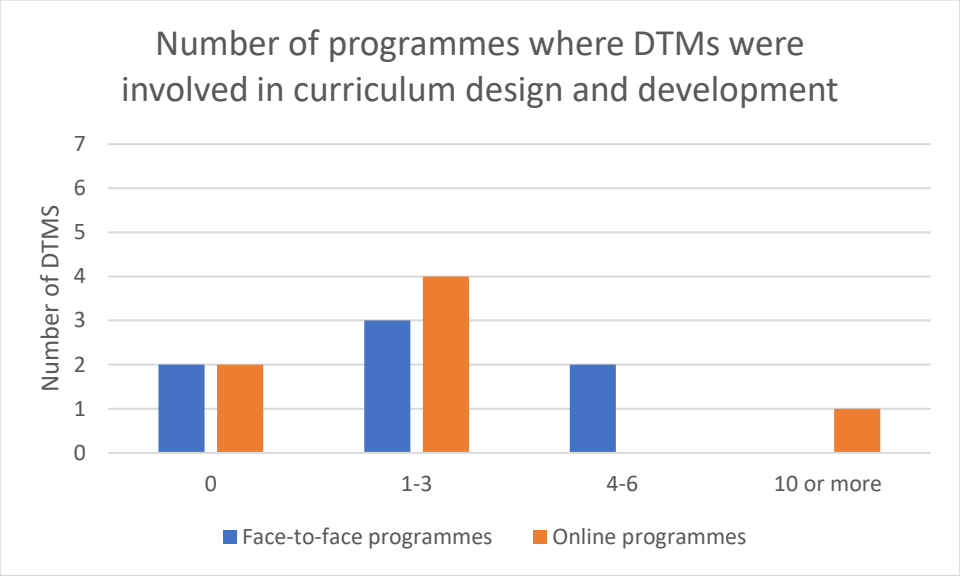
4.5 Levels of Awareness

In terms of prior experience with curriculum design and development, the survey responses revealed varying degrees of experience. Two DTMs had no experience with the design and development of face-to-face (contact) or fully online (distance) programme curricula, while three DTMs had worked on one-to-three contact programmes, and four DTMs had worked on one-to-three fully online programmes. Two DTMs indicated that they had worked on designing and developing four-to-six contact programmes, while one DTM had worked on ten or more online programmes (see Figure 4.3 for a graphic depiction). Thus the levels of awareness in terms of programme design processes were diverse, making the project management of such teams quite challenging. The survey data revealed that six of the seven DTMs had no prior experience with Scrum as a project management framework.

Of the three SMs, Misha (P3 and P5: SM) and Amelia (P1 and P4: SM) had not heard of Scrum before this project, while Olive (P2 and P6: SM) had some theoretical background in the overlapping Agile principles. Because most DTMs had no prior experience of Scrum, and similarly the PO and SMs had no prior experience of implementing Scrum before this study, the participants were considered novice teams attempting to implement an agile framework (Espinoza et al., 2020)

Figure 4.3

DTMs prior experience with face-to-face and online programme design



Reflecting on how Scrum was introduced to the Directorate, the researcher realises that it could have been less subtle and more direct. While all of the project management rules and tools were conceptualised and designed using the Scrum framework, the researcher, as the Product Owner, did not communicate this from the onset to the learning design team. The researcher first wanted to develop her understanding of Scrum and have some experience acting as Scrum master before drawing in the learning designers. While Amelia (P1 and P4: SM) was drawn in on the Scrum implementation very early and directly with the P1 project, Olive (P2 and P6: SM) and Misha (P3 and P5: SM), had to rely heavily on their Scrum training to guide them in implementation. Therefore, Misha was surprised to realise that much of what she had been doing was based on Scrum.

> So, I have to say, in terms of all the Agile principles, and waterfall, and whatever else, I don't have a lot of background knowledge to it. So, for me, the most interesting thing was to see that a lot of what I do, is, when I read the Scrum principles, and I did the course, I realised that a lot of what we do it is actually called Scrum and there's a process and, you know, we doing all these processes. So, for me, it wasn't something that I was very aware of that I already do. (Misha, P3 and P5: SM)

When asked whether the SMs felt that Scrum training was necessary for the development teams, most replied that they would not spend much time on this. The consensus was to have a brief overview so that DTMs knew the framework. In particular, the use of Scrum terminology was frowned upon.

> I think if you follow a specific way of doing, you need to tell them upfront; this is how we work. They need to know what to do. But yeah, not necessarily have all the theory the whole time explained to them of all the principles and naming conventions, etcetera. (Olive, P2 and P6: SM)

> I would rather just explain it to them and then just say, if they want to know more, then they can go and have a look at this or that." "I don't really think that it's necessary to have the whole explanation, like the one that we've read, for the development team to have all of that knowledge. If we give them the principles, this is the sprint's principles, this is the structure that we are going to follow. We're going to have weekly meetings, a pop-in meeting, and we define whatever should be done in this week. (Amelia, P1 and P4: SM)

Misha (P3 and P5: SM) was rather expressive of her dislike of Scrum terminology, equating Scrum videos to a waste of time and Scrum terminology as being opposing to a project of academic nature.

> Maybe one video explaining the process using the Scrum analogy is fine. But I also wouldn't go into a lot of formal things and say, oh, don't forget the Scrum meeting and don't forget the sprint log, and you know, we're going to have a whatever Scrum this day or whatever. …For me, I think it takes away from the academic nature. I think it also comes from, you know, being in the lecturing position myself before. I hate to watch things that take up my time that I don't need to know. (Misha, P3 and P5: SM)

The implication of sharing very little information on the project management framework was that some DTMs, such as Lethabo (P6: DTM), did not know what Scrum was, even though he was months into the project. This resulted in a negative experience for him.

> Nah, I have no idea what these are. I don't know. I am not sure about a Scrum and a sprint, but the backlogs I know, but I'm not sure of the context of this backlog. … Whenever we met, we would say, this is our weekly meetings. But there were no specific, you know, references to the types of meetings or specific references to concepts. (Lethabo, P6: DTM)

After hearing how Amelia (P1 and P4: SM) introduced Scrum to her teams, Olive (P2 and P6: SM), Lethabo's SM, indicated that she might change how she explains the process, roles and rules. The necessity to create awareness is echoed by Van der Hoorn and Killen (2021), who maintain that project managers should facilitate greater understanding among project teams of the complexities of projects to aid in collective sensemaking.

> I have never thought about any form of process, or roles or rules or anything because we need to get this document done and I think moving forward, moving into the development of the modules, maybe that is where I go wrong. That I don't do that. Maybe I must look at what Amelia is doing when she talks about roles and rules and processes. (Olive, P2 and P6: SM)

4.6 Division of Labour

The DTMs were asked how they felt about the roles and responsibilities assigned to them as content matter experts and curriculum designers of the fully online programmes. The consensus was that everyone was happy with their assigned roles, despite the steep learning curve. Aspects of Scrum, such as the structure and transparency it provided, were attributed for helping fulfil the roles of DTM.

> "So, this was, I think, my second or first year, let's call it my first year of really properly doing the lecturing thing, and a colleague just threw me in the deep end and said he wants me on the team. Let's do it. So yes, I felt really deep, like he threw me in deep waters in the start. But then your teachings and your help, and the whole structure of everything that needed to be done, was really, really helpful for me in conceptualising everything and learning as I went, so I was really happy towards the end, but it was a fight in the beginning just to stay on top of everything" (Quintin, P1: DTM).

> "As a project coordinator, I was definitely comfortable, you know, because the responsibilities assigned to me were clear, you know, and were detailed. I think from a descriptive point of view, I knew what was required of me. And at the same time, I knew my role in ensuring that our SMEs delivered on all the deliverables and outputs and ensuring that there were certain things that were required to be done are done" (Bongani, P1: DTM).

Laurene (P1: DTM) and Noah (P4: DTM) commented that they sometimes felt they were not taking on enough of a role given the full scope of the programme design and development project.

> "I was comfortable. I always felt throughout the process, I'm not doing enough towards the bigger project, and I knew I was doing my responsibilities towards my subject, and I was totally comfortable with that" (Laurene, P1: DTM)

> "I sometimes felt ashamed that it feels I'm not doing all the work and I'm probably supposed to. I've sometimes felt that, my goodness, now the learning designer *(Amelia)* is doing more than I am. So, the responsibilities were well balanced. It was assigned well; it wasn't an overload" (Noah, P4: DTM).

Linking to Noah's (P4: DTM) gratitude for the amount of work that Amelia (P1 and P4: SM) was doing, he went further to explain how they worked together, emphasising the structure of the process and detail of the information shared by Amelia. The emphasis on these Scrum elements is similar to the comments made by Quintin (P1: DTM) and Bongani (P1: DTM). Noah concluded that Amelia conducted her project management as a servant-leader.

> "She's excellent, well versed in the process and the structure, and the detailed information. So, I look up to her to present me with the structure and the detailed information, I follow her lead regarding this. So, we are working very well in terms of the way she presents it and give direction, and I appreciate that she takes the lead on this and, when necessary, signs responsibilities to me, and I think part of our relationship is that I don't want to disappoint her because she's working so hard. So I don't want to fall behind with my responsibilities, and it's really a very nice working relationship we have. … So, in that sense, of course, the learning designer was a leader giving direction. … She provides information, [and] assistance in saying this will help you to read up on this article, or go and watch this video or this will help you in order to prepare the work better. So yes, a servant-leader, for sure. It contributed to the process. So, it's not merely giving direction, but also giving assistance in that way" (Noah, P4: DTM).

Laurene (P1: DTM) also experienced Amelia (P1 and P4: SM) as being balanced in her roles as leader and servant.

> "Okay, so the learning designer is one I do see as a top-down. So, I did see it very much as giving instruction and following instruction. But I also experienced quite a bit of, I'm struggling. What can you help with? That kind of relationship. That it wasn't just teacher-child relationship, and that one could have easily emailed you guys, and there was information coming. So, that was quite good" (Laurene, P1: DTM).

These sentiments were echoed by Bongani (P1: DTM) and Binita (P1: DTM), who sometimes viewed the relationship as top-down, equal contributors, and at times the LD was viewed in a supporting role.

> "The support, you know throughout the process, made it easier. … It was more of, you know, a top-down approach at the same time, when it was required. There was a time where, you know, the LD had to sort of guide the team and expect that it needs to be done. But, there was not any time where I felt that the input of any team members was not valid" (Bongani, P1: DTM).

> "I felt that I received the assistance that I needed. Like if it was, with regards to, providing feedback, I felt that both were equal. I didn't see one as more than the other" (Binita, P1: DTM).

Alonzo (P2: DTM) also had a very positive experience with Olive (P2 and P6: SM) as his Scrum master, concluding that she was also an equal contributor.

> "She is equally contributive. She is also personal and I think she is a professional. So, she had all the positive things. I think I'm lucky, she has that, you know, that support, and my experience is completely positive" (Alonzo, P2: DTM).

The development team members had like-minded views on the skills they expected their learning designers to portray in their capacity as project managers. Communication, interpersonal skills and discipline (learning design) were specific knowledge listed as the top three skills. While Laurene (P1: DTM), Quintin (P1: DTM) and Lethabo (P6: DTM) only mentioned communication as a skill without elaborating further, Noah (P4: DTM) unpacked communication as needing to be of a certain style, regularity and timeliness:

> Communication skills are very important. With communication skills I not only refer to timely and regular communication but also a style of communication. She constantly sets me at ease. There's no tension when we communicate in terms of working together or giving instructions or sharing responsibilities and that makes it easier to work together. (Noah, P4: DTM)

Interpersonal skills such as understanding professional culture, accommodating diversity, and providing support and leadership were listed as required skills for learning designers as project managers. People-centric elements were emphasised throughout the study. Lethabo (P6: DTM) and Bongani (P1: DTM) spoke about the necessity for project managers to understand people better.

> Understanding of culture and its underlying influences on how people work in the workplace, especially professional culture. You know, I think for me, not going into cultural diversity in general, but the professional culture of a specific profession. (Lethabo, P6: DTM)

> Being able to know the social elements, and have had an overview of how people behave, more from a behavioural perspective, and understanding that people are different, and be able to accommodate people from, diverse backgrounds. …Really getting to understand the individuals for who they are, understand their strengths, their weaknesses, and, just keep on encouraging them and supporting them. (Bongani, P1: DTM)

In addition, Binita (P1: DTM) and Bongani (P1: DTM) explained that they valued feeling supported by a learning designer. Bongani specified that he does not care much about the project management approach used by the learning designer as long as a supportive role is evident.

> "Being able to support me is very important. So, as a project manager, one needs to know how to go about supporting those that you're working with" (Binita, P1: DTM).

> "Then the most important thing for me is just the support, regardless of which approach one decides to apply" (Bongani, P1: DTM).

Finally, concerning the people-centric skills required of a learning designer as a project manager, Quintin (P1: DTM) specified that leadership was important to him. Likewise, Bongani (P1: DTM) emphasised the necessity of learning designers to encourage participation through reinforcement.

> "And then, obviously, just the leadership role and the leadership skills in the meetings just to give structure to it and get everyone involved" (Quintin, P1: DTM).

> And then sometimes, in certain instances, we need to reinforce. And that's what I've really experienced throughout this process when the team was doing well, then we will definitely get feedback, and there was that element of reinforcement, and whenever the team was lacking, that will definitely be brought to our attention. (Bongani, P1: DTM)

Participants further mentioned discipline-specific knowledge that they believed was required of learning designers. Both DTMs from P1, Laurene and Bongani, indicated that a strong understanding of education, including learning and teaching principles and educational technologies, was necessary.

> "Okay, knowledge to be strong in the educational field, I think that is important" (Laurene, P1: DTM).

> "Understanding the Learning and Teaching principles, and the teaching methodologies, learning and teaching methodologies. And when it comes to technology, and digital skills as well" (Bongani, P1: DTM).

While Lethabo (P6: DTM) agreed on the importance of technological skills, he also singled out knowledge of the accreditation processes as an important skill for a learning designer to have in their capacity as an e-learning project manager.

> I think the second thing is, obviously, the processes of accreditation, you know, they need to be quite aware of the processes of accreditation and learn, if not

> only from the CHEs perspective, but also from that particular profession's perspective. Yeah, and yeah, I think basically, those are most important for me, although, you know, the technological skills, I would assume that they would have. (Lethabo, P6: DTM)

Finally, Laurene (P1: DTM) and Quintin (P1: DTM) mentioned skills which did not fall within the groupings of communication, interpersonal skills and discipline-specific knowledge. Perseverance, planning and adaptability were considered essential skills for project managers in learning design.

> And then the ability to persevere. So we have got a lot of individuals that really are doing things in their own time, in their own way. But the skill then to persevere in these circumstances, so that everybody's still on board. So the background of the process must be known by the leader and how to get everybody on board. (Laurene, P1: DTM)

> Planning skills, definitely planning this whole thing, making sure that everyone knows the schedule for the foreseeable future and then adaptability, so when we come back to you guys and say, we just need a week or two, please just to catch up, to be able to adapt to that and restructure the program to accommodate us. (Quintin, P1: DTM)

When asked how the Scrum masters (SMs) would describe their roles in the e-learning projects, there were several overlaps with the required skills mentioned by development teams. It was evident that many roles and responsibilities were involved in leading and supporting a programme development team. Support, leadership, professional development, coordination, quality assurance, and impediment removal were a few of the roles listed.

Misha (P3 and P5: SM) explained that her responsibilities are ever-changing, and because of the instability, her main role is ensuring the work gets done. She felt that she runs everything, making her project manager role in learning design quite diverse.

> For me, the most important thing is to provide obviously, the support for the subject matter experts. …I lead the team, I schedule all the meetings, I do any workshops that are required, I do any kind of skills development that's needed. I set the deadlines. …Also dealing with the teams as well and their different challenges. (Misha, P3 and P5: SM)

In contrast, Olive (P2 and P6: SM) had two very different experiences. She felt that she had to do nearly everything with one team, including much of the design and development work. In contrast, with the other team, she portrayed the role of guide, sharing her expertise on pedagogy and

accreditation documentation while the team fully embraced their roles as development team members.

> My role is then to guide, to review and to remind. … So, the one I am like, the everything, so I tell them what to do, I check if it's done, I rewrite it, and etc." "The other group that I work with, I'm like the guide. So, I'm fulfilling the role as a learning designer coming in with the knowledge from the educational sides, and the documentation, and what needs to be done. But the group takes full ownership for the development or the design of the module. (Olive, P2 and P6: SM)

Finally, Amelia (P1 and P4: SM) agreed with the views of Misha (P3 and P5: SM) and Olive (P2 and P6: SM), but further expressed that she saw herself as a mediator and quality assurer as well.

> So, I see myself as somebody that's also trying to take away the struggles or the pitfalls or the things that cause my team to stumble, and to identify places where I can even help to address the needs or the problems." "I also have to look into the quality of what we are busy with and see that the best practices in online teaching are also being followed, and I have to promote that. (Amelia, P1 and P4: SM)

From the first group interview, there were uncertainties regarding who portrayed the product owner (PO) role in this particular context. Within faculties, programmes belong to departments, with HoDs often being held accountable in institutional meetings for problems encountered in academic programmes.

> "I wondered, in our environment, who would act as the product owner?" (Amelia, P1 and P4: SM).

> The product owner is the department that owns the final product of the programme; they own the product. Uhm, so I think I am in the Scrum master role, I think the product owner lies with the department or the lecturers themselves. (Misha, P3 and P5: SM)

The researcher wondered if the fact that she fulfilled the role of Scrum master for the P1 group before handing it over to Amelia also impacted the SMs' views of the PO. Further, the researcher pondered whether her role as a researcher also meant that some of the Scrum masters mainly perceived her as a researcher and not a fellow participant.

> Well, I see myself in all three as part of all three of them *(Scrum team roles)*. Because the project owner has the project vision who breaks down the project into tasks, then prioritise them. …And the Scrum master is coming more to the nitty-

> gritty part of it … if we don't set the pace and let them work and submit this. (Olive, P2 and P6: SM)

Similar to Olive (P2 and P6: SM), Misha (P3 and P5: SM) also viewed herself as Scrum master and development team member.

> I also think I'm a development team member, because I help them to develop and to design and to conceptualise this module for the programme. So, I run the project. But I also help with the development of the material for the project. So, I would place myself in, in the Scrum master and part of the development team role. (Misha, P3 and P5: SM)

Evidently, all the SMs had a high workload in common in terms of the division of labour. Their workload as learning designers and academic staff made it difficult for the Scrum masters to set aside time for Scrum training, professional development and other academic responsibilities, such as research. Even after their training interventions were completed, their workload did not decrease, making it difficult for them to embrace Scrum fully. In her first reflection email, Olive (P2 and P6: SM) indicated that she simply could not spend more time on Scrum training or figuring out the project management software at that given time. Similarly, Misha (P3 and P5: SM) explained that she did not have the time to start using ClickUp, the project management software.

> At this stage work is added, I haven't even figured out how ClickUp (*project management software*) works, not even started logging things on it, not even continued with the workshops for the lecturers, or work on my NRF application, so to add another training, not now. (Olive, P2 and P6: SM)

> "If I had all the time I would definitely update everything and keep every document up to date and I don't mind doing the admin around it if I had the time, but for me, that's the biggest struggle" (Misha, P3 and P5: SM).

Corroborating Olive's (P2 and P6: SM) views on her workload, Alonzo (P2: DTM), in his interview, voiced his concern about Olive. He pleaded that the project manager should reduce the number of projects Olivia was involved in, explaining that she was offering short courses, presenting at conferences, and writing articles, all while supporting him and three other teams in completing their programme accreditation documentation. He concluded that she always works in a hurry.

> "So, she is always rushed out. Rushed in, rushed out, and rushed in. That, that won't help the process. This has to be managed better" (Alonzo, P2: DTM).

In her second reflection, Olive (P2 and P6: SM) still felt the pressure of her workload, mentioning that working as LD in academia meant that timelines were always tight.

> "We are on a tight time schedule, quickest possible time, in a time-box, run, run, run. There is nearly no time to go back, to correct, change and adapt" (Olive, P2 and P6: SM).

A few recommendations stemmed from the work overload concerns of the Scrum masters. Alonzo (P2: DTM) suggested that the number and types of activities the SMs are involved in should be better managed and that more LDs must be employed to meet the demand for online programmes.

> First is managing the time properly and fairly. Not to let the learning designer be overburdened with so many other tasks and so many other courses, so many other things, without considering the responsibilities she has, and if she has enough time for it." "So instead of adding more, you need to have made sense of what is the work and then get more, learning designers. Or, use learning designers from outside, you know, the privately or whatever it is. (Alonzo, P2: DTM)

The Scrum masters also had recommendations of their own. Olive (P2 and P6: SM) and Misha (P3 and P5: SM) proposed that issues such as MOU agreements, finances, marketing, and book purchases should not form part of their workload.

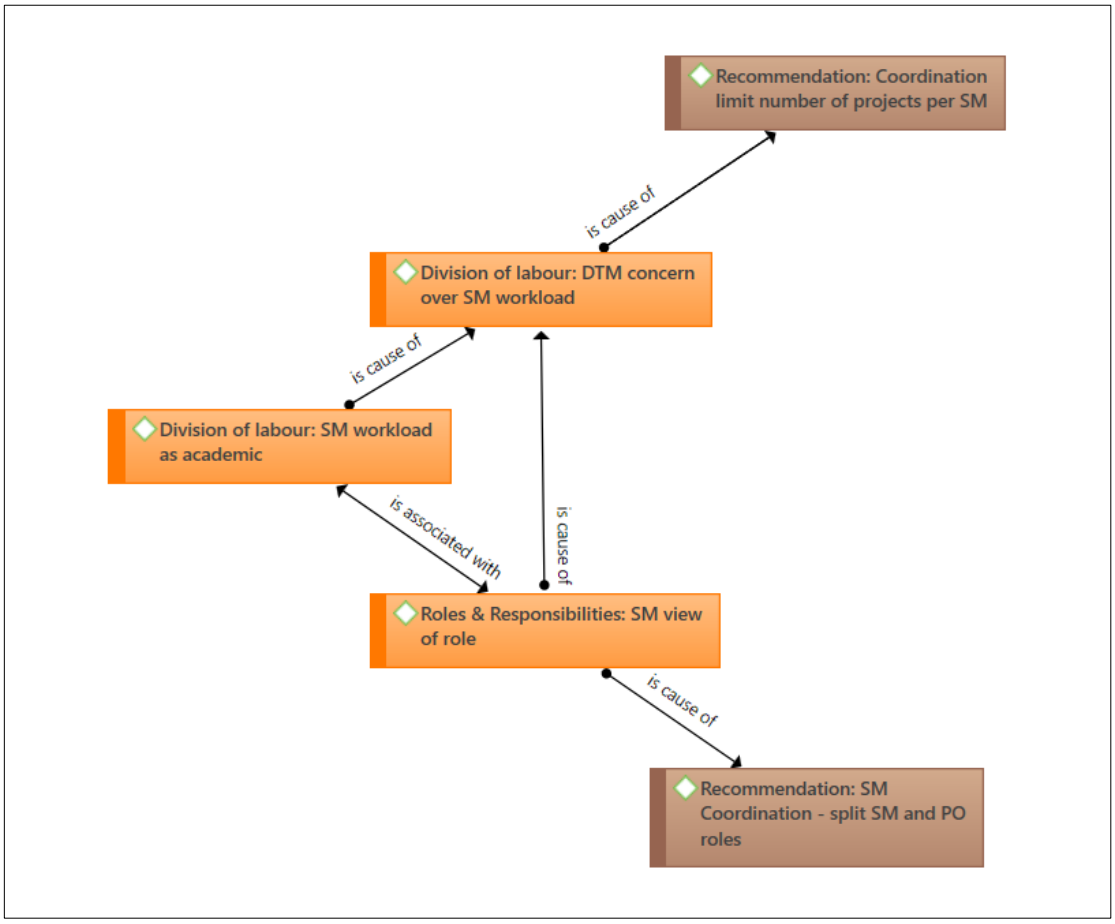
> I think maybe it would be better if from the project management side, the signing of MOUs, all that initial discussions, documentation happens without our detailed input…So, at the end, when we get involved as the Scrum masters, and that is where I see that we actually supposed to start, then we already have the team, the documentation is out of the way." "But in the higher-order stuff and the finances and the marketing and the books and the stuff, I don't see us being that much involved if we work with 10 or so programmes. (Olive, P2 and P6: SM)

> "The dean and the program coordinator, and whoever else should be in those meetings of marketing and contracts, and books and all of those money-related issues that has nothing to do with us *(the Scrum masters)*" (Misha, P3 and P5: SM).

Figure 4.4 depicts the coding network used to analyse the Scrum master's division of labour challenges and recommendations to overcome them.

Figure 4.4

Scrum master division of labour code network



While the development team members (DTMs) found their roles and responsibilities within this project fair, taking their context into account painted quite a different picture. The DTMs had so many other academic responsibilities that they often had to rely heavily on the SMs to assist in aspects of development. The fact that the Scrum masters (SMs) fulfilled both the roles of leaders and servants greatly aided the team in working towards their goal. The SMs, however, found themselves somewhat overwhelmed with all the roles they needed to fulfil. Managing the e-learning projects while providing professional development opportunities, producing research outputs and supervising postgraduate students was no easy feat. Recommendations were made to clearly establish the roles of PO, such as drawing up MOUs and attending marketing meetings. Despite all these challenges, the Scrum teams remained greatly motivated throughout the project.

4.7 Conclusion

This chapter has provided a rich description of the COVID-19 HE background within which the study took place. The researcher attempted to create a detailed view of the people-centric elements, namely the fully online working environment, Scrum curriculum teams, their motivations, and awareness as they impacted the e-learning project experience. When engaging with the findings revealed about the social interaction elements experienced in this study, the

reader is encouraged to remain conscious of the subjects, their community and the division of labour addressed in this chapter. In Chapter 5, the findings related to the tools, rules, and objectives of the study will be revealed.

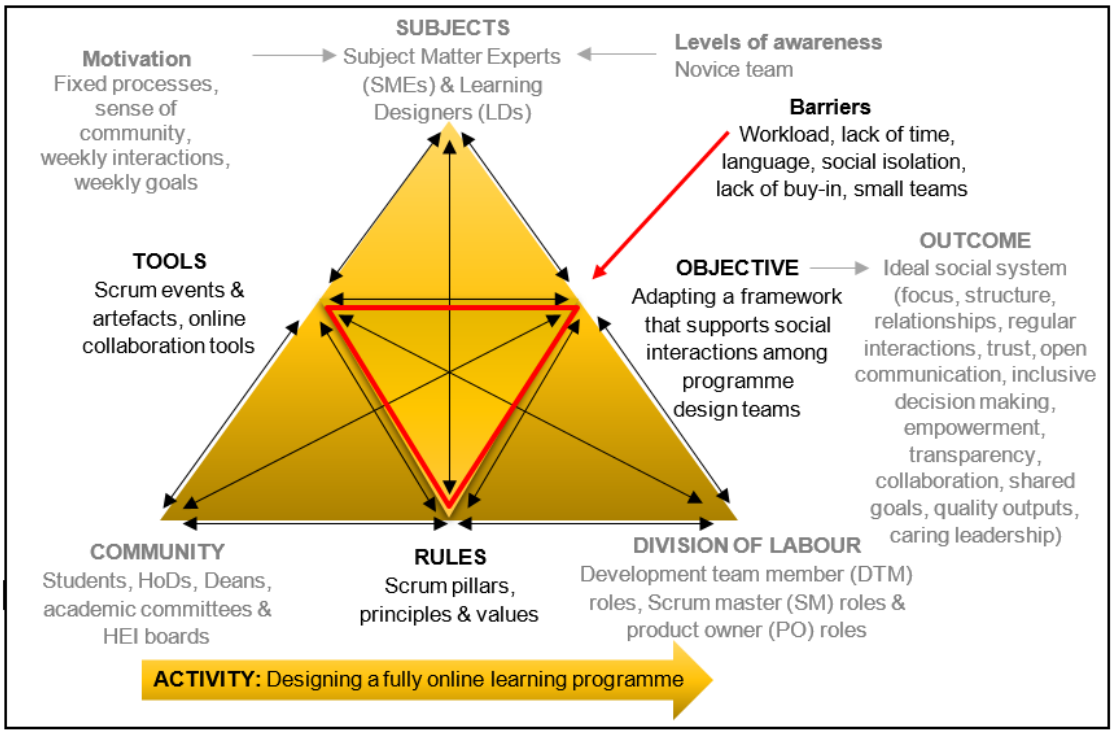
5 Chapter Five: The Tools, Rules and Objective

5.1 Introduction

Curriculum development teams have used various adaptations of activity theory (AT) to promote social interaction skills amongst recipients of the curriculum. Bleakley (2021) reported one such study, describing curriculum design using Cultural-historical Activity Theory (AT) to equip medical students with better communication skills. A second and very different example is Garraway and Winberg's (2020) study on expansive learning derived from AT as a curriculum approach to support collective learning and innovative problem-solving among vocational teachers. These and similar studies using AT in education contexts commonly emphasise the curriculum as an end product and the students' experience. In this study, the researcher was keenly interested in knowing what organisational tools and rules these curriculum development teams used to achieve their objective. This chapter, therefore, addresses the tools and rules of engagement used by the e-learning teams of the Scrum study as they worked towards developing fully online learning programmes (see Figure 5.1 for a depiction of the activity elements addressed in this chapter). The secondary research questions pertaining to how the Scrum framework can be used to promote communication, coordination and collaboration in an e-learning activity system will be addressed, as intended objective for the study.

Figure 5.1

The organisation-centric elements of a programme development team using Scrum (tools, rules and objective)



Adapted from Khayyat (2016)

5.2 Tools

Tools can be of both a physical and conceptual nature, such as the instruments used to perform an activity or the methodological approaches used to achieve a goal (Guo et al., 2020). In this study, online applications and Scrum artefacts and their accompanying events were viewed as the tools used by Scrum teams to design fully online programmes. Guo et al. (2020) note the importance of collaborative tool use to build confidence among users of digital tools working in an online environment. In Section 5.2.1, development team members' views are shared on how they perceived the use of collaborative tools such as Google Apps. Section 5.2.2 will address Scrum-specific tools, including the terminology, events and artefacts.

5.2.1 Online Collaboration Tools

As mentioned in Chapter 4, the programme development teams worked exclusively remotely during this study. For many, the online communication, coordination and collaboration tools were familiar; however, they had never used them to their full potential. Google Suite apps, including Gmail, Meet, Drive and Calendar, were mostly used. In addition, some Scrum masters (SMs) used student response systems such as Pear Deck, Padlet, and Kahoot to encourage engagement during virtual meetings.

> Well, I knew Google Drive. But I mostly used it as a backup for other documents. This was my first time really using Google Sheets and seeing how cool it is being able to work on a document and seeing there are more people working on the document with me. So, this was my first time really using Google suite to its fullest potential. (Quintin, P1: DTM)

Once the worst waves of the COVID pandemic were over, many teams started using Blackboard Collaborate to record their meetings, as Google had revoked their free recording services. Lethabo (P6: DTM) and Alonzo (P2: DTM), summarised the views of most DTMs well when sharing the importance of having meeting recordings for those unable to attend a session, or as a resource for referral.

> Definitely, I think what I liked was, we would actually record most of our sessions, whether we used Google meet, or whatever platform that was being used. What I liked was we could actually, have recordings and one could go back and check what the discussions were about. (Lethabo, P6: DTM)

> So that was an excellent thing that you followed up and sent us the recording. You know, I'm sure you remember, I was so keen to get the recording because it's such an excellent reference to go back to it. (Alonzo, P2: DTM)

Misha (P3 and P5: SM) and Olive (P2 and P6: SM) also extensively used WhatsApp to communicate with their DTMs. Individuals such as Lethabo (P6: DTM) preferred WhatsApp to email because of its instant messaging capabilities.

> With WhatsApp as a communication method, it was easier to actually respond immediately as opposed to emails, because at times, it can take some time to actually go through your emails, maybe after some few hours, but with WhatsApp, we could get each other. (Lethabo, P6: DTM)

The development team members highlighted additional aspects of their experiences that were very positive. Laurene (P1: DTM) and Lethabo (P6: DTM) explained that scheduling online meetings was more straightforward and saved time in terms of travel and conversations being more focused.

> By doing this, it does enable everybody to be together in one session. So, you can fit it in quite nicely with a remote thing rather than, you know, traveling to a distance and so forth. But I also find that once we communicate on a platform like this, we communicate and it's over and done with. Where if we sit in meetings, usually, you know, it takes much longer than projected, because there's a lot of other things going on. Where it is quite focused if we communicate on an online platform. (Laurene, P1: DTM)

> “And I mean the convenience of working online, virtually through Google Meet, I believe this for me, creates that convenience. I mean, it saves me two hours of driving to the office to meet somebody” (Lethabo, P6: DTM).

The participants mentioned that they enjoyed the collaborative nature of the Google docs and sheets used by teams to plot their modules. Laurene (P1: DTM) highlighted the fact that Google Drive made it possible to identify content duplications across modules, while Binita (P1: DTM) and Quintin (P1: DTM) appreciated how easy it was to share feedback.

> With Google Docs, I really enjoy it now because, it's a nice way of having everything in one place and the way we were working with it last year, you could see exactly if anyone edited or changed. It's easy to share comments and feedback. (Binita, P1: DTM)

> You guys could give us comments right there, like, look at this. This is good. This is bad. Restructure this. Here is an example of what we think it should look like. Do you agree? You can see the history of the work that was done on this particular tab, which was helpful. (Quintin, P1: DTM)

Lethabo (P6: DTM) valued the transparency of seeing each team member’s progress.

> "I did enjoy that collaboration that we had when we were actually sharing a similar document, and everybody could write and we could all, you know, track and see how far everybody was going. So, I really enjoyed that" (Lethabo, P6: DTM).

For the Scrum masters, working on Google drive also meant the review process was much more transparent. Misha (P3 and P5: SM) explained how much easier it was to provide feedback online and how beneficial it was for DTMs to have the comments immediately available. DTMs could start working through the feedback immediately instead of waiting for a collated document to be emailed.

> I like the review process via Google docs, because they can see what I say and change and accept and so on straightaway. So, I feel like we kind of have a flipped-classroom approach here, to doing our reviews and to submitting work because they work at their time, and we work at our time, but by the time of the meeting, everything has gone through. (Misha, P3 and P5: SM)

Amelia (P1 and P4: SM), who initially preferred face-to-face interactions, mentioned that she appreciated having a paper trail of emails. It helped her to have documentation to refer back to when she had forgotten what was agreed.

> So usually, we sent like emails and I really actually like it because we have a paper trail. I rather like being face to face with somebody but now I see the value of it, because you can remember, and you have a paper trail of everything that was discussed. It's a little bit more of a learning curve in some aspects or ways, but I think it's actually easier than doing everything face to face. (Amelia, P1 and P4: SM).

Bongani (P1: DTM) also shared in positive feedback on the tools used, emphasising that he enjoyed the variety and user-friendliness of the communication tools. The Scrum masters, at times, had to use of different virtual conferencing tools to accommodate stakeholders outside of the institution.

> I'll sum it up by saying all the tools that we used were user-friendly. And another thing that really struck me is the flexibility and the variety of tools that we used. For example, in some instances, we use Google Meet, then Blackboard, and also Zoom, just to sort of accommodate different individuals within the team. And so they were definitely user-friendly, and effective for that matter. (Bongani, P1: DTM).

Not everyone had solely positive experiences. Noah (P4: DTM) and Lethabo (P6: DTM) mentioned having technological challenges such as poor Wi-Fi connectivity and loadshedding. Many educators experienced this challenge during the COVID-19 pandemic (Khoza et al., 2021).

> In a situation where the communication is purely digital, the technology can fail you if there's a bad connection or Wi-Fi is not sufficient, which can cause communication problems. So, it's not due to human error, but merely technology failing the process of communication. (Noah, P4: DTM)

> "For me, it's good, even though you know, there are challenges that might arise with regards to issues of connectivity, load shedding and all that" (Lethabo, P6: DTM)

Laurene (P1: DTM) and Olive (P2 and P6: SM) mentioned the challenge of distractions while attending virtual meetings. They both indicated that they battled to remain focused on the screen. Olive (P2 and P6: SM) had a workaround for this by attempting to keep on her camera to maintain eye contact.

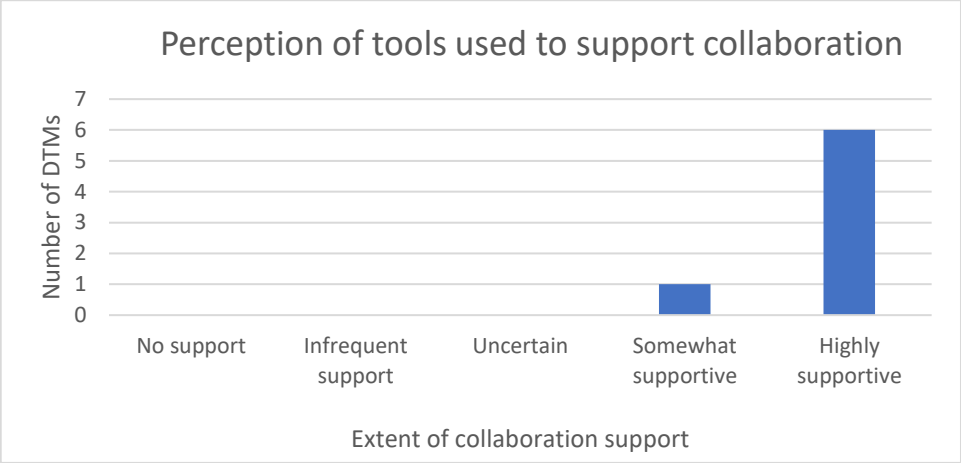
> The communication is hindered, I think, by virtual set up because, you know, we are not always 100% there. I think that is sometimes the negative of the virtual stuff that we are, there and we are on screen, but sometimes we are busy with something else, or busy with a cat or whatever. (Laurene, P1: DTM)

> What I do compare is the eye contact. I missed that. I put my camera on in all my meetings with lecturers. I always put it on because I need to see you when I talk to you, and I get distracted with everything around me if I don't see you, and then I have to think really hard about what I want to say. So I want to see the people. (Olive, P2 and P6: SM)

The survey data revealed that all seven development team members (DTMs) agreed that the Scrum masters used various tools throughout the e-learning project to support social interactions. Six of the seven DTMs found these tools to be highly supportive of collaboration, while one DTM found the tools to be somewhat supportive (see Figure 5.2). To conclude, the overall experience of the development team members and Scrum masters who used the virtual communication, coordination and collaboration tools was overwhelmingly positive.

Figure 5.2

Extent to which tools used throughout the e-learning project were perceived to be supportive of collaboration

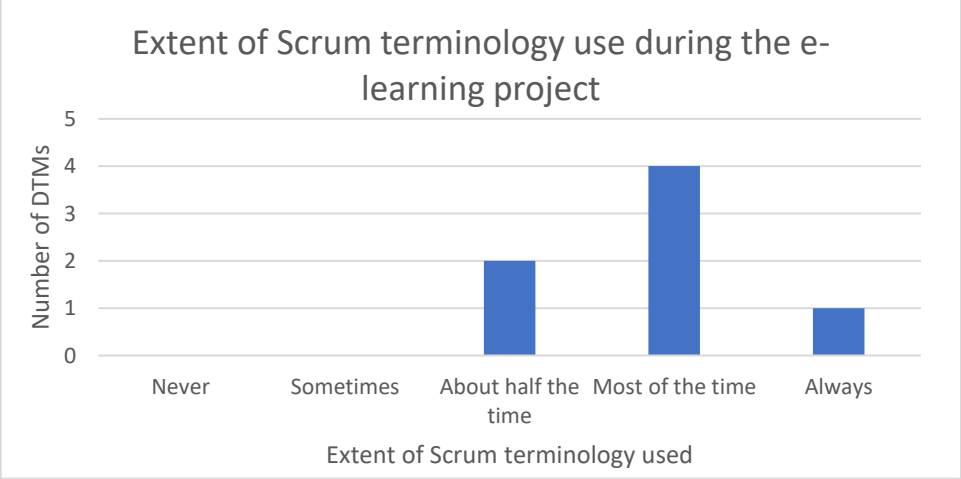


5.2.2 Scrum Tools

In addition to the virtual communication, coordination and collaboration tools, some teams also used the Scrum tools to foster social interactions during the e-learning projects. A notable characteristic of Scrum tools is the unique terminology used for the roles, events and artefacts (Kussunga & Ribeiro, 2019). The data revealed quite diverse and strong opinions about the necessity of using Scrum terminology. Most development team members (four of seven) reported that Scrum terminology was used most of the time (see Figure 5.3). The researcher notes that this is because most participants were from P1, where Amelia (P1 and P4: SM) implemented Scrum extensively. Scrum terms used included product backlog, sprint backlog, sprints, and Scrum meetings.

Figure 5.3

Extent to which Scrum terminology was used during the e-learning project



5.2.2.1 Scrum Terminology as Tool

The researcher asked the Scrum team members to explain how they experienced the use of Scrum terminology. Of the three Scrum masters, Amelia (P1 and P4: SM) was most receptive to using the Scrum terms. Throughout her engagements with her teams, she spoke of the programme backlog, sprints, Scrum sessions, and the like.

> I actually like the terms, and I like the visibility or the idea that you get when you think about a Scrum, or when you think about a sprint, but that is now in my frame of reference, it makes sense. So, I actually like the terminology. (Amelia, P1 and P4: SM)

Consequently, most development team members from Amelia's (P1 and P4: SM) teams had quite a positive experience, mentioning that although it was challenging to master, the terminology aided in understanding the process and bringing the team together.

> Well, in the beginning, it was strange, I think, as all new terminology is, but the terminology made sense, and once you learn that, it's pretty strange not to use it. So, it's just that initial process of learning what the Scrum is, what a Backlog is, what a Sprint is and then once you got that, then, yeah, it's pretty obvious and easy to use. (Quintin, P1: DTM)

> "I think this had a big impact on bringing more the team together. So, I think it did bring the developing team together more but it was, a hell of a learning experience" (Laurene, P1: DTM).

Similar to Quintin (P1: DTM) and Laurene (P1: DTM), Bongani (P1: DTM) explained that the experience was comparable to that of learning discipline-specific jargon in any field. He chose to familiarise himself with the terms quickly and was able to converse easily after that.

> I've never come across those terminologies. I had a choice to quickly familiarise myself with the terminologies or not do that, and then just be blank. But I understood from the beginning that these are the terminologies that are going to be used. And then really, it was not a problem. …And they probably could have impacted negatively if I didn't make that choice of familiarising myself with that terminology. But in any environment, in any field, once you are comfortable with the terminologies then it becomes easier to engage, it becomes easier for you to communicate. (Bongani, P1: DTM)

Noah (P4: DTM) pointed out a very important aspect of using challenging terminology when he stated that it was very helpful when the Scrum master used Scrum terminology consistently and repeatedly.

> Well it helped because the creation of terminology used consistently with the same content helped me understand what are we talking about? So, the terminology assisted me in understanding what it is that we were referring to. So, the language becomes a tool that helps you to make progress in the process. If there's no terminology used consistently, then it will be chaos. (Noah, P4: DTM)

However, Binita (P1: DTM) did not feel positive about the terminology. She found the concepts challenging within the programme design context.

> To be honest, at first I was very confused. It was like, what terminology is this Scrum or Sprint backlogs? So, yeah, I didn't fully get, you know, these concepts in the context of development. But I would say I sort of get the idea now. (Binita, P1: DTM).

Olive (P2 and P6: SM), in her capacity as Scrum master, was initially somewhat indifferent to the Scrum terminology. She did not see the value in naming a document or using the terminology for Scrum events.

> Necessarily calling it by the terminology, example, remember we are typing now in the backlog. Why do you want to even name the document, you can tell them there is your document, it's on Google Drive, I will keep it up to date with every decision that we make. Then everybody knows they can go to the document. (Olive, P2 and P6: SM)

In interviewing the DTMs from Olive's (P2 and P6: SM) teams, it became evident that she seldom used Scrum terminology to explain events or artefacts. Although Alonzo (P2: DTM) knew what a Scrum meeting was, he was unsure of a sprint. Similarly, Lethabo (P6: DTM) did not know what a sprint was, nor was he certain how backlogs were used in the curriculum design context.

> I think the terminology, you know, maybe the words was difficult to understand, but I understand the spirit of it, you know, because it is like a task, time of task, duties to finish and I understand the Scrum. I was privileged to attend the Scrum meetings, I really enjoyed it. …I still don't know what you mean by sprint. The Scrum, I understand, but the sprint, I'm not sure. (Alonzo, P2: DTM)

Olive (P2 and P6: SM) did, however, mention that with time, she might grow accustomed to using the "Scrum jargon". She pointed out that she found more value in the Scrum principles but saw the benefit of sticking to the structure of daily stand-ups.

> But maybe we get so used to it *[the Scrum terminology]* that we change it *[current academic terminology]*. I actually don't mind what it is called, as long as it is in my diary and the people pitch up. I do however value the principles, that makes

> a lot of sense, and I will see how I can work it in, or structure the work so that it is visible. … When you start off and you explain this is the principles and we are going to call our meetings now a daily stand-up, and it means we answer these three questions and then the next time when we meet you immediately put the three questions on the notice board. I think there's a lot of benefit of doing that. (Olive, P2 and P6: SM)

Misha (P3 and P5: SM), the third Scrum master, felt that within the HE context, using the terminologies would cause confusion. She, therefore, created her own terms to add a fun flair to the different weekly activities.

> I do not believe in the scrum terminology. I think the analogy is good and can be used to explain the concept. … So, for me, like, if I read this word sprint backlog, it completely throws me off, when actually it's just a list of what are the next steps to do. (Misha, P3 and P5: SM)

> I will never call it a scrum meeting or sprint. I mean, we call it Wow Wednesday, feedback Friday. Just something fun so that people know, every Wednesday you submit. Every Friday, you know, we have a quick feedback session. (Misha, P3 and P5: SM).

All the Scrum masters agreed that they did not like the Scrum terminology assigned to the roles of product owner and Scrum master. In particular, both Misha (P3 and P5: SM) and Amelia (P1 and P4: SM) pointed out that they would not use these titles when working with only the programme coordinator.

> Like I would rather just be called a project manager, because that's what I am. For me, I feel like, you know, what is this? It's a project. Who is involved? A team? Who is running the project? Me. Who is involved in the high stake decisions? The coordinator. So just keeping it straight to the point for me, works best. (Misha, P3 and P5: SM).

> But I don't think that we have to have a Scrum master and a project owner. I don't think that we that we have to have those terminology. …In any case, when I'm working with only one person, then I would also not use these terminologies, not really. (Amelia, P1 and P4: SM)

Misha (P3 and P5: SM) and Olive (P2 and P6: SM) felt that explaining the roles and responsibilities to the development team members would suffice while adhering to commonly used terms of the university.

> "Assigning roles is fine but I don't think other staff want to listen to words like Scrum master. They just want to know what is expected of them" (Misha, P3 and P5: SM).

> I think we *(Scrum masters)* need to stick to terms used in the organisation. The same with our teams, they use the terminology of the university, so it makes sense to stick with it. …When we go down into the doing, they just need to do what is expected from them and there you have identified the roles. Your role is to do this, this and this. I'm not calling you some kind of master or owner or anything. (Olive, P2 and P6: SM).

5.2.2.2 Scrum Events as Tools

Regarding Scrum events, there are generally four types of events conducted as part of the workflow: Sprint planning, Scrum meeting (also known as a stand-up), sprint review and sprint retrospective, all occurring within a sprint (Gonçalves, 2018). Each Scrum master added their own flair to the Scrum events and adapted the sprint lengths and frequency of Scrum meetings (stand-ups) to suit their teams.

Overall Workflow

The workflow for Programme one (P1) consisted of one-to-four-week-long sprints, which started with a two-to-three-hour workshop on a Tuesday. During the Tuesday session, an adapted version of a sprint retrospective and sprint planning was done. On a Thursday, the weekly Scrum session (stand-up) was conducted for 15 minutes, during which DTMs shared what they had done, what they planned to do and if there were any impediments. Midway through the conceptualisation phase, a more formal review and a sprint retrospective were held. This was only done once as an official stand-alone event. Amelia (P1 and P4: SM) explained that she believed the DTMs found this process valuable, allowing them to establish a sense of progress and accomplishment.

> I think that they *[DTMs]* also really experienced it *[the workflow]* in a positive way. And since you could see the movement since we had small little pieces that needed to be done, week by week, they could see that they are moving through the process. So, I think in that way, the Scrum approach is really quite helpful. Because now with the workshops, that was on a Tuesday, and these Scrums were on the Thursday morning, I think that that worked well. (Amelia, P1 and P4: SM).

In corroboration with Amelia's (P1 and P4: SM) views, Laurene (P1: DTM) summarised her experience of this structured workflow with regular interactions very positively:

> I think it was good because if you want to get things done, we have to have it frequently because otherwise, we just put it in a drawer and take it out in a month's time. So, I think the fact that it was that regular enforced us to stay up to date, and that you don't have to go through stuff again and again. Okay, so it was the step by step, movement through the program. The supporting documents, videos and PowerPoints that is applicable to that specific stage, I really enjoyed that. And then also, a little bit in the middle we had to present what we do in that little bit of report back. So I also felt that was quite good. So, to get people together in such a way that we can see what other people are doing. (Laurene, P1: DTM).

Programme four's (P4's) workflow consisted of one-to-three-week-long sprints, with Noah (P4: DTM) and Amelia (P1 and P4: SM) meeting once a week. In their weekly engagement, they met for one to two hours at a time, covering both the workshop content, feedback on artefacts and stand-up questions. Retrospectives were never formal events but instead integrated discussions regarding Noah's experience of the sprints. Once the artefacts were completed, the documents were showcased to the product owner. This presentation was also a much less formal event than explained in the Scrum Guide of Schwaber and Sutherland (2017).

> So, the workflow is extremely important, we've decided on a process of weekly meetings. And it is strenuous. Because it's not always possible and it sometimes puts pressure on your work. But in the end, it's overall positive because it's the only way to make progress. If you plan it and structure it in regular meetings, then you can see the progress that's made. … Since we met weekly, it gives us regular intervals for at least chewable responsibilities. It was not an overload of things that you had to prepare for the next meeting. (Noah, P4: DTM)

> "When I'm working with one person like Noah, we have our weekly Sprints, but I'm not implementing it in as diligently as we've done with the P1 people" (Amelia, P1 and P4: SM).

Alonzo (P2: DTM) was in a unique position regarding the workflow of programme two (P2). He had one-on-one weekly and later bi-weekly engagements with Olive (P2 and P6: SM) to discuss video content (the flipped classroom approach) and feedback on artefacts where after he joined the P1 team for their weekly Scrum sessions. He also attended the formal review and retrospective sessions conducted midway through the programme conceptualisation. Similar to P4, artefacts that were considered done were shared with stakeholders for discussion and input, mimicking a sprint review to a lesser extent. This review was rarely held as an event but was instead done asynchronously through Google Docs comments and Screencast videos. Although

Alonzo preferred being the sole development team member for the programme, he also appreciated being able to join P1 at the sprint stand-ups, reviews and retrospectives.

> I was lucky enough to do most of this task and the Sprint on an individual basis. So, that was for me excellent. So, my experience as an individual, and dealing with the learning designer to develop all the pieces was good. The Scrum helped me to understand what other people think and their process of doing it. …I was privileged to attend the Scrum meetings, I really enjoyed it, because you learn from others. (Alonzo, P2: DTM)

Lethabo (P6: DTM), one of the very first DTMs to start on this e-learning programme design project, was not exposed to any project management framework during the conceptualisation phase. This was during the first year of the directorate's existence when the learning design team were still figuring their processes out. Olive (P2 and P6: SM) explained the programme six (P6) workflow as being led by the completion of the accreditation documentation, with very few milestones in place.

> It worked basically like that, complete your LOs and then I get the document and in the next one, complete your LOs and then I get the document, and so that is all that we did. (Olive, P2 and P6: SM)

The negative impact on Lethabo's (P6: DTM) experience of the workflow was evident in his explanation of how the process unfolded for his team. He explained that it would have been helpful to have a clearer idea of the tasks to complete each week (sprints).

> So, there was no specific if I can say, target, or specific objectives that we had to meet over a period of time. We were just waiting to see, okay, if you can send the documents through, we'll go through that document. But for me, it would help if you know the weeks are attached to activities. If you can tell me that by week three, then we must be done with, A to Z and then I actually know that I'm falling behind or I am actually on track. (Lethabo, P6: DTM)

However, once elements of Scrum were implemented during the development phase, Lethabo (P6: DTM) reported finding the process easier because he knew what was expected each week.

> Now, when we started with the development of the actual learning activities and assessment in the study guide, it is now easier. Because now what the learning designer has started doing, is she's telling me that next week we are meeting and when we meet, this is what we expect. So, tomorrow we are meeting and I know I have to submit the alignment of assessment with the activities and the outcomes. (Lethabo, P6: DTM)

Misha (P3 and P5: SM) initially started working with her teams by meeting twice weekly, once to discuss what needed to be done and at the end of the week to discuss the feedback on the submitted work. As the number of teams increased, she reduced the meeting frequencies to once a week, using the flipped classroom approach with videos and supporting documents to train the lecturers. Meetings were used to remove impediments and discuss feedback. With all of her teams, she considered the DTMs workload throughout the semester to determine how frequently they should meet and how much work needed to be done in between.

> I know Amelia and Olive, are having all these millions of workshops, and then I'm not having millions of workshops, because I'm working with one person currently. So for me, I can quickly show her something in our meeting. … So we do have, you know, standing meetings and check-ins and work that needs to be done for each meeting and so on. …I mean, I find my projects to be all different." "So, I can't say that everything in all my teams follows the same structure and the same process. With others, it's like a start-stop kind of situation, you know, start-stop for six months, start-stop again. (Misha, P3 and P5: SM).

Sprint Planning

When speaking in particular about sprint planning, Amelia (P1 and P4: SM) explained she liked that these Scrum events provided more of a consultative environment. Instead of needing to prescribe to her DTMs exactly which steps had to be followed to achieve the next milestone, she could check in on their progress and impediments first and make informed decisions with them from there.

> It really helped us move along because we had clear goals for every week. … I like this Scrum process in that you can chunk the work. So we say, okay, for the next meeting, we want to be here. So it's a much more hands-on process, if you want to call it like that. It helps you also to better manage the workload and everything that needs to be done" (Amelia, P1 and P4: SM).

Bongani (P1: DTM) also expressed that he appreciated the consultative nature of sprint planning events.

> "We were given an opportunity as a team, as individuals, to have an input and, I think to me, that's really, very important" (Bongani, P1: DTM).

Sprints

Laurene (P1: DTM) explained, from a DTM's perspective, that the sprints helped her take away the magnitude of the task. She felt less overwhelmed knowing there were smaller, regular tasks to be completed rather than completing everything by December. Similarly, Binita (P1: DTM) and Bongani (P1: DTM) appreciated this structure and the continuity of the P1 step-by-step workflow as it helped to maintain a steady pace.

> For me, I found it much easier to work in this way. I feel that the step by step guidance is very important. … We were given, enough time to work on things. And then we had our weekly sessions, and we had the Scrum sessions. … So you know exactly what is going on, without having too much of a break where then you tend to forget. So, like working on a continuous basis. (Binita, P1: DTM)

> "It helped a lot because it made my work easier. And it allowed me to pace myself accordingly" (Bongani, P1: DTM).

In a few cases, some teams did not work according to sprints. One of Olive's (P2 and P6: SM) teams agreed to meet only every other month. This arrangement was made due to the workload and responsibilities of the P7[8] team. Their programme coordinator, for example, was away for nearly a month to attend a conference. Olive initially did not work in sprints with the P6 team either.

> Even with the P7, where we see each other like months in between. We can't even call anything a sprint. We'll call it an ultra-marathon or something because we were not at that point yet where we work frequently. (Olive, P2 and P6: SM)

Lethabo (P6: DTM) found the lack of sprinting challenging. He explained that engaging only every so often with Olive (P2 and P6: SM) and leaving the team to work big sections of work on their own for long intervals at a time was not resulting in timely nor high-quality outputs. He mentioned that the team needed to meet more regularly, and work should be given bit by bit.

> Keep you know in contact more frequently, and make the intervals you know shorter. … If you give me a document that I'm going to need in four months' time, then you're confusing me because as much as you want me to think ahead, but then I start having too many, you know, balls in the air and that can actually frustrate me. (Lethabo, P6: DTM)

Scrum Sessions (Stand-ups)

Regarding the Scrum sessions implemented in programme one, Amelia (P1 and P4: SM) explained that the team agreed to have one stand-up per week. She found it valuable to stick to the 15-minute time limit and pre-determined questions as it helped maintain team focus. During the Scrum sessions, progress and impediments became evident before they could impact the next milestones.

> It *[Scrum sessions]* actually gives one a little bit of leverage. You don't feel bad to ask, okay, what happened? Where are you? Because that is what is expected. It is a session in which they are expected to say exactly where are they and what

[8] Note, participants from P7 did not form part of this study as they had been working on their online programme for less than six months.

> is the problems that they experience, so that everyone is aware of that, and that everything can be visible. …Also, by identifying the problems that they experienced on the Thursday and being able to talk to that before they had to be done with the next milestones for that Monday afternoon, so that we can go through it before the Tuesday, I really think that in that way the Scrum session worked very well in their environment. (Amelia, P1 and P4: SM)

Bongani (P1: DTM) explained that the Scrum sessions helped him determine his impediments. In a like manner, Laurene (P1: DTM) also found the stand-ups valuable for addressing any challenges but even more so appreciated the sense of connection it created with her fellow DTMs. Binita (P1: DTM) likewise appreciated that the Scrum sessions shed light on the progress made by her team members while creating an opportunity to share ideas.

> So, those sessions did help me to just confirm, am I up to date? Where am I, you know, what is behind and so forth? I think the biggest there was that I could connect with the team in those kinds of sessions. Even if it's not a big discussion about stuff, but the confirmation, okay, I am okay, I'm up to date and it also then created quite a forum of that if I fall behind, or if I don't know what's going on. That would usually be the session in which I would have addressed it. (Laurene, P1: DTM).

> I find that the Scrum sessions really helped, you know, to keep on track. So, it answered all our questions, and just to also get an overview of what others are doing as well, and share ideas. (Binita, P1: DTM)

Misha (P3 and P5: SM) indicated that she was not using Scrum sessions with her current programmes. She explained that the team could work independently and responded satisfactorily to her feedback. With her second team, she believed stand-ups might be required; however, she intended on meeting with only certain team members who, in her view, needed to check in.

> With the second group of lectures now that I'm working with, I feel like it is important to have that check-in because the process is not as smooth for them. …But I won't make it so, can I say like, strict in the sense where, it's for those lectures that really need it and in you know, that need that contact and they have questions and so on. That is very helpful and valuable to them. But then with others who are more comfortable with the process and they understand. For them, it's just like, an extra time that they wasting when they know what to do, then it's optional for them in terms of the check-in. (Misha, P3 and P5: SM)

Olive (P2 and P6: SM) explained that daily stand-ups would not work in a HE environment, given the DTMs' teaching, supervision, research and community engagement responsibilities. With one

of the teams assigned to her towards the end of the study, she could not implement stand-ups due to irregular team meetings.

> It is very easy to quickly pop in, chat for 15 min about what you are doing, if all you need to do is to develop an online banking app. While in our case our team's other work takes 80% of their time and this is fitted in somewhere in between. Therefore, daily meetings will not work. (Olive, P2 and P6: SM)

> I have not got to the part about the extra short meeting, the stand-up meeting. That part I have not done because the meetings were so far in between, there was no use to see somebody three weeks down the line because they were too busy, my lecturers. (Olive, P2 and P6: SM)

However, she was open to facilitating one or two stand-ups with her teams weekly, depending on the team's curriculum design and development phase.

> "But, weekly meetings or maybe twice a week will definitely work, especially when we start working with the development" (Olive, P2 and P6: SM).

In the third interview, Olive (P2 and P6: SM) conveyed that she wondered if the stand-up questions could be circulated via email, especially when working with larger teams. She raised her concerns about P7, a team larger than six DTMs, pondering whether 15 minutes would suffice for everyone to speak.

Sprint Reviews and Retrospectives

Binita (P1: DTM) and Laurene (P1: DTM) did not find the single sprint review towards the middle of the conceptualisation phase sufficient. Binita (P1: DTM) explained that she would have liked to see what other lecturers were regularly doing to improve the programme alignment. Laurene (P1: DTM) indicated that more reviews would ensure better collaboration among team members, providing opportunities for modules to be better tied together, especially in developing students' practical skills.

> I would definitely like to have the opportunity to interact with the other lecturers, you know, to understand their modules better, and how does it all link to mine? So, that together we can make sure that the whole course itself aligns. It helps us overall to work on the alignment of the whole programme itself. (Binita, P1: DTM).

> I think from everybody that's taking part, maybe a good discussion group amongst all those, just to tell us what the subject is about, and so forth. I know we had, at one stage, we had time to discuss our product, but maybe a little bit more in terms of, the outlay, the weekly outlays and where we maybe can collaborate between

> the subjects so that we can make it more reliant, especially with the huge practical part of it. (Laurene, P1: DTM)

Olive (P2 and P6: SM) attempted to mimic sprint reviews with one of her very first programmes by having monthly reporting sessions between the stakeholders. However, the sprint reviews were used more as a status reporting meeting than an opportunity to showcase the work that had been completed thus far.

> But what we did is like a monthly reporting session, and I think with that, that everybody and by everybody, I mean the programme coordinator, and the HoD is aware of the progress of the team. (Olive, P2 and P6: SM)

Yet another adaptation to the Scrum events was when Olive (P2 and P6: SM) handed over the task of sprint retrospective facilitation to the programme coordinator.

> "One of the programme coordinators has it with her lecturers, but my schedule doesn't always allow it, so I only attended one of them" (Olive, P2 and P6: SM).

Misha (P3 and P5: SM) expressed that reflection (sprint retrospective) and demo (sprint review) opportunities are essential; however, the frequency that Scrum recommends did not seem feasible to her.

> Reflection is always important. I think one demo at the end is sufficient. If this was the only project then more can be done but it isn't. I don't think it is necessary for us to assess the team. The aim here is to get the job done, within timeframes, ensuring quality. Reflecting on the process, yes, but yet again each project is different. (Misha, P3 and P5: SM)

Catch-up Weeks

Noah (P4: DTM) and Quintin (P1: DTM) found the frequency of the weekly meetings and pace of weekly due dates to be quite strenuous, given their other work responsibilities. Amelia (P1 and P4: SM) adapted the Scrum framework by incorporating, what the teams called, catch-up weeks.

> I started on a weekly meeting, so a week sounds a long time. But in between sessions, six, seven days is not much. So if you know, today, we've completed this and the expectation for next week is that this should be completed, it's quite strenuous because you need to pay attention to it. Otherwise, it slips from you and next week, you have to report I haven't done anything. So, the workflow was strenuous. (Noah, P4: DTM)

> It did get a bit overwhelming to do the meetings each week and have the work that needed to be done, done each week. …Uhm, so then those catch-up sessions or catch-up weeks we had really helped. So, instead of doing the

> meetings on Thursdays, just putting aside that time to really focus and catch-up on the work that we just didn't have time to do. (Quintin, P1: DTM)

From the feedback received during the individual DTM and group Scrum master interviews, it became evident there was much benefit in implanting the Scrum events. Both development team members and Scrum masters believed that adaptations were required, given the workload of academic staff. When it comes to sprint planning, it is important to keep the event consultative, allowing the team to self-organise. The weekly stand-up (or Scrum meeting, as most participants referred to it) was considered helpful by those who attended such sessions. Unfortunately, the sprint reviews and retrospectives were not implemented frequently, nor with the correct stakeholder involvement.

5.2.2.3 Scrum Artefacts as Tools

“Scrum artefacts are means that provide transparency through a shared understanding of the work. In addition, they provide teams with opportunities for inspection and adaptation” (Gonçalves, 2018). The product backlog lists the required tasks with their descriptions, in order, which build up towards the end product. Similarly, the sprint backlog lists the tasks to be completed within a sprint. Lastly, increments are the outputs produced after a sprint and must meet the definitions of “done” to be considered useable (Gonçalves, 2018). In this study, the end product included a series of artefacts, including a programme outline and module descriptor documents and various curriculum-related accreditation documents that capture the programme information. Some of the outputs required as increments included a programme purpose statement, module titles, outcomes and credits, learning tasks and constructively aligned assessment activities.

Product and Sprint Backlog

The product backlog was created after consulting with several role-players within the University to determine what increments were required and what the definitions of “done” were. After that, the product backlog was adapted as Scrum masters gave inputs on the time estimates, order and priority of tasks. The product backlog remained an updated online living artefact as the learning design team gained more experience. The backlog was used by Amelia (P1 and P4: SM), to create sprint backlogs in Google Docs for her two teams. In addition to capturing the tasks required for the sprint, Amelia also took notes and shared vital information about the sprint increments on the backlog.

> I'm using the backlog document. I know that it's actually a document where you say what needs to happen. But I use it to write down what we are discussing, so that it's on paper and that everyone can go back and, just refresh their minds of what did we say about this and what did we decide? …If there's extra information that I want to give to the team I paste in the sprint backlog document. I use it say

> for instance, if we talk about the SAQA levels. Then I've pasted the levels in the Scrum backlog document so that they have it there with them so that they can see the verbs that we use to describe every learning activity. (Amelia, P1 and P4: SM).

Amelia (P1 and P4: SM) explained that some of the benefits of using a sprint backlog with her teams were that it promoted transparency and helped her keep track of where her different teams were in the curriculum design process.

> I think that that's one way of being transparent and then also be open with the expectations. …I think it's just easier to keep track of where you are because it kind of takes away my to-do list in a way." "I do think that by using this, it is helping you to measure your progress and to know exactly what is the next step, and you don't have to think and rethink and replan everything, every time you think about it. (Amelia, P1 and P4: SM)

Laurene (P1: DTM) and Quintin (P1: DTM) confirmed Amelia's thoughts by sharing a very positive outlook from a DTM's perspective. Laurene (P1: DTM) expressed that the list of tasks helped her feel less overwhelmed, while Quintin (P1: DTM) appreciated knowing when the team was falling behind, particularly in a virtual working environment, as the online and accessible schedule helped him not to slack.

> These were brilliant. So, I think if those weren't there, I would have been lost completely. So, I'm especially quite task-driven. So, if I get a list of things we should do, then, you know, it makes it so much easier, not to feel overwhelmed. (Laurene, P1: DTM)

> The Backlog was helpful and fun. Not always too much fun when the Backlog started growing. But then at least we knew, okay, now it's time to put in the work over the weekend. …I knew when what had to be done. So, I think sometimes working virtually, you can fall into a trap of slacking. But with a set schedule, knowing what needs to be done. I think that helped a lot. (Quintin, P1: DTM)

Olive's (P2 and P6: SM) teams did not use Sprint backlogs but instead a living document in the form of an email schedule to which her DTMs contributed in planning for the next meeting.

> We always decide, we have like an agenda, and then what we're going to do, what is the reason for the meeting, and we discuss that topics, to go from one step to another step. So, either myself or the learning designer, send what really needs to be discussed this week. …But I don't recall we use, you know, something like this? Is it a Sprint backlog? Is it like a document? (Alonzo, P2: DTM)

Misha (P3 and P5: SM) did not make use of the product or sprint backlogs for teams where she was assigned as Scrum master. She found the paperwork unnecessary, explaining that she likes to work in the moment by focusing on what needs to happen now, as there are often too many unexpected changes. She further noted that her teaching background might have influenced her as she is accustomed to understanding processes in her head rather than capturing them on paper.

> Personally, I am not a fan of unnecessary paperwork. I don't see the need for a sprint backlog document, etc. …I'm not so strict on having these documents of process and timelines and, so on, because it changes." "I'm focused on what needs to be, what needs to happen, and not how I'm going to make it happen. That kind of just comes to me like, okay, I need to have a meeting, how am I going to do this, I'm going to do it this way. (Misha, P3 and P5: SM)

> So, I'm not saying I give no attention to it, I just don't document it very well if I understand the process in my head. Maybe it stems from my own background of teaching, I don't know. But like I would plan, and I might not have had a lesson plan. But I definitely knew how I was going to teach the lesson when I walked into the class. So, whether I did that, while I was driving to work, I approach the situation of my projects exactly the same way. (Misha, P3 and P5: SM)

Later in the interview, after hearing what Olive (P2 and P6: SM) and Amelia (P1 and P4: SM) had to say, Misha (P3 and P5: SM) indicated that she might start using the backlog documents. Her intention is to use it with groups that need more guidance and support. She also explained that having sprint backlogs for every team might help her remember what decisions were taken.

> I will be using some of it, like I said, with the groups that I think really need that extra guidance and support. I like the backlog document like I said, and maybe I'll use that one. …I mean, because we work with so many programs and there's so many meetings, often it slips your mind. Well, what did they actually say about that? So, if I can go back to that document now, it's almost like a refresher. (Misha, P3 and P5: SM)

Of note was when Misha (P3 and P5: SM) inherited a programme from Amelia (P1 and P4: SM), she indicated that the sprint backlog helped her to determine what had been done and what still required work.

> So, of course, you know, getting the project where it was already somewhat started, and trying to get my head around where in the process we are, and what was discussed. Seeing that document kind of gave me an idea of, okay, what did

> the previous person do so far? And for me to pick up from there and continue, you know, it kind of guided my thoughts. (Misha, P3 and P5: SM)

Although it requires some time to create and update a sprint backlog, the benefits of using it as a communication and coordination tool were evident from the data gathered. The development team members appreciate a sprint backlog's transparency and accountability. While Olive (P2 and P6: SM) did not use a traditional sprint backlog, Alonzo (P2: DTM) did benefit from contributing to an agenda for what would be discussed and delivered at each follow-up meeting. Unfortunately, no development team members from Misha's (P3 and P5: SM) teams were willing to participate in the study, as it would have been interesting to hear how they experienced having no backlogs.

5.3 The Rules

Kaptelinin and Nardi (2006) describe rules as those norms and procedures that facilitate and regulate relationships and social interactions between subjects and their communities. Scrum adheres to three empirical pillars to govern its rules: transparency, adaptation and inspection (Bhavsar et al., 2020). In addition, Scrum teams follow five principles which guide and support their work towards developing an end product. The principles include collaboration, time-boxing, iterative development, value-based prioritisation and self-organisation. All subjects are encouraged to embrace the Scrum values of courage, focus, openness, respect and commitment (Schwaber & Sutherland, 2017). The sections below describe the participants' experiences of the Scrum rules as applied and adapted among the e-learning project teams.

5.3.1 Scrum Pillars as Rules

Batra et al. (2017) explain that "customer collaboration" is one of the greatest tenets guiding project interactions in Agile projects. This collaboration between Scrum master and "customers" must be mutual and guided by the pillars of Scrum. In this study, the development team members, as academic staff, were as much the "customers" of the Scrum masters as the students who will one day graduate from the online programmes produced were the "customers" of the DTMs. Therefore empirical approaches, in the form of the Scrum pillars, i.e. transparency, adaptation and inspection, were taken to adapt the Scrum process to suit the changing needs of the DTMs. The DTMs' experiences and those of the SMs, informed much of the decision-making throughout the e-learning project. After all, Scrum is founded on progress "based on observations of reality, not fictitious plans" (Doshi, 2016, p. 1).

5.3.1.1 Transparency

The Scrum masters defined transparency as sharing information with their teams regarding processes, timelines, and quality standards. Amelia (P1 and P4: SM) captured the group's thoughts well:

> Okay, with transparency, I understand that everybody needs to know exactly where am I? What are we doing? What do we aim to achieve? And where are we at this stage? So, what is acceptable? So how do we define this is good enough? That is what I see as transparency. (Amelia, P1 and P4: SM)

Strategies used by the SMs include a sprint backlog (Amelia, P1 and P4: SM) and sharing all the resources and documentation on Google Drive (Amelia, P1 and P4: SM; Olive, P2 and P6: SM; and Misha, P3 and P5: SM). Misha (P3 and P5: SM) went further to explain that she uses open discussions during her team meetings and shares all the project documents on G-Drive.

> We discuss everything very openly in our meetings. We also have a G-Drive folder where, you know, everything is uploaded, like our production schedule, the carousels, the important points. (Misha, P3 and P5: SM)

During their individual interviews, all of the DTMs reported positive experiences of the level of transparency shown throughout the e-learning projects. Of the seven DTMs who completed the survey, five indicated that transparency had the greatest influence (ranked number one) on their e-learning project experience, being positive[9]. Both Scrum pillars and principles were included in the options DTMs could choose. Table 5.1 summarises the participants' ranking of elements which impacted their activities *most positively* (minimum value of 1) to *least positively* (maximum value of 8) on their e-learning project experiences. The low mean score (*M*) of 1.86, standard deviation (*SD*) of 1.46 and variance of 2.12 shows how closely the seven team members ranked their experience of transparency as highly positive. Porter (2019) reported similar findings when investigating project management in HE. Transparency of processes and regular communication were the top-ranked contributors to effective project management (Porter, 2019).

Regarding transparency, Quintin (P1: DTM) and Bongani (P1: DTM) appreciated knowing what was expected of them and having insights into all the project processes.

> We all had access to the Google drive and sheets, and all of that, that was used in the development. So I mean, I could even see what was happening on aspects and fields that I was not involved in. Like the bigger processes of getting the documents ready for whichever approval it needed. I did not feel like I was left out on anything. (Quintin, P1: DTM)

> We knew what was expected out of us. And so, it was transparent, it was sufficient, because at the beginning of the process, in our meeting, we discussed the expectations and how the process is going to unfold. (Bongani, P1: DTM)

[9] Access to the raw data of this study can be provided upon request. Confidentiality and limitations of use agreements will need to be signed as per University policy.

Table 5.1

Scrum elements impacting positively on the DTMs e-learning project experience[10]

Elements	*Min*	*Max*	*M*	*SD*	*Variance*	*N*
Transparency	1	5	1.86	1.46	2.12	7
Adaptation	2	6	4.14	1.46	2.12	7
Inspection	1	7	4.57	1.76	3.1	7
Self-organisation	2	8	6.14	2.03	4.12	7
Collaboration	1	7	4.29	2.05	4.2	7
Value-based prioritisation	2	8	5.14	2.29	5.27	7
Workflow or time-boxing	2	8	4.86	2.23	4.98	7
Iterative development	2	8	5	2.33	5.43	7

Laurene (P1: DTM) also found the process transparent and addressed an additional component which facilitated this. She explained that initially, she experienced some challenges navigating Google Drive as the naming conventions were not always known to her. She mentioned that providing direct links (URLs) in the email summaries after each workshop greatly helped. The value of having multiple communication techniques to promote transparency was a positive experience for her.

> I sometimes had a bit of a problem, getting all the documentation, you know if it's in a Google Drive, the naming of the things. So searching for it was sometimes problematic. But I think the emails that you guys sent out with the links really helped a lot too, you know, to connect the documentation of where we are. So, that made it very, very transparent" (Laurene, P1: DTM).

5.3.1.2 Adaptation

The Scrum masters shared similar views on what they considered as an adaptation. Misha (P3 and P5: SM) described adaptation as "being flexible and open to change, depending on the situation" while Olive (P2 and P6: SM) summarised it as being "able to adapt to challenges in the group". Amelia (P1 and P4: SM) explained that adaptation requires the learning designer to give and take, in the sense of adapting to the lecturers' schedules and discipline-specific views. A good example of adaptation among Scrum team members was provided by Misha (P3 and P5: SM):

[10] The researcher acknowledges that the sample size is too small to draw statistically significant results. The descriptive statistics do however aid in clarifying which elements were ranked *most positively* (1) to *least positively* (8).

> So, I think in terms of adaptation, I mean, you can have it in your mind what you think is suitable, but the lecturer might have a different idea, because they come with the content knowledge, so they understand how the student will understand things and which method would probably work best. So, I am open and adaptable in that sense. (Misha, P3 and P5: SM)

Regarding the challenge of workload that both DTMs and SMs experience, some flexibility was incorporated into the Scrum framework by adapting certain project milestones. Olive (P2 and P6: SM) explained that she found the initial timelines unrealistic and, therefore, embraced adaptation.

> "So my issue is timelines, but we need to be realistic, I am rather slow and alive than fast and dead with only half of it done" (Olive, P2 and P6: SM).

Teams then negotiated timelines to bring in more flexibility, as Misha (P3 and P5: SM) and Binita (P1: DTM) noted:

> "As much as we stick to time frames, we also adapt the time frame to suit productivity and efficiency and so on" (Misha, P3 and P5: SM)

> "You know, there were times where the dates were, you know, changed to accommodate others to give enough time for each of us to work on our modules. There was flexibility" (Binita, P1: DTM).

An important component of adaptability was foreseeing and planning for impediments, such as exam grading, early in the process. Quintin (P1: DTM) expressed that he predicted that the flexibility was planned for and that it paid off by keeping him motivated when he got overwhelmed by his workload.

> So, I don't know, if it comes back to your planning, I guess. Trying to get the programme done as soon as possible, leaving some time too for us to catch up. So yes, I think the fixed process helped but being able to move around when needed, that was really what made this possible and gave us some courage to carry on. (Quintin, P1: DTM)

A further adaptation mentioned by Bongani (P1: DTM) was that the meetings were more regular early in the process until the team was comfortable with the fundamental curriculum concepts and could function more independently.

> But we really had to meet on a regular basis at the beginning. And then to towards the end, I think that came with a comfort from the project coordinators that as a team, we can be able to start doing certain things on our own, with mentoring in the process. (Bongani, P1: DTM)

Olive (P2 and P6: SM), together with the researcher in her capacity as product owner, started implementing a flipped classroom approach as an alternative to offering synchronous workshops. This option made it possible for DTMs to view video content and read learning materials before their synchronous session, leaving time to work collaboratively on the actual curriculum documents during the meeting timeslot.

> I follow the process like you and Olive have done where you have developed all of those videos for the flipped classroom approach. So, we meet once in a week and then actually, it's like a work session, where we work together on the things that we suggested. …It's like active working sessions. (Amelia, P1 and P4: SM)

Adaptation was ranked second highest (mean score of 4.14) of both the Scrum pillars and principles by the development team members for contributing to a positive e-learning project experience (see Table 5.1). De Sa et al. (2022) report similar findings when implementing Scrum at a Brazilian Air Force renowned for its hierarchical and militant project management. Being open to adapting Scrum to suit the context is essential, but so are formalising of its events to ensure goals are consistently achieved (De Sa et al., 2022).

5.3.1.3 Inspection

The Scrum masters associated inspection with terms such as revising, checking, and giving feedback. Olive (P2 and P6: SM) and Amelia (P1 and P4: SM) were not fond of the word inspection and preferred to use the terms review, rework and revisit. Inspection made them feel like inspectors instead of team members partaking in discussions to improve the overall product quality.

> I actually don't like the word inspection because it feels very, like, I don't know, but in any case. I don't like the word. I would rather maybe say review. I don't like inspection because that feels that I'm not really part of the process (Amelia, P1 and P4: SM).

Despite the word "inspection" being unpopular, the development team members (DTMs) across all the programmes appreciated the process of regular and ongoing inspection among the Scrum team members. Inspection was ranked lowest contributor, among the Scrum pillars, to a positive e-learning project experience (mean score of 4.47), and fourth overall (including the Scrum pillars and Scrum principles) (see Table 5.1). Bongani (P1: DTM), Binita (P1: DTM) and Noah (P4: DTM) mentioned the benefit of having an improved end product of higher quality, while Quintin (P1: DTM) and Laurene (P1: DTM) experienced inspection as a learning opportunity, which helped them to become better in all aspects of curriculum design.

> So that revisiting previous steps was in fact very valuable. Because as you make progress through the process, you grow in your skills and get more attuned to how

> to formulate things. So, in that sense, revisiting was very valuable, because it's contributed to an improved product. (Noah, P4: DTM)

> So, reworking those things I think for some people would have been a schlep. But for me, it was quite nice. In a sense that it was a whole different world that I didn't know much about that I could, then learn from. In terms of revisiting a step, revising, or reworking documents, I did appreciate that. (Laurene, P1: DTM)

Alonzo (P2: DTM) explained that curriculum design is a thinking process; therefore, it is necessary to inspect one's work after some time and thinking to make improvements.

> It is a thinking process. So, thinking is very important, because you start reading this again, and you say, ugh, but this isn't exactly what I'm looking for and what you're supposed to do. So I think it has to be like this revisiting steps, and reworking documents. I enjoy that. I never get bored of it. (Alonzo, P2: DTM)

Bongani (P1: DTM) emphasised that inspection improved the constructive alignment of the e-learning programme elements. It was in moving back and forth between the curriculum components that constructive alignment was established.

> And, you know, revisiting all the steps has helped a lot, to ensure that our work is aligned because we were sort of wrestling between moving back and forth between the exit level outcomes, and the assessment criteria and making sure that they are aligned to the purpose statement. Let me talk about constructive alignment. It's not an easy process, and it requires you to really move back and forth and revisit some of the steps. (Bongani, P1: DTM)

Online collaboration tools and Scrum artefacts aided in making the project more transparent, as did having a sharing or "open" mindset. Adaptation extended beyond lengthening project timelines to relinquishing power so that all team members carried equal authority in determining what changes might contribute to a better end product. Finally, inspection was highly appreciated for contributing to quality outputs and making curriculum design a learning and growth opportunity. Bongani (P1: DTM) described the empirical pillars as a "magic box" that aided in balancing deadlines and quality work.

> I think, a magic box to this project was the flexibility in it. And I think it was a good balance between the fixed and the flexible process. But understanding that the most important thing in a process, as much as you want to submit certain things to meet the deadlines, is its quality. (Bongani, P1: DTM)

5.3.2 Scrum Principles

Scrum is founded on five principles: collaboration, time-boxing, iterative development, value-based prioritisation and self-organisation (Stellman & Greene, 2015). These principles aid development teams to become self-understanding so that the strengths of each member can be optimally utilised, making the team more productive and the work more enjoyable (Gloger et al., 2013). Haugan (2011) maintains that the Scrum principles allow for adaptation and exploration by Scrum teams, often leading to a richer end product than in traditionally managed projects governed by control and execution. At the heart of Scrum is a collaborative team (Batra et al., 2017).

5.3.2.1 Collaboration

Amelia (P1 and P4: SM) defined collaboration as working together towards a common goal. She went on to use imagery explaining that collaboration was akin to individuals running a race together, but instead of competing against each other, they are assisting each other to reach the end. Misha (P3 and P5: SM) used phrases such as “sharing of ideas” and “learning together” to explain what collaboration meant to her. She mentioned that through collaboration, individuals learnt from each other’s strengths.

> “They [DTMs] learn together and they develop not only their programs, but themselves, together” (Amelia, P1 and P4: SM)

With a mean score of 4.29, collaboration was ranked first of the Scrum principles and third overall (Scrum pillars and principles combined) as an element which positively influenced the e-learning project experience of development team members (see Table 5.1). Wu et al. (2022) reported benefits of joint progress, deepened understanding, critical thinking, and feelings of belonging among curriculum designers who worked collaboratively. Similar findings were reported by the curriculum development team members who partook in this study.

Laurene (P1: DTM) emphasised that collaborative working contributed to eventually developing a higher quality curriculum:

> It's also then much more helpful to get a better quality project or product out there, I think because everybody's got a different input into this and I think the more the input, I mean, it is scrambled in the beginning, but I think the better the project that we can deliver. (Laurene, P1: DTM)

Binita (P1: DTM) and Bongani (P1: DTM) explained that collaborative working meant they could learn best practices from their fellow team members. Binita (P1: DTM) mentioned that working with DTMs helped her formulate ideas, while Bongani (P1: DTM) added that the e-learning project had a lot of moving parts which made it necessary for people to come together and share expertise.

> We will engage with issues, for example, related to how our module outcomes are linked to the program purpose statement. And so we kept on having those conversations. And we kept on wrestling with the ideas throughout the process. (Bongani, P1: DTM)

Bongani (P1: DTM) further described how collaborative working made him feel like an equal contributor and valued team member.

> You know, when you feel you're, sort of included, and your view matters, your opinion matters, then I think that it also helps, as well. And understanding most of what is required of you. And so, I think, for the fact that it was more to do with a shared vision, just for the fact that all of us felt that we are contributing to the whole process. (Bongani, P1: DTM)

Similarly, Quintin (P1: DTM) shared Bongani's views, adding that the collaborative process helped him stay informed and feel valued. He never felt lost but could openly voice his views throughout the project.

> I think the collaboration went really well. It was an open platform; anyone could give their inputs. It was group emails all the time. I never felt lost or behind or didn't know where, or what we were doing, and I always felt like I could give my opinion whenever I felt that it was necessary. (Quintin, P1: DTM)

Strategies used by the Scrum masters to encourage collaboration included game time during workshops to build relationships and trust, asking DTMs to brainstorm a shared vision and having show-and-tell sessions to share ideas (Amelia, P1 and P4: SM). Olive also used sessions where her teams shared their work for peer review and provided feedback on each other's module descriptors so that everyone contributed towards achieving "the common goal" (Olive, P2 and P6: SM). In addition, Misha (P3 and P5) created a WhatsApp group for teams to brainstorm solutions to challenges experienced and to learn together.

Quintin (P1: DTM) shared his views on the strategies used to encourage collaboration from a development team member's perspective.

> Yes, we had those interactive learning sessions, where you guys used various online tools where we, I kind of want to say we played games, but those educational games, where you had to put in words or explanations or there's an interactive learning session. And then towards the end, especially when that backlog started filling up, you encouraged that we have little group meetings. Just to get back on track and to help each other. I know me, a colleague and Bongani had a couple of them. So yeah, I think those strategies did work to achieve our goal. (Quintin, P1: DTM)

Laurene (P1: DTM) explained that she wanted to have more of the smaller group meetings, as mentioned by Quintin. She felt more discussions among the subject matter experts about their content were necessary, along with one-on-one discussions with the programme coordinator. In their separate interviews, Laurene (P1: DTM) and Bongani (P1: DTM) spoke of the same challenges experienced when wanting to work more collaboratively in terms of lack of time and member availability. While it seemed as if Laurene (P1: DTM) felt the problem lay with Bongani (P1: DTM) not being available to meet with her or small groups due to his limited time, Bongani (P1: DTM) expressed the opposite, indicating that his team members were too busy to meet with him.

> I think time would always be a challenge to get the time slots. I mean, one has to figure out your week and when you get to work on what. … So, there was in the process, almost an invite to really get involved with each other, or Bongani. I think at one stage there was an invite that Bongani must talk to certain team members and so that was there. But it didn't filter through. (Laurene, P1: DTM)

> Well some of the challenges were more to do with the time, and for the fact that I couldn't meet with my team, as I would have loved to; some are very busy in terms of their workload, and I needed to respect that. (Bongani, P1: DTM)

While individuals who formed part of a development team consisting of several subject matter experts found the collaboration very valuable, those DTMs who worked alone expressed missing out. Noah (P4: DTM) was his programme's only subject matter expert. Although he collaborated with the SM (Amelia) and other stakeholders, he missed having a team member to collaborate with on discipline-specific matters.

> The strategies were always in place to consult, if necessary, with other stakeholders." "Just perhaps, to soundboard where you can have somebody reflect and with whom you can test your ideas regarding the content now itself. Is this appropriate? Is this relevant? Is this important? Yeah, perhaps that was a challenge to me. (Noah, P4: DTM)

5.3.2.2 Time-boxing

In a study conducted by Sjøberg et al. (2012) to compare Kanban to Scrum, it was found that time-boxing was quite rigid and artificial. In addition, meetings such as sprint planning were considered a waste. Scrum teams found more value in the stand-up meetings and visual sprint-backlog statuses to maintain a sense of urgency (Sjøberg et al., 2012). Similar findings were reported in Section 5.2.2.2 on Scrum events as tools, with SMs integrating sprint-planning meetings with workshops to save time and DTMs reporting their dependence on sprint backlogs. What did, however, differ between these two studies was the context. While Sjøberg et al. (2012)

reported on a software innovation company, the context of this research study was in HE. Working with curriculum teams meant there were fixed deadlines established by quality control committees that had to be met. Therefore, it was not an option to do away with time-boxing as in Sjøberg et al.'s (2012) study. Further, in this study, the DTMs also reported benefits of sticking to a time-sensitive schedule as it helped them prioritise work and maintain focus.

From the survey data, it was revealed that time-boxing (mean score of 4.86) ranked second among the Scrum principles (and fifth overall when including Scrum pillars) as an element which attributed to the e-learning project being experienced as positive (see Table 5.1). While most DTMs appreciated that having a fixed amount of time to complete tasks meant the work got done, some found it challenging given their other responsibilities. Scrum masters were forced to build in catch-up weeks to accommodate for times when deadlines could not be met.

When asked how the Scrum masters understood time-boxing, Amelia (P1 and P4: SM) described it as chunking work into smaller bits to help teams maintain focus on their weekly goals.

> Well, that is when we are just chunking whatever should be done, in different time spans." "It helps with the structuring of the interactions between people as too much time will allow for straying from the topic." "I'm implementing that every week. (Amelia, P1 and P4: SM)

She went on to explain that she allows her teams to set their weekly goals as this creates greater buy-in.

> So, what I usually do is I say okay. So, which part do you think should be done at this stage? I really like it when the team can buy in. So, when they can tell me but listen, we will be able to do this by that time, because then it means that they have set the goals for certain work, so it's not as if it's imposed on them from the outside. But of course, I will give some guidelines and say, but listen; this is the latest date that this can be done. (Amelia, P1 and P4: SM)

Misha (P3 and P5: SM) explained that she also gave weekly activities to be completed by her teams; however, she preferred how she worked when still being campus-based. She used to set an entire day aside with her teams doing a 6-8 hour workshop rather than splitting it up over multiple weeks.

> "I would rather attend one day with everything, than six weeks of two hours here, two hours there, the two hours there" (Misha, P3 and P5: SM).

Laurene (P1: DTM), Quintin (P1: DTM) and Noah (P4: DTM) appreciated having fixed timelines to complete the tasks. All three DTMs indicated that it helped them to remain on schedule with a project of this length and magnitude.

> I think in setting those times, one force yourself to do it a little bit ahead of time. … I think it helps, especially with the deadlines because otherwise, we would just take our time. Sometimes it did feel a little bit forced. But I think it is necessary to do it in such a way. (Laurene, P1: DTM)

> I'm personally one of those guys that needs a deadline and so I know when my work needs to be done. Don't tell me that in two years' time, we need to launch a project and this is what needs to be done, because I'm probably going to try and do it all the night before. So, I think the deadlines and the feedback sessions really helped to keep us on track. (Quintin, P1: DTM)

5.3.2.3 Iterative Development

Iterative development ties closely to inspection, as discussed in Section 5.3.1.3. The Scrum masters explained that they worked iteratively by producing an increment, then revisiting it to see if any improvements could be made.

> I think that's part of the review process or the inspection process. It is most visible there, where there are several iterations of something, and you go through it, and each time, as you go through it, every time, it's developed further or made better or improved on. (Misha, P3 and P5: SM)

Olive (P2 and P6: SM) referred to this as working forward, then backwards and forward again, while Amelia (P1 and P4: SM) explained iteration as looking at something several times, and thinking about it several times to improve it.

> "I work on the forward, back principle and then back and forward" (Olive, P2 and P6: SM).

> I would say to look and look again and think and think again. So, because I see that even with a purpose statement and everything. You think that, okay, I have it now. But then when you think about it again, then you can find better words. So, I don't think that you can do any development work if you don't have an iterative process of looking at it again, with fresh eyes after a while. (Amelia, P1 and P4: SM).

Amelia (P1 and P4: SM) and Noah (P4: DTM), who worked together, described their experience of the iterative process as necessary to bring about constructive change to the module content.

> If I just think about the P4 and how many times we went back and changed things and changed the content, when something new happens or when we read another article or anything like that. (Amelia, P1 and P4: SM)

> Quite a bit into the process, I realised, once you've completed step one, it doesn't mean step one is finished. You need to return, revise, adjust, reformulate. At first,

> it seems odd. Now, I thought we finished with this, and then afterward, I realised, but this is very important just to go back and improve on the content. (Noah, P4: DTM).

Similar to Noah, Alonzo (P2: DTM) mentioned that he only later realised that curriculum design was iterative. He further explained that instead of this process frustrating him, it helped him to understand curriculum design better and to produce better outputs.

> I realised that the process is also not from ABC; you actually go ABA because then you go back and then you go back some more. You really like moving around. …So, I'm not frustrated, I feel actually it's all positive, and it's all coming to better documentation and better understanding of what we are doing. (Alonzo, P2: DTM)

Bongani (P1: DTM) also experienced iteration as a positive Scrum principle, mentioning that through conversing with team members, self-criticism and Scrum master feedback, he was able to enhance his work. He explained that this process has made him more diligent as he strove to produce quality outputs.

> Well, I think the influence was positive for one simple reason that whenever you construct something, you think you're comfortable with it, but through really deep and detailed conversation and critiquing our work, uhm, revisiting some of the work that has been done, and through the feedback, that has allowed us to enhance the quality of the work that we've produced. And, that has allowed, I think, most of us, or me in person to be very diligent, in my work, and as well to critique my work before submission, and then that was a positive experience. (Bongani, P1: DTM)

Laurene (P1: DTM) and Quintin (P1: DTM) shared Bongani's appreciation of the Scrum master feedback. Laurene (P1: DTM) explained that the feedback gave her a sense of safety, and that if a mistake or two slipped through, the SM would catch it before it was included in the final documents.

> So sometimes you write stuff down, and you wonder, is this correct? Does that align with all these very important documents? And then just getting the feedback, like you had to reword this or do this differently, just gave me a safe space to know, that somebody will correct it if it's not in line with all the very important documents and alignments. (Laurene, P1: DTM)

Quintin (P1: DTM) explained that after the first round of feedback, he would work on the comments and submit his work again. If he received no comments, or only comments that the work was well done, he was satisfied with his outputs. He also mentioned that colour schemes were used to indicate that work was complete, which worked well for him.

> Well, I'm very happy with the outputs. A lot of effort went into it from my side and from yours. I was happy that I populated some of the columns and you guys gave me feedback and I worked according to that feedback. Because I knew that you guys went over it after I completed it and you did not leave any comments or said this is good or that gold colour scheme that you used. If it was golden, I knew you were happy from your side. And yeah, so I was happy with that as well. (Quintin, P1: DTM)

Iterative development was ranked third of the Scrum principles (and sixth of the eight elements) that contributed positively to the DTM's project experience (see Table 5.1). The standard deviation score of 2.33 and variance of 5.43 show that the seven DTMs were not all like-minded in their ranking of this element. Inayat et al. (2015) found that iterative development often results in project schedules and timelines being very challenging to estimate. The time it takes for DTMs to move back and forth between the increments might influence their ranking.

5.3.2.4 Value-based Prioritisation

Value-based prioritisation (mean score of 5.14) was ranked fourth of the five Scrum principles (and seventh among the eight elements) that impacted the DTMs experience of the e-learning project positively (see Table 5.1). Interestingly, value-based prioritisation had the largest standard deviation (2.29) and variance (5.27), indicating that the seven DTM's did not all agree in their ranking and provided quite different scores. The researcher believes that this may be due to many milestones being determined by outside stakeholders, while prioritisation of tasks was often negotiated between the product owner and Scrum masters. DTMs decided on task prioritisation to a lesser extent as they relied on their learning designers. Binita (P1: DTM) confirmed this notion, indicating her appreciation. While some team members preferred being told precisely when to do what, others, such as Quintin (P1: DTM), might have preferred more opportunities to negotiate priorities.

> I would say that you facilitated this programme for us, and you knew exactly how to go about this. How can I say you are the expert at this. So, you know the strategies and the means of facilitating. …Because you know exactly yourself what you need to do to go about this, and in that way, it shows us what we need to be doing in order to make this a success with you. (Binita, P1: DTM)

Olive (P2 and P6: SM) expressed similar sentiments to the researcher when she explained that prioritisation was often determined by the university and programme roll-out dates.

> We work already in a value-based prioritisation because we have a very strict structure of what needs to happen when. When we are in the early phases we need to take the University dates into consideration, and when we design and

> develop, we take the going live dates into consideration and make sure that everything is done by then. (Olive, P2 and P6: SM)

Amelia (P1 and P4: SM) defined value-based prioritisation as deciding the order of tasks to be done based on priority. Misha (P3 and P5) further explained that certain tasks sometimes needed to be paused, such as the development of an activity, due to software challenges, but this did not stop the process. The next prioritised task that could be continued was undertaken until the software problems were sorted out.

> You have to know what to focus on at what stage of the project. … I look at the tasks that should be done and then based on the value that they add towards the end of the project, we prioritise certain ones of them. So, we are implementing that now, especially with the documentation. (Amelia, P1 and P4: SM)

> Sometimes, we have one activity that needs to be developed, and it requires certain software. So, we say, Okay, well carry on developing the rest of the weeks of work. As soon as the software is available, we carry on, because we prioritise other things and then something that's not needed right now can be done a little bit later. (Misha: P3 and P5: SM)

5.3.2.5 Self-organisation

Schwaber and Sutherland (2017, p. 6) define self-organising teams as those who “choose how best to accomplish their work, rather than being directed by others outside the team”. This is achieved when the Scrum master coaches teams to become more autonomous, self-motivated and accepting of their responsibility as team members. Olive (P2 and P6: SM) and Misha (P3 and P5: SM) thought of self-organisation of how they conduct themselves as project leaders and respond to unforeseen challenges. Olive (P2 and P6: SM) mentioned that she encouraged her teams to be open about their challenges so that they could negotiate a plan of action. Amelia (P1 and P4: SM) shared similar views but also mentioned that she expected her teams to be self-organising:

> I think we all aim to be organised and we have our to-do lists every day. But I think that if you're not organised, then you are going to struggle in this environment. You know, because there's quite a number of things that we have to remember. So we actually expect of our team members to also be self-organised, but we try to give them a little bit of a structure to tell them what should be done when and I think in that way, we are trying to help them to organise themselves as well. (Amelia, P1 and P4: SM)

Bongani (P1: DTM) described his team as being cross-functional, with the project environment allowing individuals to contribute meaningfully depending on their expertise.

> "We bring different expertise when it comes to our modules and then that's when I think the environment was accommodating and as well conducive for everyone to have their say or input" (Bongani, P1: DTM).

Although the development team members (DTMs) voted self-organisation (mean score of 6.14) as the least significant principle (ranked eighth overall) contributing to a positive e-learning experience (see Table 5.1), Laurene (P1: DTM), Binita (P1: DTM), Noah (P4: DTM) and Alonzo (P6: DTM) had positive experiences of working autonomously.

> The way in which we decide to do things, even if I look at the documents from other people, you can see autonomy there, because each and every one has got its own little flair to it. I think it was more than enough autonomy, even if there was strict guidelines in terms of what it should look like. (Laurene, P1: DTM)

> So, basically, once we understood all the instructions and had the objectives in mind, I could decide from there how to proceed and go about the development with my specific module. So, in terms of the development part itself, if I was struggling with something, I would like refer back and reach out to you. But in terms of the content development itself, I felt I had enough freedom to work the way I wanted to. (Binita, P1: DTM)

Each Scrum principle added a necessary element to the e-learning project management. Although the Scrum masters adapted each of the principles to suit their management styles and the needs of their teams, none were deemed unnecessary or disposable. The DTMs valued collaboration most because it contributed to a better quality end product and a richer learning experience through knowledge sharing. For the SMs, the strength of collaboration lay in how the project was coordinated and communication encouraged. These elements of collaboration were well described by Batra et al. (2017), who maintain that the strength of collaboration can be measured by knowledge sharing, while engagement and task-related coordination are the driving forces geared towards gaining mutual benefits for all involved.

5.3.3 Scrum Values

Bhavsar et al. (2020) maintain that the Scrum values of commitment, respect, openness, focus, and courage, have led to greater responsibility and accountability in organisations when followed by project team members. The Scrum masters in this study believed that there is merit in the sequence of establishing Scrum values to build on the strengths of each. Firstly commitment, the decision by individuals to work towards achieving the team goal (Bhavsar et al., 2020), can be seen as the cornerstone of Scrum values. Once established, respect, which generates virtual bonding (Bhavsar et al., 2020), should be the next central point as it is fundamental to team building. Once teams have connected, openness should be established to promote trust

(Bhavsar et al., 2020) through transparency. After that, teams can focus on working collaboratively towards achieving the team goal. Finally, courage should be inspired as it capacitates the team to solve problems more creatively and confidently (Bhavsar et al., 2020).

Amelia (P1 and P4: SM), Olive (P2 and P6: SM), and Misha (P3 and P5: SM) agreed that the values emphasised by Scrum formed part of their daily practice irrespective of the project management framework implemented.

> "Well, I actually think these values are the values that that we implement in our daily lives, in any case, all of us" (Amelia, P1 and P4: SM)

> I mean, we do focus, we do commit to it, we are open, we do respect everybody's opinions and judgments, we are courageous to stand up and say right you know this needs to change or we discuss it, we collaborate with each other, so we are adhering to all these values already. I think that you can't work with people if you don't practice these values. (Misha, P3 and P5: SM)

Olive (P2 and P6: SM) further explained that upholding these values ensures that Scrum masters remain servant-leaders instead of implementing the traditional top-down managerial relationships.

> I will be quite surprised if focus, commitment, openness, respect and courage is absent in any environment? How do you work without it? I am already doing it, I surely hope so. …I think it is quite obvious that if you don't have the values, it is a slave – boss relationship. I feel that for the principles to even count, if the values are not there, then it is a futile exercise, moving back to one person that is keeping track of progress and taking out the stick. (Olive: P2 and P6: SM)

5.3.3.1 Commitment

Olive (P2 and P6: SM) viewed commitment as the most important among the Scrum values. She was, however, concerned about whose end goal the team was committing to achieving. She explained that the e-learning project depends on the buy-in of all DTMs as subject matter experts, as they provide important discipline-specific expertise, which she could not.

> Commitment keeps all of it together, commitment from me and commitment from the team. So the question is whose dreams or commitment are we following?" "…it is important to get a good buy in from your team members, in our case the lecturers, so that the commitment is there to be involved, to fill in the detail, so that the end product is excellent. (Olive, P2 and P6: SM)

Lethabo (P6: DTM), one of the DTMs who worked with Olive (P2 and P6: SM), explained that the project goal's consequences were not a priority to some DTMs. He explained that some team members showed a lack of commitment because line managers instructed them to work on the

e-learning project. These members displayed high attrition rates or rarely prioritised the team goals if they had academic demands competing for time.

Misha (P3 and P5: SM) highlighted the problem of negative social influence impacting individual commitment. Fortunately, she had a strategy for dealing with “rotten potatoes”, explaining that zealous commitment from a learning designer paired with good leadership and frequent communication could encourage greater commitment.

> The commitment of the PCs, and then the individual SMEs, they definitely do impact on each other. Because through their social interactions, it's almost like you know, the saying, one rotten potato spoils the whole pocket. So, if you are a person that's easily influenced, then you are influenced by that rotten potato. (Misha, P3 and P5: SM).

> And then it's also up to you on how do you manage their commitment. So, if you are committed and they see that you are committed, and you do follow up, and you are consistent, it kind of makes them feel obligated to be committed. (Misha, P3 and P5: SM).

Misha (P3 and P5: SM) further expressed her frustration as a learning designer when being held accountable for meeting deadlines set by University structures when she needed to work with teams that were not committed to the project. Once again, she showed a solution-driven mindset when explaining that implementing collaboration strategies could strengthen feelings of commitment among team members.

> We can prioritise as much as we want but if we don’t have the buy in and commitment from the SMEs, we won’t meet deadlines. … Building relationships, sharing knowledge, evaluating each other’s tasks, reflecting, being creative and having a sense of, we are doing this together, can really change the commitment and time spent on the project by all team members. This will ultimately help with adhering to timelines when these projects are not a priority to the SME’s. (Misha, P3 and P5: SM)

For Amelia (P1 and P4: SM), commitment success lies in being honest about what commitments could be made. She maintained that being realistic about matters such as timelines and workload would support team cohesion. Being realistic would also resolve issues such as a conflict between DTMs and senior management within their Faculties. Everyone would have a shared understanding of the joint process and product forming part of the commitment.

> Especially the fact that we commit to be realistic. This will for sure influence the team cohesion since it will cultivate a mindset that promotes the success of the team. This also speaks to the way in which management interacts with the team

> and their progress, the trust that needs to exist; we all work towards a common goal and are driven to reach it. (Amelia, P1 and P4: SM).

5.3.3.2 Respect

Respect plays a vital role in team collaboration. Bongani (P1: DTM) indicated that the Scrum team's relationships were built on respect and valuing each other's opinions. For Laurene (P1: DTM), who was part of Bongani's team, respect had a close tie with when in the project one became involved. She felt it was very important to be included right from the start, as this led to greater respect for the team and the module content. Laurene (P1: DTM) also explained that respect leads to feelings of accountability towards the team in achieving the collective goal.

> "I will say that the relationship it was based on respect. It was based on you know, giving everyone a voice. …I will say that even, you know, the opinions and ideas of everyone who was involved, it was respected (Bongani, P1: DTM).

> So, it is important to be involved from the beginning. I think that gives you respect for what you're doing currently. So, it gives you respect for your content material, it gives you respect for the team members, but it also gives you a lot more responsibility. So, if I am involved from the beginning, I take responsibility for where we are going. If you're going to give me a project, which is halfway developed, I'm gonna think that, yoh, I actually wanted it like this, and this. I'm going to feel forced to think in somebody else's mind-set. (Laurene, P1: DTM)

Quintin (P1: DTM), Noah (P4: DTM), Binita (P1: DTM) and Lethabo (P6: DTM) used terms associated with respect when speaking about their experience of the leadership and support given by the Scrum masters. "Appreciate", "look up to", and "commend" were some of the commonly used terms. The DTMs explained that it was imperative to have Scrum masters who uphold principles and practices worthy of respect.

5.3.3.3 Openness

Being open was viewed as speaking one's mind (open communication) and being willing to try new things (receptive to change). Olive (P2 and P6: SM) mentioned that she liked the impact that the Scrum pillars (transparency, adaptation and inspection) had on openness. She explained that openness encouraged individuals to speak about their challenges, allowing her time to determine a suitable course of action. While interviewing Lethabo (P6: DTM), who experienced approximately a year of project management without the Scrum framework, he spoke of the importance of open communication similarly, emphasising that learning designers should allow DTMs to express their concerns openly before discussions on processes and timelines occurred.

> "I think having that open communication before we draft days and all that would have helped. I would say, let's communicate openly. Let's be considerate of each other's, you know, workload" (Lethabo, P6: DTM).

Olive (P2 and P6) further used a metaphor to explain how challenging it was to ask professionals outside of education to become curriculum design experts. She compared academics to wild horses as they were used to professional practice and often a teaching environment where they facilitate learning in any manner they deem appropriate. The curriculum design and development journey, however, was likened to a race track, with its own set of rules governed by national HE standards and online design best practices. Openness, in conjunction with respect and courage, enabled the academics to work collaboratively with the learning designers who were viewed as racehorses because of their know-how as curriculum, pedagogy and instructional design experts.

> We are taking wild horses, and telling them to run on the race track, difficult to happen. So openness, combined with courage and respect is important to let the wild horses run with the racehorse to effect change. (Olive, P2 and P6: SM)

Like Olive's comment about the Scrum pillars supporting openness, Amelia (P1 and P4: SM) also connected the pillars and values. Amelia commented that transparency, a Scrum pillar, would not be possible without openness as it relied on shared values and clear goals. Amelia (P1 and P4: SM) further maintained that openness relied on good communication between Scrum teams and stakeholders. Linking to Laurene's (P1: DTM) views on respect, which depends on being involved in the project from the beginning, Amelia (P1 and P4: SM) specified that the team should decide upon values in the early stages of the e-learning project. For Amelia, it was important that academics "buy into and also have a say in what the norms will be" (Amelia, P1 and P4: SM).

> It's *[Openness]* dependent on good communication in the team, between the team and the management. There needs to be clear goals and a common set of values to be transparent. This should probably be negotiated in the early stages of a project. (Amelia, P1 and P4: SM)

The DTMs also shared their views on the importance of openness. While Noah (P4: DTM) explained that DTMs needed to be open to learning new things and doing things differently for curriculum design to be a success, Quintin (P1: DTM) spoke of openness helping to establish feelings of a community. Quintin (P1: DTM) and Bongani (P1: DTM) further appreciated the openness of their SMs, when they described the learning designers as being approachable and willing to adapt. Misha's (P3 and P5: SM) use of instant communication tools to resolve impediments quickly served as evidence of this.

> "When we just couldn't deliver on certain aspects that were related to the process, then there was open communication and there was room as well for us to adapt accordingly along the way" (Bongani, P1: DTM).

> "I'm open to always assisting them. It just takes one WhatsApp and they have my attention" (Misha, P3 and P5: SM).

Quintin (P1: DTM) further elaborated on the online platforms contributing to openness as everyone could communicate openly and view all the resources and working documents in real-time and had access to each other's work constantly. Similarly, Bongani (P1: DTM) experienced the ambience of the project as encouraging openness.

> "The environment was conducive for everyone to openly share their views and to share their ideas (Bongani, P1: DTM).

5.3.3.4 Focus

The demanding workload of academics and learning designers at the University has been discussed at length. When speaking about focus in the group interviews, Olive (P2 and P6: SM) alluded to the complications of focusing on one curriculum design project when there were so many tasks. She concluded that her focus is somewhat like a production line. When she is with a team, she gives her full attention to their qualification, but her focus shifts entirely once she has to meet with the next team.

> In an ideal world, which we are not in, where you work with one project, it might be good. In our situation, we are not focused, we don't have one role, and we are even trying to combine more than one project in one meeting, a lot of multitasking. So what does Scrum values, such as focus mean to me? I will give my full attention to what I am busy with, and then move on to the next. So I have a production line of focus. (Olive, P2 and P6: SM)

In Misha's (P3 and P5) description of focus as Scrum value, she concentrated solely on her role as leader and manager. In her response,, it almost came across as if focusing on the project would have a detrimental effect on the social and emotional support of DTMs. Throughout the study, there had been concerns raised by DTMs about a lack of investment in their personal well-being from multiple individuals in managerial roles.

> In terms of focus, you know, I believe I'm very focused. I'm not the one that starts the meeting with how's your cat? and how's your dog, those kinds of things. So, even with the lectures that I have, as much as it's nice to have the social side of it, we are very focused. Because I kind of feel as a project leader or manager, you've got to kind of demand that, not in a very assertive way, but demand the focus. You

> know, you create the environment. If you set that meeting, you're in control of it, so you determine what happens there. (Misha, P3 and P5)

Amelia (P1 and P4: SM) also raised her concerns over focus, as a challenging Scrum value to maintain. She mentioned that the academics who formed part of the Scrum teams were often those overworked individuals who were already drawn into numerous activities across the University. Requiring them to add the e-learning project to their already full list of responsibilities proved challenging.

> So, I think that the focus one is, I think, a huge problem because you have to focus on so many things together at the same time, and I think, especially for our team members. I really have a problem with this. Because what I see as well, if you want to give something to somebody, give it to somebody that makes something happen. So, I mean, all of our team members, they are the go-getters in the faculty and they have a lot of different responsibilities. So, I cannot really expect of them to only focus on the development that we are busy with, and that I see a problem with, because they are so busy with other things as well in the faculty. (Amelia, P1 and P4: SM)

The development team members confirmed Amelia's concerns. Lethabo (P6: DTM), a full-time faculty member, explained that his PhD studies sometimes meant that he could not focus on the e-learning project for long periods. Further, when he lost family members during COVID, he continued to be asked to focus on the e-learning project, amongst other academic responsibilities, despite feeling overwhelmed. In Quintin's (P1: DTM) case, as a part-time faculty member, his focus depended on the University rhythms. When student exams were completed, and the grading of assessments increased, his focus on the curriculum project was reduced. However, when the students were in recess, he could give his full attention to the project again. Quintin (P1: DTM) indicated that he remained dedicated to the project, as did Noah (P4: DTM), who explained that he adjusted his weekly schedule to focus exclusively on the e-learning project.

> "I think from my side, perhaps that adjustments were necessary, for example, just to allocate certain times to create a time slot in the week where I focus exclusively on this material, so that took adjustment" (Noah, P4: DTM).

Alonzo (P2: DTM) and Laurene (P1: DTM) spoke about the meetings being valuable contributors to their ability to maintain focus. While the weekly meetings helped Alonzo (P2: DTM) with accountability and staying on track, Laurene (P1: DTM) maintained that the meetings hosted via virtual conferencing tools were more focused than face-to-face meetings, which helped her to be more attentive.

5.3.3.5 Courage

Amelia (P1 and P4: SM) and Quintin (P1: DTM) described the requirements for a courageous team. From a Scrum master's perspective, Amelia (P1 and P4: SM) spoke about the necessity for learning designers to create a working environment where DTMs would feel safe and their inputs respected for them to act courageously. Quintin (P1: DTM), in his capacity as a development team member, similarly stated that learning designers should implement strategies to inspire courage among teams if they are to participate actively.

> "It is much easier to not have an opinion and just go with the flow. To be able to act you need to feel that the environment is safe and that your inputs are considered to the benefit of the bigger picture" (Amelia, P1 and P4: SM).

> "So, just getting people to engage with you to buy into the process and getting courage to give inputs. That is, I think, the most essential part" (Quintin, P1: DTM).

While Amelia (P1 and P4: SM) spoke of creating a safe environment for her DTMs to aid in team courage, Misha (P3 and P5: SM) had more traditional views on courage as a value. She regarded being courageous as respectfully reprimanding individuals who do not deliver increments as agreed.

> I do have the courage to call them out, when you know, they haven't delivered on time, or they falling behind, and not publicly, to maintain the respect, but you know, to also show that I have to manage this project and my role is to manage it and your role is to be committed to deliver on time. (Misha, P3 and P5: SM)

For the Scrum values to hold value for the entire team, it is important to have a common understanding of how to uphold them. While the learning designers felt that the values are common practice in everyday life, making time for the development team members to speak about commitment, respect, openness, focus and courage at the onset of a project has proven to be essential. The very nature of a Scrum master as a servant-leader is to maintain a balance between the people-centric and organisation-centric aspects of project management. Upholding these values and encouraging DTMs to do so as well aids in reinforcing the balance. In closing, Amelia (P1 and P4: SM) recommended an inclusive and transparent strategy to encourage all team members' buy-in into the Scrum values.

> I would recommend that the team set up their values, in the first meeting they discuss and decide what their values should be and then they can sign that as a 'promise' to each other. The Scrum master could provide guidance as to which aspects could be included, but since they have to commit, let them set up the terms. (Amelia: P1 and P4: SM)

5.4 Objective

Petrucco and Ferranti (2017) define the activity system element, “objective”, as the activity system goal towards which all other elements work. In a study by Hughes (2017), the objective was to develop a tool that would contribute towards obtaining the goal. Similarly, this study aimed to develop a framework that supported social interactions among programme design teams. Scrum was identified as a potential project management framework and tool based on Agile principles to guide the management of the participating curriculum design teams. The study participants had a very positive experience of Scrum as a promoter of communication, coordination and collaboration in a virtual environment. However, several adaptations to Scrum were required for the framework to be implemented in this study’s context.

5.4.1 The Scrum Framework as Promoter of Social Interactions

As studies involving Scrum in HE increase, more insight is gained into how Scrum impacts aspects of social interactions among team members. Rodriguez et al. (2021) report positive experiences of student team communication due to the implementation of Scrum in a Software Engineering course. Hidalgo (2019) conducted a study where Scrum was implemented among academics involved in research teams, and the findings revealed that Scrum contributed positively to coordination practices. Finally, Sandberg and Crnkovic (2017) studied collaboration among universities, research groups and companies, concluding that Scrum ceremonies enhanced collaboration among Scrum teams in many ways. In this study, similar findings were reported among programme development team members regarding the positive impact Scrum had on social interactions.

5.4.1.1 Communication

All three Scrum masters believed that the Scrum framework supported virtual social interactions among programme design teams. Amelia (P1 and P4: SM) explained that communication was enhanced due to Scrum's structure for managing virtual programme design teams.

> I think that it's a really good framework to enhance social interactions. So, we know we have our workshops on a Tuesday, Scrum is Thursday. So it structures the workflow in that way. But then also in the Scrum session, it's giving you that structure of, let's report back, let's say what happened? Why did that happen? How can we help you to move along? So, I think that it increases communication because it gives everyone the feeling of what do I have to talk about. So in a way, it focuses the communication that is taking place. (Amelia, P1 and P4: SM)

Bongani (P1: DTM) corroborated Amelia’s (P1 and P4: SM) views, explaining how Scrum’s emphasis on transparency enhanced communication. He valued the clarity, regularity and

timeliness of communication throughout the e-learning project, explaining that he knew what was expected of him well in advance.

> One of the best practices which were to communicate on a regular basis, whether digitally using emails and having meetings on a regular basis. It was clear, it was direct, and I knew what was required of me. You know, when I say a regular basis, I'm not saying that every day, but on time, when things need to be communicated. I didn't have to wait for a couple of days before I could know what was required of me. (Bongani, P1: DTM)

When completing the survey, DTMs were asked to select the most appropriate description of the overall communication practices experienced among the programme team members throughout the e-learning project. An explanation of programme team members was provided, listing the learning designer, programme coordinator (PC) and subject matter experts (SMEs). One DTM selected *very inefficient*. The researcher speculates that this is quite possibly because he was the PC and sole SME working on the programme. On the other hand, two DTMs selected *efficient,* and four selected *very efficient*. Thus the majority found the communication practices very effective throughout their programme development journey.

The seven development team members were also asked to rank from highest (1) to lowest (7) on how effective communication used throughout the project contributed to several components. The results indicated that the communication practices followed throughout the Scrum process contributed highly to enhancing *transparency* (mean score of 1.86). While *fast and effective information transfer* had a mean score of 3 and *improvement of products through reviews and feedback* had a mean score of 4, the standard deviation (2 and 1.85 respectively) and variance (4 and 3.43 respectively) indicated that some DTMs had quite differing opinions on the contribution of communication to these components. *Building relationships and a sense of community* had the lowest standard deviation (1.03) compared to variance at 1.06, indicating that the DTMs were like-minded in their ranking. Interestingly, the mean score (4.29) places it fifth of the seven components enhanced through communication. The DTMs ranked communication practices as an aid to *problem-solving* the lowest (mean score of 5.86) (see Table 5.2 for the full list of components).

In a study by Rodriguez et al. (2021), the participants reported that implementing Scrum as a teaching strategy resulted in faster problem-solving. While the impact of Scrum on *problem-solving* was given a low ranking in this study involving curriculum design teams, *fast and effective information transfer* was ranked second highest. These studies' contradictions in findings may result from how participants understood constructs and how the researchers grouped the constructs in the data-gathering instruments. However, it can be concluded that Scrum positively impacts the promptness of communication, which is of the essence to any project's success.

Table 5.2

Components enhanced through the project communication[11]

Components	Min	Max	M	SD	Variance	Count
Fast and effective information transfer	1	7	3	2	4	7
Improvement of products through reviews & feedback	1	6	4	1.85	3.43	7
Solving problems	2	7	5.86	1.73	2.98	7
Empowering individuals	3	7	4.86	1.64	2.69	7
Encouraging adaptation	2	6	4.14	1.46	2.12	7
Enhancing transparency	1	4	1.86	1.36	1.84	7
Building relationships and a sense of community	3	6	4.29	1.03	1.06	7

5.4.1.2 Coordination

Regarding Scrum's impact on coordination, Amelia (P1 and P4: SM) explained that the framework provided Scrum masters with direction because it forced them to plan ahead.

> And then it helps with the coordination for the project because you also have to say, okay, but what is coming next, so you have to be ahead of the work the whole time. And it also helps the team to know exactly where we are heading. (Amelia, P1 and P4: SM).

Olive (P2 and P6: SM) shared similar views to those of Amelia (P1 and P4: SM) on the positive impact of Scrum on coordination, adding that being a Scrum master prompted her to engage with her teams more regularly to follow up and to be more of a servant-leader.

> So for the coordination, it definitely helped me to structure it better, to manage it better, to check in better with them *[development team]*. It just made me attend to a lot of those things. … So, what I like about all the things that I've learned in Scrum, is the regular check-ins. I think in the past, it was like, there is your work that you need to do, send it back to me when you're done. And then I don't follow it up. So now I'm much stricter on following up and checking in if there's anything that I can assist with. (Olive, P2 and P6: SM)

Misha (P3 and P5: SM) indicated that due to Scrum encouraging adaptation and self-organisation, she appreciated that she could coordinate each team according to their unique needs.

[11] Given the sample size, the descriptive statistics are merely used to aid in clarifying the ranking of components enhanced through communication.

> I enjoy the flexibility and it removes the monotonous nature of project management as each project is like a new experience of trying new things and doing things differently. I see it as a learning experience for myself in adapting to the situation each time. (Misha, P3 and P5: SM)

In turn, Amelia (P1 and P4: SM) explained how Scrum aided in promoting inspection as part of her coordination responsibilities purely because of the artefacts (sprint backlog) and value-based prioritisation that Scrum demands.

> Scrum is excellent for inspection. Because it helps you because you set the goals for every week. So it's very easy then to see whether the goals have been met or not. And then also it's actually already visually then communicated. So you actually don't even have to voice it because it's, it's visible. So I really think that Scrum helps with the inspection part as well. (Amelia, P1 and P4: SM)

The DTMs also experienced the e-learning project's overall coordination as very efficient because of how it was organised, providing an enabling and unified environment for individuals to collaborate. Five of the six participants who completed the survey question ranked coordination as *very efficient,* while one ranked it as *efficient*. In a follow-up question, findings revealed that *project orientation* was ranked as the coordination component that most positively influenced the project outcome (mean score of 2.43). Similar findings were reported in a study by Vishnubhotla et al. (2020), who found that task orientation was one of the essential elements that enabled teams to function effectively. *Project organisation* and *servant leadership* were the combined second most positive components, with a mean score of 2.86. Noteworthy is that the standard deviation (0.83) and variance (0.69) *for project organisation* are much lower than that of *servant leadership* (1.73 and 2.98, respectively). These scores indicate that the participants were more like-minded and that how the project was organised greatly impacted an overall positive project outcome. Having clearly *defined expectations* was ranked the lowest overall, with a mean score of 3.71 (see Table 5.3).

Misha (P3 and P5: SM), Lethabo (P6: DTM), and Amelia (P1 and P4: SM) believed that managing the social interactions of a development team required assertiveness. The coordination aspects of Scrum assisted in this regard.

> The biggest challenge is you are always going to find one person in every group, that's difficult to work with, and doesn't have these same values that come naturally to them and they need to kind of be pushed or you need to show a little bit of assertiveness there" (Misha, P3 and P5: SM).

Table 5.3

Most positive influential coordination components on project outcome[12]

Components	Min	Max	M	SD	Variance	Count
Project staffing	1	5	3.14	1.25	1.55	7
Project organisation	2	4	2.86	0.83	0.69	7
Servant leadership	1	5	2.86	1.73	2.98	7
Project orientation	1	5	2.43	1.5	2.24	7
Defined expectations	2	5	3.71	1.28	1.63	7

While Misha (P3 and P5: SM) described herself as an assertive project manager, it was not the case for all the Scrum masters. Lethabo (P6: DTM) indicated that he wished Olive (P2 and P6: SM) had been more assertive during the conceptualisation phase.

> I believe learning designers are very important and I think, they bring quite a lot to the table. I would prefer them to be more authoritative if I can say. You know, to be more of a boss or more of a manager than a coach or mentor, because at this point in time, I need somebody who is going to be giving me instructions on what needs to be done. Strict instructions. We need to get the work done and for me, I would have loved to see them becoming a bit more dominant. (Lethabo, P6: DTM).

Amelia (P1 and P4: SM) professed on two separate occasions that she struggled to be assertive.

> I am not assertive, I'm very accommodating. It's not necessarily bad but it could hinder progress. … It *[Scrum]* changed my approach. So it made it a little bit easier for me because I sometimes have a problem to be a little bit assertive. (Amelia, P1 and P4: SM).

Interestingly, she found that Scrum helped in this regard due to the structure it provided through events such as stand-ups, and the Scrum principles, including time-boxing and value-based prioritisation, which aided in coordination.

5.4.1.3 Collaboration

In Section 5.3.2.1, collaboration is discussed as the most highly ranked Scrum principle to influence the e-learning project experience of development team members positively. Strategies employed by SMs to encourage collaboration are also unpacked. During the final group interview, the Scrum masters indicated that in their experience, implementing Scrum has enhanced

[12] The researcher acknowledges that the sample size is too small to draw statistically significant results. The descriptive statistics do, however, aid in clarifying the impact of coordination components on project outcome.

collaboration among development teams. Amelia (P1 and P4: SM) believed that Scrum helped her teams establish a sense of belonging, supporting the team to work together towards a shared goal.

> "I think that it's also good for the collaboration in the team and also for the feeling of I belong to a team and we are all busy working towards a common goal" (Amelia, P1 and P4: SM).

Olive (P2 and P6: SM) also mentioned the positive impact Scrum has on collaboration because the framework allows adaptation and self-organisation. She explained that the DTMs enjoyed being able to negotiate how the process unfolded and what aspects could enrich the curriculum from subject matter experts' views.

> I like that you put something on the table, for example, you give homework or your topics to talk about, but also then getting the input from the people and what they actually need. So, it's like you have a proposal, but they have a choice whether to follow that proposal exactly as it is or not. For example, my next step in my programme is to talk about learning outcomes and then when I present that to them, they can say, we have just done it in a different course. Can't we just rather talk about assessment criteria because that part we don't understand? It's not rigid in the sense of what happens. There's a negotiation. (Olive, P2 and P6: SM)

Overall the DTMs had a positive experience with the collaboration between programme team members ranking the projects as *somewhat* (five of seven) to *highly collaborative* (two of seven). Neutral and negative selection options such as *uncertain, infrequent collaboration* and *no collaboration* were also provided. As a follow-up question in the survey, DTMs were asked to rank assumed collaboration benefits from *most* (1) to *least* (7) experienced throughout the e-learning project journey. Creating a sense of shared ownership (mean score of 2.43), contributing to openness to change (mean score of 3), and developing unique solutions to complex challenges (mean score of 3.29) were ranked amongst the top three benefits experienced. The lowest-ranked collaboration benefits experienced by the DTMs were embracing a culture of learning (mean score of 4.14), improving team efficiency (mean score of 5) and fostering healthy relationships such as mutual trust and interdependence (mean score of 6.57). The standard deviation of 0.49 and variance of 0.24 of "healthy relationships" show that the seven DTMs agreed that collaboration did not result in their experience of mutual trust and interdependence. Of note is that increasing individual motivation and a sense of accountability was ranked 4th of the seven assumed benefits of collaboration, with a mean of 3.57, a standard deviation of 2.26 and a variance of 5.1. These results show that the DTMs had very different views on the actual experience of increased motivation and accountability due to collaboration. See Table 5.4 for a summary of the results.

Table 5.4

Ranking of collaboration benefits experienced by development team members[13]

Benefits	Min	Max	M	SD	Variance	Count
Contributing to an openness to change	1	7	3	1.93	3.71	7
Creating a sense of shared ownership of the programme being developed	1	5	2.43	1.29	1.67	7
Embracing a culture of learning	2	6	4.14	1.25	1.55	7
Increasing individual motivation and a sense of accountability	1	7	3.57	2.26	5.1	7
Developing unique solutions to complex challenges	1	6	3.29	1.67	2.78	7
Improving team efficiency	4	7	5	1.07	1.14	7
Fostering healthy relationships	6	7	6.57	0.49	0.24	7

Given the positive experiences of both SMs and DTMs, relating to communication, coordination and collaboration, the objective of implementing Scrum to support social interactions among virtual programme design teams can be considered met. Communication was said to be more focused and lead to increased transparency, while the events and principles of Scrum led to better coordination. Aspects of collaboration were also enhanced through Scrum, such as DTMs feeling a greater sense of shared ownership. While many aspects of Scrum could be followed as prescribed, the context within which the study took place required adaptations. Both Scrum masters and development team members had recommendations for improving the implementation of Scrum.

5.4.2 Adaptations to Scrum to Enhance Social Interactions

Regarding adaptations to the Scrum framework, all three SMs indicated that changes were required to enhance social interactions even further. Amelia (P1 and P4: SM), Olive (P2 and P6: SM) and Misha (P3 and P5: SM) recommended that the terminology not be adhered to as strictly (see Section 5.2.2.1 Scrum terminology as tool) as HEIs had well-established terminology for different roles, processes and artefacts. The recommendation was also made on numerous occasions that daily-stand ups be held once or twice a week at most, given the workload of

[13] The descriptive statistics used in this study are merely for clarification purposes, to shed light on the ranking of collaboration benefits as experienced by the small sample of development team members.

academic staff. Misha (P3 and P5: SM) further explained that the framework needs more time for DTM orientation as a separate Scrum event.

> So I think yes, we do have a full picture that we do give to them, to the whole SME team. And it is a lot of information to process. But then we have schedules and timelines to get this done. So, they need to get it quickly, so we can start. As opposed to giving them time. (Misha, P3 and P5: SM)

Her views were shared by Noah (P4: DTM), who explained the process as being highly complex. He resorted to much self-study to familiarise himself with curriculum design processes and intended outcomes. He recommended that an extensive orientation be conducted before the process commences, during which processes, guiding documents and technical language are thoroughly explained, giving sufficient time for DTMs to come to terms with the commitments.

> It started out as difficult in the sense, what is expected? How to do it? That was a bit difficult for me since I'm not doing it every day. It is a very complex process and so I had to make adjustments and read up a lot at the beginning of the process, just to familiarise myself with what is expected, what is the outcome? …So, if I can make the recommendation, perhaps start a week earlier, or just give some period for orientation. Sending communication, well in advance of the commencement of the process just to warn a person, you need to know these elements before we can start. That would have helped me, I think. (Noah, P4: DTM).

For the development teams who had extensive orientations stretching over several meetings, the overall experience was much more positive, leading to greater social interactions. Bongani (P1: DTM), commented that the orientation process aided in a shared understanding of the project as a whole.

> I think that the orientation was detailed and informative. And it was not rushed it was done, not in only one meeting, but there were several meetings that were scheduled, just to take us through the processes. …Everyone who was involved, were engaged, and for me, I felt that I knew what was required of me. I knew the scope of this project, the timelines as well as how it was going to be approached. (Bongani, P1: DTM)

Further, to increase social interactions in the virtual environment, Olive (P2 and P6: SM) recommended keeping cameras on during meetings.

> I also feel that seeing the person is important. So, we put our cameras on in our whole one and a half hour meeting so that we are actually talking to a person and not talking to a photo. And I think that also helps you in coordinating your team

> by seeing the energy of all the people. And that increases the buy in and the vibe going on. (Olive, P2 and P6: SM)

Olive (P2 and P6: SM) also observed that development team members longed to engage more socially, especially in person (face-to-face).

> I can see that people miss that. They miss the fact that we can talk a little bit and just get to know each other a little bit because you tend to have a relationship with your SMEs and you get to know them well because we work closely together for a long time. It's always we missed the physical touch. (Olive, P2 and P6: SM)

This view was confirmed by the majority of DTMs, who indicated a need for a more informal and socially oriented gathering that did not revolve around work but provided engagement opportunities of a personal nature. Laurene (P1: DTM) explained that she would have liked to meet with her team in person to build personal relationships. Similarly, Quintin (P1: DTM) indicated that although he enjoyed engaging on a personal level for the first few minutes before and after meetings, he felt that alternative strategies should be sought to allow teams to form more social bonds.

> I think it will benefit obviously to have a little bit of a one-on-one contact, not only on a virtual platform. But then I have to also think about what I want from the one-on-one, and it's basically just to get to know the team of people better, you know, to just get to know them better in terms of not only a professional side of it but also, what's clicking and what's not clicking. (Laurene, P1: DTM).

> Ten minutes before and ten minutes after meetings, just talking and getting to know one another on a personal level, away from the professional level, I think that really helped. So yeah, maybe schedule a social meeting, although I think even more meetings might hinder some people. Maybe finding a way around that, but just becoming more familiar with the people you're working with, can help. (Quintin, P1: DTM)

Lethabo (P6: DTM) illuminated the challenge of online engagement as always being limited by time and having a very work-driven focus. He explained that he missed the tea time slots often accompanied by attending workshops on campus, during which teams would engage socially. His recommendation was to have bi-weekly virtual social gatherings of short duration, simply to talk about people's personal lives.

> Online, we need to get done with what needs to get done. We don't have time to be having these long conversations that we would have socially. There's no tea time. You remember when we had a workshop on main campus, it was good because when we take breaks, then we have a chance to get to know each other.

> You get to know each other well, face to face, whereas virtually, we have a limited time period and we have to make sure that we do what needs to be done. …I think sometimes we just need to have a short ten to 15 minutes, kind of meetings maybe every second week to just talk about the challenges and not talk about the work itself. You know, just say are you doing well? …Talk about your life without talking about the work itself, and I think, the issue of understanding what the person is going through in life. (Lethabo, P6: DTM)

Likewise, Bongani (P1: DTM) indicated that he missed the "human touch"; however, he felt that in-person interactions on campus would be the ideal means to solve the need for personal interaction.

> I think a combination of face-to-face and online. Hopefully, things will get better; we'll overcome the challenges with COVID. Now we will be able to meet face to face because one thing that I've realised is that you cannot replace the human touch, that social aspect of physically meeting. (Bongani, P1: DTM)

An interesting finding from the individual interviews with the DTMs was that Laurene (P1: DTM) and Lethabo (P6: DTM) needed a collaborative space where they could engage with fellow academics without the presence of a Scrum master. Lethabo (P6: DTM) found using WhatsApp as a social interaction tool for a group for his department members to be very helpful for collaboration, while Laurene (P1: DTM) suggested a separate meeting for her academic team to engage.

> I think, if a team can have collaboration space away from the product development, but the team as such has a space that, if everybody's got questions, we work there as a team. So, maybe another session, just the team of SMEs discussing where we're going. Not necessarily the Scrum team. (Laurene, P1: DTM)

Thus, sufficient time should be spent on team Orientation to improve the social interactions of virtual programme development teams who use Scrum as a project management framework. Teams should be introduced to the Scrum project's principles, roles, events and artefacts as adapted for the context in which the teams work. Social and personal engagement should not be neglected in a virtual environment. In instances where physical gatherings are not possible, the findings suggest that virtual social events where cameras are switched on should be incorporated to develop personal bonds among team members.

5.4.3 Adaptations to Project Management to Better Mimic Scrum

Amelia (P1 and P4: SM) indicated that she would continue with her implementation of Scrum as she had been doing, as her strategies worked well with her existing and new programme

development teams. Misha (P3 and P5: SM) also indicated that she would continue to work in the same way she had done previously; however she would be guided by the different dynamics of her teams rather than by Scrum.

> "At this stage, I will continue as previously" (Amelia, P1 and P4: SM).

> I wouldn't change anything. I think with each project I find myself adapting to the people I work with, the circumstances I work in and the type of project (content). …I also find that with some groups multiple meetings and check points are needed but with others, people work independently and do not need that extra push. I don't believe in micromanagement at all. Individuals need to be accountable and committed to timelines and projects. (Misha, P3 and P5: SM)

Interestingly, Olive (P2 and P6: SM) wanted to adapt more of her managerial practice to suit Scrum than wanting to adapt Scrum to suit her context. Olive (P2 and P6: SM) explained that there are several things she would like to improve on in her implementation of Scrum to enhance social interactions continually. Firstly, she mentioned that her process should include sprint reviews and retrospectives more regularly. Secondly, she explained that for the sake of transparency and to foster self-organisation, she would replace her handwritten paper-based backlog with an online living document. The intention was that the whole Scrum team should be able to monitor the project progress in terms of what has been done, what needs to be done, and the impediments experienced. Thirdly, she wanted to revisit the Scrum principles and values with teams who returned from taking a break in their design process. She intended to remind the DTMs of the principles and values they had already applied in their previous engagements so that they could feel motivated to work collaboratively again.

> "… not bringing in the principles of they haven't done it, and that's why I'm telling you that. To remind them of where we started and what I've seen in the past when we work together how they already practice this principle. So, just maybe reminding them and bring it to their attention and let them feel good that they've already done these things. Because I think, sometimes, when you put values and principles in front of people, sometimes people can get the feeling they need to tell me this now because I don't do it, which is not the case with them. So, it's more of a positive reinforcement of the values of Scrum. (Olive, P2 and P6: SM)

Finally, Olive (P2 and P6: SM) concluded in her last reflection email that she plans to include "a shared vision and values" discussion in each phase of the ADDIE (analysis, design, development, implementation and evaluation) curriculum process.

> "I want to focus in the next sections on including a shared vision and values, not for the whole programme but for each phase including design and development" (Olive, P2 and P6: SM).

In projects where the objective is to implement and adapt a framework such as Scrum, an essential aspect not to be overlooked is the individual personalities of the Scrum masters. While some may accept the initiative immediately, others will need more time, and a few may never attempt to adapt their project management strategies. From the study findings, it became evident that training interventions were helpful to some extent. However, the greatest influencer was working closely with someone actively attempting to implement Scrum. Seeing Scrum in action proved highly beneficial to Amelia (P1 and P4: SM) and Olive (P2 and P6: SM). However, for all the Scrum masters and development team members, there were several barriers to overcome.

5.5 Barriers

In the final email reflection, SMs were asked what aspects of the HE and academic environment hindered the success of social interactions among their Scrum teams. Olive (P2 and P6: SM) specified "timeframes and rigid rules" as barriers, while Amelia (P1 and P4: SM) indicated "a lack of time". As was mentioned in Chapter 4 when discussing the context, internal approval processes often determine timeframes by which certain artefacts must be submitted. Throughout the study, the topic of academic workload was frequently mentioned as a barrier by all the SMs and DTMs. Individuals had much difficulty managing their existing workload in addition to the taxing amount of work and demanding timeframes needed to design and develop a fully online learning programme.

Several DTMs (Binita, Alonzo and Laurene) mentioned language as a barrier. While Binita (P1: DTM) and Alonzo (P2: DTM) initially battled with some of the curriculum and Scrum jargon, Laurene (P1: DTM) indicated that she required time to grapple with a concept and internalise its meaning and become comfortable with its use. Given the fast pace of the sprints, very little time was made available for this assimilation of Scrum terminology. The recommendation made by Alonzo (P2: DTM) to create a list of abbreviations and terminology could greatly assist with this matter. Laurene (P1: DTM) further indicated that virtual engagements amplified the challenge of communication as non-verbal cues used to indicate uncertainty or confusion were missed during meetings.

> But I always asked the learning designer I hope one day you can have some sort of a list of all the abbreviations because you talk very easy when you talk about HEQC. You know this abbreviation by heart because you work with it, but for me as not only an educator, it becomes difficult for me to catch up. (Alonzo, P2: DTM)

> I think I'm somebody that takes quite a while to think about stuff before I get geared into action. And the virtual meetings do take away some of that thinking time, in a sense that you don't get the nub of the language. So, if you don't see me frowning, you won't ask DMT2, is there something you don't understand. Where I think if it's not virtual you can see reactions. One can pick up on that much easier. So, I think the whole thing in terms of communication, the whole fact that we don't have non-verbal cues, does take away some of the conversations. (Laurene, P1: DTM)

Quintin (P1: DTM) mentioned that asynchronous working was sometimes quite challenging. Given the team's existing workload, many resorted to working evenings or weekends. Unfortunately, this resulted in DTMs needing to wait for a day or two before receiving responses to queries that prevented them from making progress. However, Quintin mentioned that fortunately, having all the resources available on Google Drive alleviated the problem to some extent.

> So maybe, just waiting for responses, especially when you're working Sunday night, you know, it is you're not going to get a response until like, Monday or whenever. So, working on the backlog and then trying to figure things out at inconvenient times for others is challenging, but then the resources were there to just go quickly, look at yourself and search for your answers. Which, in hindsight, is probably better, because then you conceptualise it a bit better, I think. (Quintin, P1: DTM)

The challenge of small teams was also brought to the fore by Noah (P4: DTM), who felt uneasy about the quality of the content he was designing as the sole DTM. Fortunately, at a HEI where quality assurance is highly prioritised, all modules are moderated internally to ensure that curriculum components meet minimum standards. Regardless, being unable to converse with a fellow subject matter expert during the conceptualisation stage remained a barrier for Noah (P4: DTM).

> I think my need was just somebody to at least reflect on what content I'm providing, whether it is efficient and sufficient and appropriate. … I'm not sure whether the other teams perhaps consist of more than one member from the academic side, just to help formulate, help think how to construct or conceptualise the content. (Noah, P4: DTM)

After several Lethabo's team members left the University, he also found being the sole DTM challenging. Lethabo indicated that having more DTMs present during meetings resulted in richer conversations and often led to identifying and proposing solutions for potential problems that students might encounter during fully online studies.

> When we were two, it was slightly challenging, because now meetings were getting shorter, we could not get into the thick of things to discuss other issues that might arise when we were many. So, I think that became a challenge. But I've seen that lately since we are now about four, it has improved quite a lot. We can have conversations, and you know, somebody raises something that I would not have thought of raising, and it does help at this point in time. (Lethabo, P6: DTM)

It must be reported that while Noah (P4: DTM) and Lethabo (P6: DTM), who worked in general fields, found working alone cumbersome, Alonzo (P2: DTM), who worked in a highly specialised field, found many benefits in being able to work individually on the programme conceptualisation. He explained that fellow subject matter experts were distributed across the globe, and he simply did not have the time to participate in all of the ADDIE phases as this stretched over more than a year. Alonzo (P2: DTM) found it more efficient to work on all the accreditation and approval documents with Olive (P2 and P6: SM) and to involve more DTMs during the module development and facilitation.

> It's not easy to get the group of specialised people to be efficiently working through all the steps. So, I myself feel that I scored working individually because of the efficiency. Yes, I spent more time, I put in more effort and then I collaborate after, the first approval. (Alonzo, P2: DTM)

In addition, Lethabo (P6: DTM) found it challenging that his learning designer did not know him on a more personal level, especially regarding his boundaries. He recommended speaking about each other‘s worldviews and what informs how people react to certain situations. This ties to the recommendation by many DTMs to adapt the Scrum framework to include more social or in-person events to build personal bonds outside of professional relationships. Working remotely and being driven by strict timelines, resulted in feelings of social isolation for many.

> You know, I think that that would have been the cornerstone to say, let's get to understand each other first. Let's understand who someone is from her professional background, family background and all these things, then you would understand. Because sometimes that can create challenges when people don't understand why people behave, how they behave. (Lethabo, P6: DTM)

A final barrier Lethabo (P6: DTM) and Olive (P2 and P6: SM) raised was the challenge of having some DTMs that did not want to participate in the project of their own accord. A lack of buy-in resulted in a lack of commitment and continual extension of deadlines, as timelines were rarely met. Olive (P2 and P6: SM) concluded that such individuals should instead be removed from the project team.

> “I had that situation where the colleagues I was working with, they were forced to work with me, but they did not want to do this or they were just not in it” (Lethabo, P6: DTM).

> If I just think, if somebody is not committed at all, so let's say is forced to do this, I don't think that whatever you try is going to change commitment.” “If you don't have buy-in at all, then I will say rather kick the person out. (Olive, P2 and P6: SM)

Clapp et al. (2019) also found a lack of time due to the high workload among subject matter experts to be one of the greatest barriers to developing HE distance learning programmes. Similarly, in a study by Richardson, Ashby, Alshammari et al. (2019) investigating collaboration between instructional designers and academics, a lack of time for programme design due to academic commitments such as research, as well as a lack of personal interest and buy-in from academics into the project of course design, was documented. Given that this study involved mainly remote teams, the lack of personal interactions and engagements of a social nature presented as an additional barrier.

5.6 Conclusion

In this chapter, the organisation-centric elements of the study were unpacked. The tools, rules, and objectives that governed the social interactions of Scrum team members were explained from the perspective of the participants who recounted personal experiences. In addition, barriers which impacted the social interactions among remote Scrum team members were revealed. While implementing the Scrum pillars and principles received high praise, the Scrum terminology, events and artefacts required several adaptations before it suited the curriculum design teams’ needs. Overall, the participants reported Scrum as having positively impacted the management of communication, collaboration and coordination practices among remote teams. Barriers relating to workload, small teams and social isolation, amongst others, were, however, reported. In the next chapter, the researcher will explore the overall outcome of this study, discussing how to encourage Scrum adoption. Scrum implementation advice is also unpacked to explore how Scrum masters can better ensure successful communication, coordination and collaboration among team members

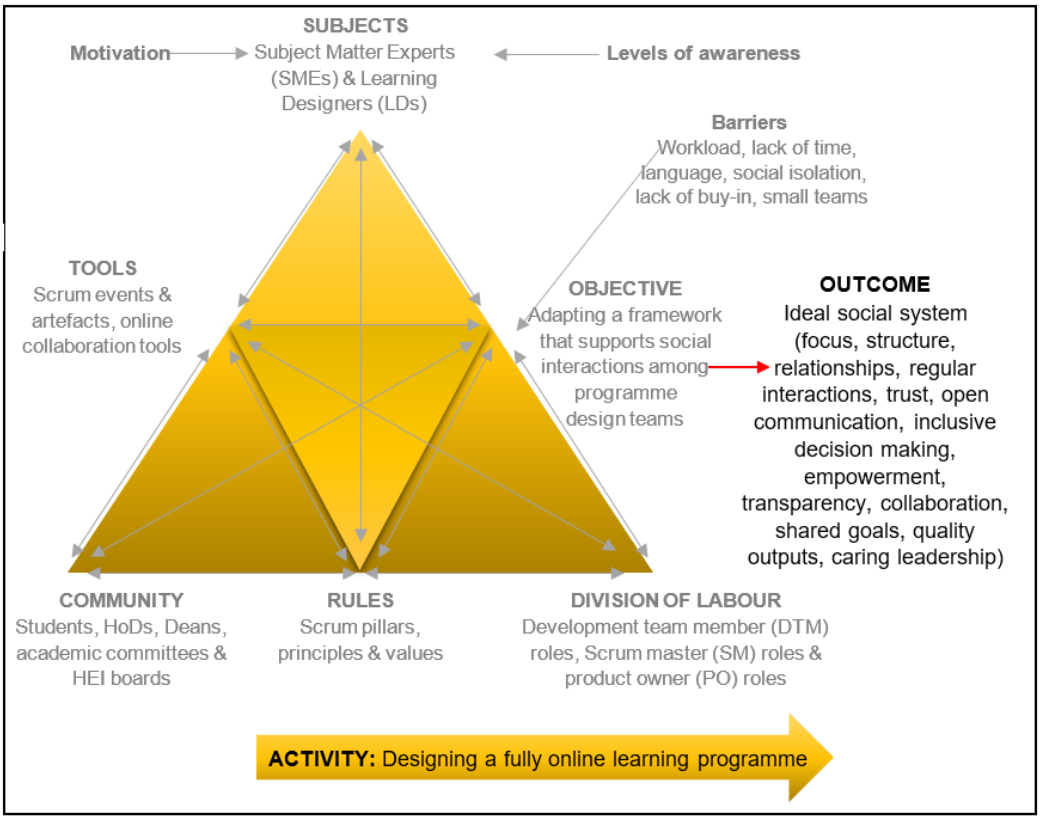
6 Chapter Six: Outcome

6.1 Introduction

Through an analysis of Activity Theory (AT) and all the elements pertaining to this study, from the subjects, their community and the division of labour, to the tools, rules and objectives associated with Scrum, it was established that the adoption of Scrum enhanced social interactions (SI) among remote programme design teams. The resultant outcome of the study was better communication, coordination and collaboration experiences for many Scrum team members where the Scrum guidelines were followed closely (see Figure 6.1). Wu et al. (2014) refer to Agile project management as creating a social system where the coordination practices lead to greater accountability. They maintain that a different leadership style is required, including "openness, honesty, and sincerity as well as curiosity, patience for results to emerge, and the impatience that drives the process forward" (Wu et al., 2014, p. 154). In the sections below, the researcher will conclude the findings in the final two chapters by shedding light on the final views of the participants regarding the leadership and SI requirements needed to create an ideal social system.

Figure 6.1

The outcome of using Scrum as project management framework for higher education e-learning teams



Adapted from Khayyat (2016)

6.2 Encouraging Scrum Adoption

Encouraging the learning designers (Scrum masters) to embrace Scrum as a project management framework was essential to achieving the project objective. When asked about their preferences for Scrum training formats, Olive (P2 and P6: SM) indicated that attending the Scrum short courses had bored her, but at the very least, the quizzes in the courses she had attended as part of her Scrum training, encouraged her to listen because she does not “like to fail”. In contrast, Amelia (P1 and P4: SM) supported the Scrum training courses, principles and values shown in YouTube videos but listed her personal experience of implementing Scrum as the ideal learning format once some foundational Scrum knowledge had been established. Lastly, Misha (P3 and P5: SM) also preferred experiential learning.

> Experience and collaborative discussions, or presentations. Due to high workload even if the opportunity is there to do courses, read articles and watch YouTube videos, bite size learning, experiential learning and active learning is what I prefer. (Misha, P3 and P5: SM)

In the final reflection emails, each learning designer reflected on what Scrum meant to them. Their explanations of Scrum revealed quite a lot about their feelings towards its adoption and implementation. Amelia (P1 and P4: SM) wrote about Scrum using terms that reflect her familiarity with and personalisation of Scrum principles, events, and values. Similarly, Olive (P2 and P6: SM) addressed Scrum events and principles as they pertained to her personal journey of becoming a servant-leader.

> The process of managing a project by breaking a project into small chunks that could be done in a week’s time. The team meet on a weekly basis to discuss the tasks, map the progress and identify problems in a safe, trusting environment where the Scrum master work hand-in-hand to eliminate the factors that could hinder the project. (Amelia, P1 and P4: SM)

> Agile way of doing project management that stems from the sport rugby, when they scrum, they always say, touch, pause, and engage. This relates to keep in touch with your teams and do regular check-ins. Then do, review, reflect. And lastly, interact with your team, communicate with them and collaborate with them. (Olive, P2 and P6: SM)

Interestingly Misha (P3 and P5: SM) also referred to Scrum and its connection to rugby, as Olive (P2 and P6: SM) had done; however, Misha did not elaborate on any positive aspects tied to her experience of implementing Scrum. In fact, Misha mentioned that she would not use Scrum in her managerial practice.

> "Scrum is something that is done in rugby. I think Scrum is a nice analogy to explain project management. The principles are valuable but I will not use the analogy in my actual work" (Misha, P3 and P5: SM).

In the researcher's reflection notes on how to better encourage Scrum adoption among learning designers, she reminded herself of the following important steps to obtain Scrum master buy-in.

> You must have an implementation plan and get buy-in, for example:
>
> 1. First talk to learning designers (LDs) about project management frameworks being considered, and allow them to provide inputs.
> 2. Explain why and negotiate how the organisation is going to implement Scrum, emphasising the pillars, principles and values just as much as the events, team and artefacts.
> 3. Do necessary training to gain foundational knowledge, in a variety of formats to attempt to suite LD needs and preferences.
> 4. Do personal check-ins and let everyone share their understanding and iron out misconceptions, fears or differences in opinions.
> 5. Implement and encourage shadowing of fellow Scrum masters to view implementation in action.
> 6. Meet frequently to discuss what works/doesn't, as well as adaptations made.
> 7. Allow flexibility.
> 8. Decide on timeframes by which to re-evaluate framework chosen. Steps 4-6 repeat in cycles indefinitely. (Researcher reflection notes).

Implementing a new agile project management framework requires taking a team through a process of embracing change (Efe & Demirors, 2019). Three of the most important strategies to enable the management of change are facilitating communication, maintaining a flexible workflow and valuing stakeholder participation (Arefazar et al., 2019). Although the researcher attempted to implement these strategies with the SMs, change management remained challenging and continued to require persistence from the Scrum teams as they adjusted. In this small team of SMs, buy-in was fast for some, who were keen to do self-development and introspection. In contrast, other SMs completed the training interventions but had little motivation to continue implementation unless it was monitored or evaluated.

The Scrum masters' responses, in explaining Scrum as a project management framework after months of training, observation and encouragement for implementation, revealed much about the extent to which they embraced Scrum. From this willingness or lack of an inclination towards adopting Scrum, a clear pattern could be seen in the views shared in the final group interview and email reflections, which dealt with the project outcome. While Amelia (P1 and P4: SM) and Olive (P2 and P6: SM) often responded using concepts and principles associated with Scrum

and servants, Misha (P3 and P5: SM) spoke in a manner relating more to traditional project management styles.

6.3 Scrum Implementation Recommendations

In the final group interview, the Scrum masters were asked what recommendations or advice they would give other Scrum teams working in higher education (HE), to improve social interactions among curriculum development team members. Interestingly the responses did not pertain as much to principles or practices of Scrum implementation as they did to contextual advice on managing curriculum development teams in HE. Both Misha (P3 and P5: SM) and Olive (P2 and P6: SM) emphasised the importance of having a close working relationship with the programme coordinator (PC) as PCs could aid in encouraging subject matter experts (SMEs) to achieve the project goal on time.

> So for me, I think it's very important to have a good relationship, with the program coordinator, because if you have the buy-in and understanding and good communication with the program coordinator, generally that person is there together with you to get the SMEs to deliver on time and for the project to progress, the way it should. So I think relationship building is very important there. … And yeah, open communication channels. (Misha, P3 and P5: SM)

> I will definitely make sure that everything that's decided on, the program coordinator is involved as part of the communication, if you pick up there's going to be some resistance or things." "So, if the due date to have things ready, is that specific day, then the PC needs to know the progress towards that day. So, that is the kind of communication that is extremely important to have. Because it doesn't help that you try to let somebody stick to a document *[memorandum of understanding with fixed timelines]* that they have signed, but nobody *[PC, HoD and others in leadership positions]* has heard in the past, that this person is behind or something. (Olive, P2 and P6: SM)

When providing advice on coordinating academic teams, Misha (P3 and P5: SM) explained that project managers should be willing to adapt their practice to suit the unique project needs. She encouraged SMs to embrace flexibility and open-mindedness in adapting different strategies with different teams to reach the same project outcome. Noteworthy is that adaptation and flexibility are empirical pillars of Scrum.

> In terms of coordination, flexibility would be the first one and adaptability. Because all projects are different with different individuals, different content, different environment, different circumstance. So for me, if I had to advise any other project manager on how to coordinate, I would say, you need to be very open-minded,

> and you need to be able to adapt and look at different options of how you can reach the same outcome by taking a different path. (Misha, P3 and P5: SM)

Olive (P2 and P6: SM) recommended that in cases where there is only one individual (DTM) working on a programme, they should be combined with an individual from another programme. She explained that working together had positive outcomes such as accountability, motivation and sharing of ideas.

> I will suggest that whoever coordinates teams take at least two people at the same time if it's possible, because that links up with that whole idea of, the one person says but I've just figured out how to mark a rubric on a discussion form and in the meanwhile, another one was shying away from discussion forums because they don't know. That's just a silly example. … I think for the group cohesion and for going ahead and challenging one another and trying not to fall behind the two of them together, I think it's a good idea. (Olive, P2 and P6: SM)

Bongani (P1: DTM) confirmed Olive's views that working towards the project outcome is better achieved by small teams of individuals working together. Diversity meant higher quality output individuals came with different life experiences that strengthened the whole group.

> We all came with different expertise and our strength, our knowledge, and experiences really contributed to the quality of the output. And I don't think if we work as individuals, we could have achieved what we've achieved. I think the quality of the output came from the collaborative approach of being able to work together, and then we share our experiences. (Bongani, P1: DTM)

Also related to having individuals working together in small groups, Misha (P3 and P5: SM) advised that SMs always work with their DTMs in a team rather than one-on-one. This choice stems from the current practice at the University that once teams reach module development, individual DTMs start working alone. However, Misha (P3 and P5: SM) recommends that this remain a collaborative phase where all DTMs progress together through storyboarding and building the module in a learning management system.

> So, for me, I'm a big supporter of group activities, whether it's face-to-face, online, virtual, or whatever. I prefer to have the entire group together, where I explain something or one person has the problem, and we solve it together. As opposed to doing it one-on-one, for the simple reason that the others learn from each other. …So I think that group collaboration is very important. … I would have preferred that all SMEs are on the same page at the same time" (Misha, P3 and P5: SM).

The learning designers (LDs) and development team members (DTMs) also noted important strategies to enhance each social interaction element. Interestingly the majority of the Scrum

values and principles were mentioned in the LDs final reflection notes and DTM interviews to explain what successful communication, coordination, and collaboration would entail. This endorsement speaks to the universal nature of the Scrum values and principles in creating an ideal social system among Scrum team members.

6.3.1 Ensuring Successful Communication

To communicate successfully with development team members, openness, shared expectations, and regular interactions were proposed as crucial communication strategies. Further, a number of participants listed transparency, inclusive decision-making, and trust. Misha (P3 and P5: SM) had a unique strategy in her list of successful communication recommendations, specifying “keeping it real," being genuine and unimpressionable. Amelia (P3 and P5: SM) also had a unique contribution listing empathy as a necessary trait for successful communication. It created social bonds with teams, which inspired greater dedication for fear of letting the team down.

> “Transparency, clear expectations, continuous follow up or touch base with all stakeholders, consistency, reflection, openness, keeping it real” (Misha, P3 and P5: SM).

> Regular interaction – in this way you can obtain details regarding the circumstances that the teams operate in and keep track of the progress. Trust – have to communicate that you, as a leader, work with the team and try to remove obstacles and create an environment for successful execution of the project. Empathy – by displaying empathy, you create an environment in which the team members do not want to disappoint and want to deliver for the greater good of the team. They also have the courage then to communicate more openly and honestly. (Amelia, P1 and P4: SM)

Similar to Amelia’s (P1 and P4: SM) response, Bongani (P1: DTM) mentioned trust as essential to successful communication among virtual project teams. He also emphasised the importance of consulting with all the development team members, linking to Olive’s (P2 and P6: SM) mention of inclusive decision-making.

> I think there are two things to communication. Firstly, for me, it's trust. You know, trust comes in many ways. Firstly, where the team or group dynamics are established, and the roles are clarified and everyone knows what to expect, then it comes easy for people who are involved to be able to communicate and secondly is acknowledging that communication cannot be in a linear approach or one way. It needs to be sort of consultative; you need to really be cognisant of other people's needs. (Bongani, P1: DTM)

> "Openness, shared expectations, shared goals, and inclusive decisions" (Olive, P2 and P6: SM).

Noah (P4: DTM) mentioned timely and regular communication, corroborating Amelia's (P1 and P4: SM) response on interacting regularly. On the other hand, Binita (P1: DTM) explained that transparency was core to successful communication, similar to Misha's (P3 and P5: SM) proposal for transparency and communicating clear expectations.

> Timely, I mean, that in time, in advance. If there's anything that you need to prepare, that you at least have time to prepare it. I mean, it doesn't help if somebody communicates with you; 'I need the following information within 10 minutes'. That's not good communication, I think. Second one of regular communication. You lose contact with the content, as well as personal contact, if there is no regular communication. (Noah, P4: DTM)

> So, for instance, when you send out the meeting links, you would provide a description of what we are going to discuss and so for me, I knew exactly what is this communication going to be about. And also the indication of who are the participants. So, we knew exactly if it's just like going to be the P1 stakeholders in the project or are we going to be communicating with others that you are assisting within their programme. And I think, for me, knowing what exactly what is going to be discussed and sticking to that contributes to successful communication. (Binita, P1: DTM)

Elements listed by the DTMs that were different from those of the SMs, regarding what would make communication more successful include listening capabilities (Laurene, P1: DTM) and having predetermined schedules (Lethabo, P6: DTM and Binita, P1: DTM).

> "I think for me, the most important thing is, having a predetermined schedule, with reminders. Sending calendar meetings, whenever we need to talk. I think it helps" (Lethabo, P6: DTM).

> "Okay, so for me, I like to stick to like, proper planned schedules. So for me, with regards to like, last year, the sessions that we had, everything was planned out nicely" (Binita, P1: DTM).

In chapter five, the participants' experiences of the Scrum tools (events and artefacts), rules (pillars, principles and values) and overall framework as promotors of social interactions (objective) were discussed. Tying to the requirements listed here for successful communication, Quintin and Bongani (P1:DTM) previously revealed that they experienced the project communication as "open". At the same time, Olive (P2 and P6: SM) attributed the Scrum pillars to encouraging her to practice open communication. Amelia (P1 and P4: SM) mentioned how a

sprint backlog aided in communicating clear expectations, which was corroborated by Bongani (P1: DTM) when he specified that he always knew what was expected of him. Scrum, as a promoter of regular interactions and transparent communication, was reported by several DTMs (Bongani, P1: DTM; Laurene, P1: DTM; Noah, P4: DTM; Lethabo, P6: DTM) and SMs (Olive, P2 and P6 and Amelia, P1 and P4) throughout the chapter. Both Amelia (P1 and P4: SM) and Bongani mentioned (P1: DTM) their appreciation of the Scrum events in providing a consultative environment for collective decision-making. Scrum, therefore, provided a framework that promoted many of the criteria specified by DTMs and SMs as necessary for successful communication.

6.3.2 Ensuring Successful Coordination

Showing just how intertwined the social interaction elements of project management are, communication was listed by Laurene (P1: DTM), Quintin (P1: DTM), Bongani (P1: DTM), Alonzo (P2: DTM), Lethabo (P6: DTM) and Amelia (P1 and P4: SM) as essential to successful coordination. Whilst many mentioned communication in the broadest sense of the word, others emphasised that it should be regular (Bongani (P1: DTM), open (Lethabo, P6: DTM) and effective (Amelia, P1 and P4: SM), in other words, clear and impactful.

> “Well, the biggest thing I'd say is communication. You cannot coordinate if you can't get a response from people and I think I want to say, planning ahead” (Quintin, P1: DTM).

Additional elements for successful coordination included that Scrum masters should be transparent about the process and its requirements (Quintin and Bongani, P1: DTM), should plan ahead (Quintin and Binita, P1: DTM), share expectations (Lethabo, P6: DTM and Bongani, P1: DTM) and consult with DTMs (Lethabo, P6: DTM and Bongani, P1: DTM) to ensure that everyone’s needs are accommodated. These same elements were considered essential to successful communication.

Further, SMs as project facilitators were required to demonstrate traits such as leadership (Alonzo, P2: DTM), professional expertise, consistency and determination (Binita, P1: DTM).

> I would say that, for instance, you facilitated this programme for us, and you knew exactly how to go about this. You know, how can I say, you are the expert at this. So, you know the strategies and the means of facilitating. So, if the facilitator knows exactly what they are doing, and they are consistent with their work and also determined, then I feel for me that leads to successful coordination because you know exactly yourself, what you need to do to go about this. (Binita, P1: DTM).

Bongani (P1: DTM) also mentioned that flexibility is key to successful coordination. He emphasised that as much as having a detailed plan is a requirement for good project management, the SM still needs to be willing to adapt the plan as situations or requirements change.

> I think being flexible, because, in any coordination, there are certain things that are required that you plan, and you just realised that things don't go as planned. And it's not about having a rigid plan, but having a detailed plan that is transparent, that will clarify all the milestones, and even the responsibilities of everyone that is involved, but at the same time, it shouldn't sort of take away the flexibility that further might be required along the way" (Bongani, P1: DTM).

All three Scrum masters emphasised the importance of remaining focused on the project goal for coordination to be successful. Misha (P3 and P5: SM) listed additional elements, such as providing feedback and building trust, while Olive (P2 and P6: SM) added that humility and coaching were important requirements for successful coordination. In turn, Amelia (P1 and P4: SM) explained the importance of inspection.

> "Always be prepared, always show up on time, always provide feedback, and build trust amongst your team. Do not ever appear incompetent. Provide structure, organisation and good leadership skills" (Misha, P3 and P5: SM).

> "Humility, focus on the outcomes, role of a coach" (Olive, P2 and P6: SM).

> "Regular evaluation of progress to identify obstacles to progress, putting measures in place to minimise the effect of the problems experienced" (Amelia, P1 and P4: SM).

The findings in chapter five show how closely Scrum helps teams meet many of the criteria specified for successful coordination by both DTMs and SMs. The structure provided by Scrum events was attributed to encouraging regular, timely, transparent and consultative communication (Amelia, P1 and P4: SM; Laurene, P1: DTM; Quintin, P1: DTM; Bongani, P1: DTM and Noah, P4: DTM). Olive (P2 and P6: SM) found Scrum helpful in making her a better servant-leader to her curriculum design teams, aiding her to plan her projects better. Binita (P1: DTM), Bongani (P1: DTM) and Quintin (P1: DTM) found that the project schedule provided sufficient flexibility and accommodated adaptation, while Alonzo (P2: DTM) and Laurene (P1: DTM) found the Scrum events helpful in maintaining focus throughout the project.

6.3.3 Ensuring Successful Collaboration

Misha (P3 and P5: SM) emphasised the importance of creating collaborative opportunities to enhance collaboration among Scrum team members. How work sessions, tools and documents are used should all encourage collaboration for a task to be completed successfully. Quintin (P1:

DTM) shared similar views to Misha, explaining that creating opportunities for people to engage is essential to coordination, as is boosting their courage to do so within the team.

> Create the collaboration opportunities. You need to facilitate the project development in a way that indirectly forces the participants to collaborate. In order to successfully complete or accomplish a task they must need to collaborate. Do not make it optional. (Misha, P3 and P5: SM)

> For collaboration to be successful, you really do need participation from all sides. Being a lecturer myself, sitting in front of that computer screen, and just hearing yourself talk is mind-numbing. So, just getting people to engage with you, to buy into the process and getting courage to give it inputs, that is, I think, the most essential part. (Quintin, P1: DTM)

Teams need to understand the purpose of collaboration and should be encouraged to participate in decision-making (Olive, P2 and P6: SM). Noah (P4:DTM) emphasised the importance of a goal being shared among the team, for if everyone works towards an individual goal, it could lead to a misaligned curriculum.

> “Define the goal, focus on the outcomes, include people in the programme, learn and reflect” (Olive, P2 and P6: SM).

> I think a clear goal is very important, a shared clear goal. To work together is fine and any stakeholder can contribute in an equal manner. But as long as you know what a shared goal is, that makes it much easier to work together. Since, if you don't achieve the same goal, everyone is going to work in their own direction and make it difficult to produce coherent content. (Noah, P4: DTM)

In turn, Amelia (P1 and P4: SM) emphasised that successful collaboration can only be maintained if the team has been guided to interact respectfully with each other and built trust through their daily engagements. Interestingly, trust was mentioned as an important component for the success of all three social interaction elements.

> “Respect for each other. Trust – we are all striving towards the same goal for the greater good. Valuing the differences in approach as a strength in the team” (Amelia, P1 and P4: SM).

For Bongani (P1: DTM) and Lethabo (P6: DTM), successful coordination could only be ensured if the SM truly understood the individuals forming the team. Bongani (P1: DTM) emphasised the importance of SM support, based on an understanding of the individuals’ strengths and weaknesses. Similar to his requirements of flexibility for successful coordination, he further

explained that an SM must be willing to adapt their collaboration strategies, sometimes being more democratic and at other times more autocratic.

> Firstly, knowing your team members and being able to adapt the approach. In an environment where it needs sort of a more democratic and more relaxed approach, then you really ensure that you create a democratic environment that allows everyone input. But if you're really working with individuals that need a push, then that's where you have to adapt, maybe probably become more autocratic.“ “But the most important thing for me is just the support, regardless of which approach one decides to apply. The support and really getting to understand the individuals for who they are, understand their strengths, their weaknesses, and just keep on encouraging them and supporting them. (Bongani, P1: DTM).

A recommendation offered by Lethabo (P6: DTM) was for a workshop to be included in the process that focuses specifically on group dynamics. He maintained that collaboration could be successfully executed once the group understood each other as individuals.

> There must be some form of workshop, that would look at group dynamics, talk about each other and let's have somebody who can come, and we discuss our personalities, so that we get to understand each other. (Lethabo, P6: DTM)

One of the Scrum Principles is collaboration, which is underpinned by the Scrum events, artefacts, team roles and values. Therefore, Scrum creates and encourages collaborative opportunities as specified by Misha (P3 and P5: SM) and Quintin (P1: DTM) as an important criterion to ensure successful collaboration. Scrum requires teams to be self-organising, open and focused using backlogs, stand-ups and clearly defined team roles to aid individuals in working together towards a shared goal. This ties in with Olive's (P2 and P6: SM) and Noah’s (P4: DTM) requirement of having a clear shared goal to promote successful collaboration. Noteworthy is that an aspect for consideration to enhance the Scrum framework for implementation in HE contexts would be to include an event that deals specifically with getting to know the team members on a more personal level. This requirement was specified in chapter five as well, where Olive (P2 and P6: SM), Laurene (P1: DTM), Quintin (P1: DTM), Bongani (P1: DTM) and Lethabo (P6: DTM) mentioned a need to for a session of a more social nature.

6.4 Empowerment as a Project Outcome

Being in the education field and embracing the spirit of Scrum, an additional intended outcome for this curriculum development project was to empower academics to become self-organising curriculum development practitioners. Cobb (2015) maintains that embracing the Scrum principles means transitioning from wanting to control individuals to want to empower them.

Similarly, Schwaber and Sutherland (2017) emphasise the importance of organisations in empowering their development teams for teams to fulfil their roles optimally. The Scrum principles can only be fully embraced by empowered teams (Söderback et al., 2016). Therefore, the Scrum masters were regularly encouraged to empower their development team members.

Misha (P3 and P5: SM) acknowledged that her teams' feelings of reward for persevering through the curriculum design and development process lay in personal upskilling and professional development.

> We need to make sure that the experience is enjoyable for them. This for me is the key aspect. They need to feel a sense of reward and accomplishment. The best way to do this is to upskill them in the process. (Misha, P3 and P5: SM)

When asking the development team members (DTMs) if they felt more empowered after their involvement in this project, all seven of the DTMs had an overwhelmingly positive response. Laurene (P1: DTM) explained that she had been lecturing at the university for a long time without any education training. All that she knew she had to teach herself. She found this e-learning project to be an empowering experience, helping her to understand the curriculum design process from start to finish.

> So, throughout the process, it was never just about doing this work. It was, wow, this is interesting. Oh, I didn't know this. You know, those kinds of moments. … So I've been working or lecturing at the university for a very long time, but I've never had any training in terms of education. So, you learn as you go and you read what you need to as you go along. But this was very valuable in especially the steps. You know, in especially empowering me to do a proper job of development of curricula from the start. Because it seems to me that every time I did it, I did it just a little bit of a back end or the tail end of it, and if I do it from the start, it's actually so much easier to make so much more sense. (Laurene, P1: DTM)

Quintin (P1: DTM) similarly mentioned that he knows a lot more about designing learning programmes in terms of processes and decision-making, tools to use, new teaching methodologies and the like.

> I think I know a lot more regarding this whole business of designing learning programs, seeing the process it takes, seeing the reasoning behind certain things, seeing what possibly can be incorporated in the future, what tools are out there, and what other ways they are doing things other than what we have been doing this whole time. (Quintin, P1: DTM)

While Noah (P4: DTM) shared Laurene and Quintin's sentiments, he added that the process was tough but highly recommended for all lecturers for its empowering benefits.

> Oh, yes, for sure. I can recommend it to anybody. It's a tough process. There is no two ways about it; it's really tough. But it adds so much knowledge for use in everyday work regarding teaching and learning, structuring a curriculum, presenting lectures, because everything has to do with the curriculum design. Eventually, the way in which you present the material, the tools that you use, all of these are part of the design process. (Noah, P4: DTM)

Bongani (P1: DTM) expressed his newfound awareness of how all curriculum components align. Before his involvement in the e-learning project, he had not known that the programme purpose, exit level outcomes, assessment criteria, and learning outcomes were directly linked to what he did in the classroom. He expressed his newfound appreciation for the Classification of Educational Subject Matter (CESMs) and "the relationship between all these moving parts."

> In fact, I felt as if I was a student, again. Where it gave me a broader perspective, especially as a program coordinator, understanding the process of what it takes when you design curriculum. And it has given me that holistic view in terms of curriculum development. (Bongani, P1: DTM)

The level of detail covered throughout the e-learning project is what made Lethabo (P6: DTM) feel most empowered. He explained that he could now account for every hour of his module credits, being able to align outcomes, activities, assessments and learning resources. He concluded that after this process, he felt like a learning designer himself.

> I believe there were quite a lot of things that I thought I knew, but I had not been directly involved. I think, for me, it has been such a wonderful experience. …It was just detailed, and I think, rich information for me. It has changed also how I teach in the class. So for me, I feel like now I'm a learning designer myself, hey. (Lethabo, P6: DTM)

6.5 Conclusion

While a framework such as Scrum greatly influences the social interaction experiences of both SMs and DTMs, the findings have revealed that the leadership styles of SMs are equally influential. Steinbinder and Sinsneros (2020, p. 243) recommend five traits for a leader to be truly caring, i.e. "self-awareness, deep listening, being curious, being empathetic, and being decisive." The findings discussed above and in previous chapters show that not all SMs were equally strong in each of these five traits. While Misha (P3 and P5: SM) led her teams very decisively, Olive (P2 and P6: SM) frequently showed her strength as being self-aware. Amelia (P1 and P4: SM) was frequently complimented for her empathetic mannerisms. Fortunately, caring leadership traits are

behaviours that can be learned. The more consistently they are used, the more effective leaders become at these behaviours (Steinbinder & Sinsneros, 2020). The findings suggest that Scrum, with its pillars, principles and values, provides an ideal framework for SMs to practice such leadership. Through the Scrum events, regular and consistent opportunities for practice are provided. In looking at the top traits listed by the DTMs for successful communication, coordination and collaboration, all learning designers as project managers should strive to be caring leaders.

7 Chapter Seven: Conclusions and Recommendations

7.1 Introduction

Agile project management and enabling leadership have proven to strengthen relationships in online environments through active communication and committed collaboration (Jacobs et al., 2021). Encouraging such social interactions when managing projects leads to more significant workplace learning within organisations (Rozkwitalska, 2020). While the benefits of Agile management are well documented, the social phenomena of transitioning teams, who wish to adopt frameworks such as Scrum, remain poorly understood (Espinosa-Curiel et al., 2018). In this concluding chapter, the researcher will reflect on this study's methodological, substantive and scientific findings, which aimed to determine whether an adapted version of Scrum could be used to promote social interactions in e-learning design projects. Recommendations for further research will also be addressed.

7.2 Summary of the Research

In the first chapter, the researcher introduced the reader to the study's research problem, rationale, and purpose. The research questions were established stemming from this background. With online education and training on the rise, an increased demand for suitable instructional design partners and lead subject matter experts in developing online courses has been witnessed. However, steering virtual communication, coordination and collaboration practices have been challenging. The researcher witnessed how waterfall management approaches led to great frustration among teams when failing to meet rigid deadlines and attempting to stick to project goals that were dictated rather than negotiated by the team. As more studies on agile strategies that allow flexibility and encourage stakeholder collaboration emerged, the researcher began to ponder whether Scrum, in particular, might be well suited to the management of curriculum design teams. Therefore, the problem under investigation was whether an agile framework such as Scrum could support instructional designers in promoting social interactions among development teams. The context of this study explicitly related to e-learning teams involved in programme development within a university setup.

The main research question guiding this study was, therefore:

> To what extent can a Scum framework be used to promote social interactions in the analysis and design phases of an e-learning project in the higher education context?

The following secondary question was asked to support the primary question:

How can the Scrum framework be implemented to promote *communication, coordination* and *collaboration* in an e-learning activity system?

In chapter two, the researcher unpacked the literature reviewed for this study in greater detail. An overview of e-learning and the rise of fully online learning was provided. After that, the researcher unpacked how instructional design models, particularly ADDIE, were often used to structure the programme design process, as was the case in this study.

Next, the researcher provided an overview of project management from traditional waterfall approaches to more agile approaches, including Scrum. Scrum explained what roles team members should partake in, or how managers should conduct events. Unlike most other frameworks, it also provided much-needed guidance on principles and values required to enhance the social interactions of development teams. While social interactions comprised several constructs, the researcher particularly focused on communication, coordination and collaboration in this study.

Activity theory (AT) was used as a theoretical lens to aid the researcher in maintaining focus on all the activity systems that form part of an e-learning project, curtailing the possibility of having blind spots due to personal bias (Bleakley, 2021). AT was also used to guide the secondary research question, the data gathering instrument design, and used as a structuring principle in chapters four and five.

Chapter three continued to explain how having an interpretivist worldview influenced the researcher's ontological, epistemological and axiological assumptions, which influenced the inquiry process. The researcher described how a qualitative research approach was used to study a single case, namely the online programme support directorate, where various departmental teams designing online programmes served as embedded units. Purposive and convenience sampling was used as only participants who had been in the Scrum process of designing a fully online programme for a minimum of six months, were included in the study (Lu & Franklin, 2018). Details regarding the five data-gathering strategies used, including reflexive observations, reflective email interviews, semi-structured group interviews, a survey and semi-structured individual interviews, were also provided (Olsen, 2012).

Chapter three further explained how content analysis occurred through iterative rounds of coding, categorising and theming of the data (Gioia et al., 2013). The researcher carefully adhered to quality control mechanisms, including credibility, transferability, dependability, confirmability and reflexivity devices (Korstjens & Moser, 2018). In the final section of chapter three, ethical guidelines were discussed.

The fourth chapter discussed the findings relating to the people-centric activity elements of the Scrum e-learning project. The researcher commenced with a detailed description of this study's

higher education (HE) context and the participants. This information was provided to aid future researchers and readers in identifying transferable aspects in their contexts (Roberts et al., 2019). Discoveries regarding the perceptions of the division of labour between development team members (DTMs) and Scrum masters (SMs) were then unpacked. Finally, the researcher reported on elements which kept individuals motivated throughout the e-learning design project. Having a fixed process, a sense of community and consistent weekly interactions with clear tasks kept the DTMs working towards the project goal. At the same time, the SMs were motivated by a need for timely project delivery, quality outputs, providing caring leadership and building relationships.

Chapter 5 unpacked the organisation-centric elements of the study. In this chapter, the findings of using Scrum as a set of tools and rules to adapt the framework to support social interactions among the design teams were described in detail. The participants exposed to Scrum discovered that the framework was valuable in encouraging transparent, frequent, and effective communication. Regarding coordination, the SMs who attempted to implement Scrum found that the framework encouraged them to organise, serve, and lead more intentionally. The opportunity created by Scrum for self-organisation and adaptation resulted in a greater willingness to work collaboratively, participants reported.

The findings, however, suggested that adaptations to Scrum, within the context of e-learning design in HE, were required. Aspects related to an orientation sprint, flexibility with terminology use, and a reduced number of stand-up meetings were some recommendations for adaptations discussed. The researcher also reported on the barriers discussed by participants as they worked towards their project goals. The findings revealed that time constraints due to academic workload were among the greatest elements hindering communication, coordination and collaboration efforts.

Chapter 6 concluded the chapters discussing the findings by providing an overview of closing remarks made by participants regarding encouraging Scrum adoption and implementation recommendations. The results indicated that organisations wanting to adopt Scrum should attempt to provide diverse training options for their staff. A further crucial factor was providing Scrum masters with dedicated time to complete their training and transition to implementation. Finally, Chapter 6 addressed empowerment as a project outcome, which the researcher believes should be a standard goal of all e-learning projects at higher education institutions. The findings revealed personal upskilling and professional development as a big driving force for many DTMs who joined the e-learning project.

7.3 Methodological Reflection

A qualitative research approach was followed in this study, given the complexities of the activity theory elements at play, and the necessity to obtain rich descriptions to enhance the

understanding of each (Moghadam et al., 2021). A single exploratory holistic case study with embedded units was used. Again, the study's nature and the reality of the researcher being the sole investigator in this study resulted in the design being deemed appropriate. If further studies were conducted, adding co-researchers and a broader sample would greatly enhance the study as multiple e-learning design teams across various universities could be included as cases. The experiences of curriculum design teams exposed to different project management frameworks could also be explored as a comparative study.

Convenience and purposive sampling of the participants took place (Chukwuere, 2018). Since this study was conducted during COVID-19 lockdown, participant traits of willingness, availability and accessibility were even more significant than under less strenuous conditions. Of the six development teams contacted, only four teams from different departments participated in the study. The development team members (DTMs) who were unwilling or unable to participate represented two teams who worked with the same Scrum master (SM), resulting in the researcher's inability to triangulate this particular SM's views with those of her DTMs. However, cross-fertilisation, comparison and contrasting of all of the SMs' and DTMs' views still occurred (Dahlin, 2021), with the researcher disclosing this limitation early in the study. Whenever possible, it is ideal to have both SMs and DTMs on the same Scrum team participating in a study so that the views of all who collaboratively conceptualise, design, and deliver programmes are represented (Saunders et al., 2020).

The researcher became deeply immersed in the study, fulfilling the roles of product owner (PO), Scrum master (SM) and curriculum design expert. This involvement provided an opportunity to fulfil better the role of primary data gathering and analysis instrument (Yin, 2003). Including a co-researcher could have aided in enriching the data gathering and study findings, as interviews with the researcher (as PO) could have supported critical reflection on how participants implemented and perceived this role. The researcher continually used the reflexive questions proposed by Patton (2015) to ensure that triangulated inquiry was taking place in an attempt to remain reflexive. The findings revealed that more emphasis could have been placed on determining what informs the participants' worldviews. By incorporating opportunities to probe reflexive screens of culture, social aspects, family and values, the study could have allowed a more complete depiction of the participants to emerge, enhancing the trustworthiness of the findings even further (Stewart et al., 2017). These probes should form part of the Scrum implementation process and the data-gathering instruments used throughout the study, as revealed by the participants' needs for cultural and personal understanding.

The process was iterative, with adaptations being made to the data-gathering techniques and instruments as the researcher grew in understanding the topic under investigation (Saldana, 2011). The contemporary reflective journal was an ever-evolving, multi-faceted data gathering

technique used primarily for the researcher's decision-making. The researcher used multiple formats to aid in capturing personal desires, evolving research design ideas and participant-observer experiences. WhatsApp voice notes while driving, written notebook entries during work meetings, mind maps on loose papers grabbed as thoughts arose at night, and more structured OneNote diary entries when writing thesis chapters at a desk were some of the formats used. Ortlipp (2008, p. 704) explains that "using reflective research journals can make the messiness of the research process visible to the researcher who can then make it visible for those who read the research and thus avoid producing, reproducing, and circulating the discourse of research as a neat and linear process". Like Ortlipp (2008), the researcher used her journal entries to explain to the readers what her project desires and paradigmatic assumptions were and how they impacted her design decisions. However, the researcher differed in her approach in that she did not use direct quotes from the diary, but rather reworked the narratives to suite the thesis writing style. The researcher acknowledges that for raw data review the journal entries could have been better structured; however, combining this information into a single journal over three years and forcing a rigid logical structure could have detracted from the value the researcher gained from maintaining fluidity.

Initially, the intention was to have four focus group interviews with each Scrum team. Realising that DTMs might feel compelled to only speak well of the social interactions experienced in the presence of the SMs, the decision was made to conduct group interviews with the SMs separately. The SM semi-structured group interviews provided an opportunity for the learning designers to share and discuss their practice, which led to the willingness of peers to expand their Scrum implementation based on the strategies disclosed (Nobrega et al., 2021). For the DTMs, the decision was taken to conduct semi-structured individual interviews as some of the programme teams were only represented by one DTM who could participate in the study. In comparison, other teams consisted of only one DTM. A further perceived benefit of the individual interviews was that participants were more willing to share personal feelings and thoughts, especially regarding aspects they found challenging. Kruger et al. (2019) have noted similar observations, especially where participants were demographically dissimilar in terms of position, gender, income or race (as was the case in this study).

The reflective email interviews proved to be a valuable data-gathering technique given how overloaded the Scrum masters (SMs) felt working remotely with multiple teams and competing for time to fulfil academic responsibilities for the duration of the study. The emails allowed participants to think about their responses and reply independently (Topping et al., 2021). However, one downfall was that the SMs often wrote very cryptically, jotting down bullet points rather than constructing full sentences. The researcher proposes providing clear guidelines to participants regarding response formats expected when using email interviews. Fortunately, the

findings from the group interviews could be compared to the email interview reflections to aid in clarifying responses, where necessary.

Finally, the survey was the only quantitative data-gathering instrument used. Piloting the instrument proved valuable in pinpointing an average completion time, enhancing the ease of use and avoiding ambiguous questions and terminology. Although only a tiny portion of the findings was captured and reported through quantitative research, the findings remained extremely valuable. The Qualtrics survey tool was useful for capturing participants' demographic details, thus reducing time spent during individual interviews on such questions. In retrospect, the researcher could have increased the number of questions in the survey, as the questionnaire took only ten minutes to complete. Where qualitative techniques provided richness and detail of participants' experiences, the survey data captured numerical and visual summaries that could be quickly interpreted and provided objective results (Nayak & Narayan, 2019). Quantitative tools offered the possibility for inferential statistics, although this was outside the scope of the study, given the small sample size (Ciancarini et al., 2021).

The researcher began data analysis at the same time that data was gathered. Although the researcher intended to follow only inductive data analysis methods, the researcher soon realised that the nature of the study lent itself more to deductive inquiry. Therefore, the researcher started with an inductive mode of investigation but eventually conducted primarily deductive analysis (Merriam & Tisdell, 2016). Verbatim quotes of two or more sentences were assigned to a priori codes to avoid losing the essence of what a participant was conveying. The researcher used a combination of activity theory elements, Scrum elements and emergent data categories to theme the data (Linneberg & Korsgaard, 2019). The researcher recommends that in studies similar to this, future researchers should also limit the possibility of overlooking data that does not fall within a priori themes by remaining open to removing, redefining or adding to the existing activity theory and Scrum constructs (Elliott, 2018). Therefore, the a priori constructs were used as organisational and provisional exploratory themes rather than fixed premises. While themes often represented features that frequently recur across the transcripts, some themes were unique and only presented one participant's views. This use of themes was to aid with the writing up of findings, allowing participants' interpretations and experiences to emerge while presenting them in a manner which would respond to the questions being investigated.

Quality assurance techniques used to enhance the rigour and trustworthiness of this qualitative study included credibility, transferability, dependability, confirmability and reflexive mechanisms. Strategies used to establish credibility included triangulation through multiple data-gathering techniques, prolonged engagement with Scrum team members in the field, encouraging member checking of all transcripts, and using participant quotes to write up the findings (Korstjens & Moser, 2018). The researcher believed these mechanisms to be sufficient in

establishing credibility, as these are highly recommended in the literature. By piloting the questionnaire, the researcher enhanced the instruments' credibility. Although questionnaires are generally considered quantitative instruments that adhere to validity and reliability measures, the nature of this study and how the data was used did not call for measures such as test-retest reliability or factor analysis (Maree & Pietersen, 2011). The researcher instead triangulated the responses between constructs measured in the questionnaire and those of the various interview responses.

Rich descriptions of the study population and sample were provided to unpack the study's demographic boundaries and contexts to establish transferability (Johnson et al., 2020). The researcher worked with participants from four different departmental groups, using the same data collection instruments with each. This was done to capture a range of views and experiences to better understand and uncover the phenomena under investigation (Tong & Dew, 2016). Tracy and Hinrichs (2017) clarify, however, that although it is the researcher's responsibility to provide thick descriptions of the study context, only a reader can truly determine the extent of transferability to their own contexts or experiences.

Through clear and consistent descriptions of decisions taken regarding the study purpose, sampling, gathering of data, analysis of data, and representation of the findings, the researcher attempted to enhance the dependability of the interpretations, findings and conclusions drawn from the raw data (Korstjens & Moser, 2018). Revisiting coded data over a prolonged period of analysis, referred to as double coding, was also used to determine if the researcher still considered the codes dependable (Baxter & Jack, 2010). The researcher, however, believes that dependability could have been further enhanced by a co-researcher who could have compared codes and categories to determine if similar conclusions would be surmised (Richardson et al., 2019). Finally, in addressing the confirmability of the study, the researcher remained reflexive, self-aware and open throughout the study. From the onset, she acknowledged her paradigmatic stances, taking into account biases and how personal feelings and insights gained from working closely with the participants for an extended period might impact the study's findings. The researcher attempted to allow the participants' voice to come to the fore rather than influencing the study's outcomes by continually reflecting on whether the findings captured best portray the participants' experiences at a given moment (Johnson et al., 2020; Thomas & Maglivy, 2011).

7.4 Substantive Reflection: Contribution of the Study

The findings of this study revealed that Scrum is well suited for use among HE learning design teams relying on remote social interactions to achieve their project goals. This study confirmed previous findings indicating that Scrum positively impacted the development teams' communication, coordination and collaboration efforts. Magana et al. (2018), who incorporated

Scrum into an online course for group learning and Azanha et al. (2017), who used Scrum to manage an IT project within a pharmaceutical company, also found that Scrum greatly contributed to enhanced communication. Similarly, in software engineering (Bhavsar et al., 2020) and collaborative research initiatives (Hidalgo, 2019), Scrum has been reported to improve coordination. Finally, Avila et al. (2022) and Espinosa-Curiel et al. (2018) also found Scrum to encourage greater collaboration among software engineering students and software enterprise employees, respectively. While most of the studies mentioned above are in fields other than curriculum design, Clark and Koppy (2020) reported that their instructional design team successfully implemented Scrum with cross-functional teams comprising subject matter experts, instructional designers and curriculum developers.

The study's results brought to the fore the nature of social interactions within a project as being both work and emotional-related. Bellis et al. (2022) also found these dimensions evident in Scrum implementation, as teams constantly shifted between professional processes and behavioural dynamics. Initially, the researcher focused on establishing how the work-related elements of Scrum could contribute to the enhancement of communication, coordination and collaboration, not realising the impact of COVID-19 and social isolation on the participant's emotional needs (Jacobs et al., 2021). The findings revealed that digital Scrum teams need personal connection, social gatherings (virtual or in-person) and an understanding of cultural differences. Rahman et al. (2021) similarly found that when conducting qualitative digital research, and even more so during a pandemic, it is important to consider role players' mental and physical health.

This study discovered that Scrum provides sufficient work-related project management elements to support project managers in enhancing virtual social interactions. The framework includes rules (for example pillars of transparency and principles, such as iterative development), tools (including events, such as sprints, and artefacts such as sprint backlogs) and division of labour (specifically the team roles of Scrum masters) that encourage frequent, transparent and goal-directed social interactions. Rashid et al. (2019) confirm that Scrum's work-related elements, when correctly executed, can become so effective that a next generation of eco-friendly green-agile models are being implemented to make the already competitive benefits of timely, structured, inclusive and effective Scrum management even greater.

Scrum also catered to some extent for emotional-related dimensions through values, such as focus, openness, and roles of servant leadership, and rules related to collaboration and self-organisation. In previous studies, Scrum was found to help leaders be more inclusive (Bellis et al., 2022). Participants in this study reported the same experience of inclusivity. The findings revealed that development team members, in particular, valued how inclusive sprint planning events were. A study by Bick et al., (2018) reported that Scrum pillars, principles, values and

events encouraged team members to voice their opinions and collectively solve problems. Espinosa-Curiel et al. (2018) reported similar findings in their study on teams transitioning to Scrum. Participants claimed that Scrum events made individuals more receptive to feedback and willing to share ideas. In this e-learning curriculum design study, the results showed that weekly stand-ups aided in connecting team members with each other. It was, however, communicated that the pressure to meet timelines resulted in much emphasis on organisation-centric management, rather than human-centric leadership. Shahin et al. (2021, p., 75287) also found that product owners and Scrum masters have a greater responsibility to be conscious of team member and stakeholder needs, actively putting "human values at a central point in the decision-making".

Implementing Scrum in a HE environment was not without its challenges. One of the greatest barriers faced by the Scrum masters and development team members in this study was their existing workload. As academic staff, the participants continuously needed to juggle competing performance areas of teaching, research, admin and supervision, impacting their time and workload. Smith et al. (2020) made similar discoveries in their study. The findings suggest that Scrum teams should be given time off from some of their day-to-day academic tasks to focus on the curriculum design project. Clark and Koppy (2020, p. 23) also confirmed that Scrum teams need to have "all other projects and most standing meetings removed from their plates to enable them to focus on the Scrum work with their partners".

Second to workload was the challenge of working in small teams of less than four members. Findings revealed that this negatively influenced content quality and the academic rigour of a programme. Vaid and Ghose (2020) confirm that teams of seven to ten individuals are ideal for Scrum implementation because communication and coordination are more manageable, and teams can more readily self-organise to allow individual expertise to enhance increment output. In addition, terminology, including both Scrum terms and the curriculum jargon, also posed a barrier to social interactions in Scrum teams. Scrum masters were inconsistent in their use of Scrum, with some finding the terms meaningful, and others claiming that the terminology confused academics and was therefore omitted. Arcos-Medina and Mauricio (2019) similarly found that teams did not always use Scrum terminology consistently. Ragas and Ragas (2021) explained that Agile teams' poor grasp of Scrum terms' working definitions was often the cause for incorrect terminology use, or lack of use entirely. The researcher drew the same conclusion based on the findings of this study. It is, therefore, very important that sufficient time is spent on terminology integration early in the Scrum introduction stages if teams are to embrace the purpose and values encapsulated within the Scrum terms.

7.5 Scientific Reflection

This study has shown that the Scrum framework, to a large extent, can be used in HE programme design when remote teams need to enhance their social interactions. Scrum provides a structured process with valuable pillars, principles, artefacts, values and roles that encourages daily communication, transparent coordination, and collaborative teamwork. The findings, however, revealed that the individual personalities of Scrum masters greatly influence the extent to which Scrum will be adopted. While some project managers may be eager to embrace the framework almost immediately, others require what the researcher termed “cycles of implementation”. The product owner (PO) is responsible for determining how best to encourage Scrum masters to attempt implementing Scrum. Initially, diverse training opportunities and frequent engagement with Scrum masters (SMs) may be required, to strengthen buy-in and address concerns. Focus groups were proven to work well in this regard, as less experienced Scrum masters can learn much from more experienced SMs. The PO needs to continually engage with each SM to determine their views on Scrum, and their needs to embrace its pillars, principles and values better. Once these are in place, continuous attempts should be made to encourage the implementation of roles, events and artefacts. The adoption of Scrum should not be considered complete after a lapse of time or completion of certain training activities but should rather be seen as a continual process to grow in the understanding of the various aspects of Scrum.

In particular, Scrum events and artefacts were attributed to enhancing communication. The results revealed that sprint planning sessions, accompanied by an online sprint backlog to which everyone has open access, promote transparent and inclusive communication. The regularity of “next-steps” emails and the nature of stand-up meetings to discuss *what was done*, what *needs to be done* and *what impediments were experienced* also contributed to positive communication experiences. The participants perceived these social interactions as meaningful and goal driven. Finally, the findings indicate that the tone and intention of communication should be geared towards empowering individuals to enhance communication experiences.

Given that the study was conducted remotely and fully online, the researcher proposes that instant communication and collaboration technologies such as Google Suite (including Google Docs, Google Sheets, Google Chat and Google Meet), Zoom or BlackBoard Collaborate and WhatsApp, be used together with Scrum practices to facilitate social interactions among remote teams. The findings revealed that using these tools to host the Scrum events and share Scrum artefacts, led to open communication and more regular collaborative interactions. Inspection (one of the Scrum pillars), in particular, was strengthened through these online tools, which simplified the provision of online comments, reviews, and feedback on curriculum documents. The participants in this study reported benefitting greatly from these collaborative communication tools being used for evaluation purposes.

Communication challenges documented in the findings included a lack of non-verbal communication, a lack of understanding of professional culture, and insufficient personal interactions of a more social nature. When cameras are switched off, the loss of non-verbal cues creates a communication barrier as the Scrum master do not realise that some participants are expressing uncertainty or confusion. Cameras should be kept on to allow the perception of non-verbal cues to enhance virtual communication. “Non-verbal communication channels play a crucially important role not only in the establishment of successful meetings but also in the formulation of positive (possibly mind-enhancing, productivity-boosting) interactions among individuals” (Ciancarini et al., 2021, pp. 71949–71950). Alzoubi and Gill (2021) also documented cultural differences as the greatest communication challenge experienced between remote Agile teams. It is recommended that Scrum masters become well-versed in cross-cultural communication and leveraging diversity in a team. Finally, opportunities for team members to form connections beyond their work roles should be provided. The study revealed that people have the desire to connect emotionally. Forming personal connections, leads to the building of trust, which in turn breaks down barriers of hierarchy, allowing scrum team members to contribute equally to decision-making.

When closely following Scrum, the framework is very useful in strengthening the coordination capabilities of Scrum masters. Working in sprints aids in breaking the work down into manageable chunks, resulting in useable increments being produced every few weeks. Creating the curriculum in increments aids with frequent reviews, feedback and improvement so that by the time the curriculum needs to follow approval processes, the learning outcomes, assessment tasks, learning activities and resources have been adapted and finalised to meet stakeholder needs. The stand-up meetings also result in greater accountability among DTMs as they know they have to report to their entire team on progress. The stand-ups also prompt regular check-ins and follow-ups among Scrum masters who are not inclined to do so naturally. While stand-ups were reduced from daily to weekly engagements, the researcher does not recommend meeting any less frequently. The findings revealed that these 15 minute interactions lose their value if not conducted on a regular weekly basis.

Further iterative development led to enhanced quality outputs and an enhanced learning opportunity for DTMs who were required to revisit curriculum components and make improvements after feedback. Scrum was also attributed to helping the novice DTMs to adjust to the demands of the e-learning programme design project. Many commented on the clarity of processes and level of detail provided when following Scrum, as being an enabler to achieving project goals. The findings revealed that the transparent practices of Scrum led to higher motivation levels among DTMs as they appreciated having a thorough understanding of the processes and timelines. The frequency of engagements encouraged by Scrum also led to higher motivation levels for some participants as they felt more focused, knowing work was due each

week. Finally, participants expressed that servant leadership also contributed to their positive experiences of project coordination.

A thorough orientation to Scrum and curriculum design is recommended to add additional value to Scrum implementation for design teams new to curriculum development and remote working, to add additional value to Scrum implementation for design teams new to curriculum development and remote working. While Scrum lacks a project initiation phase (Flewelling, 2018), the researcher included an orientation sprint for the teams where she fulfilled the role of SM. The participants perceived this as very helpful and reported a better understanding of the project goal, timelines, and team responsibilities. Among teams who did not receive proper orientation, feelings of uncertainty, being overwhelmed, and experiencing confusion about the project were documented. The findings of this study suggest that Scrum projects should kick off with an orientation sprint that lasts for a week or two as teams are introduced to the Scrum framework and e-learning curriculum design field. An increment for this orientation sprint could include terminology and the agreed-upon working definitions to be used by the team, the team values and the project goals to which the team collectively commit.

In the field of programme design, a further adaptation to Scrum is the requirement of “teaching opportunities” or “empowerment events” that pertain particularly to upskilling DTMs in pedagogy, curriculum development and instructional design. Many development team members have expertise related to their disciplines and can self-manage in this regard. However, they lack the curriculum knowledge required to develop the various sprint increments for module and programme design. While some teams used weekly synchronous workshops as “teaching opportunities”, others used a flipped classroom approach, where videos and resources were shared for self-study in advance of the team sprint planning events. During these events, questions and concerns pertaining to the shared resources were discussed to clarify the curriculum components to be developed for the week. When time constraints are barriers to e-learning programme design projects using Scrum as project management framework, the researcher recommends using a flipped classroom approach for teaching opportunities.

With one of Scrum’s principles being collaboration, and all Scrum practices being geared towards teamwork, Scrum was reported to enhance the collaborative efforts of teams. The study revealed that higher-quality outputs were delivered due to collaboration and sharing of ideas and expertise. Collaboration also made some participants feel like valued team members, which boosted motivation and commitment. Through collaboration participants, teams developed a sense of shared ownership, experienced a willingness to adapt to change, and contributed to unique problem-solving. Self-organisation and adaptation, both promoted by Scrum, also positively impacted collaboration as teams felt empowered to make decisions about the best manner to work towards a common goal.

The researcher recommends that during the orientation sprint, time should be dedicated to explaining the collaborative nature of Scrum, and how programme teams should work towards a shared qualification vision. Team members should be given time to discuss the subtle differences between cooperation (working as a group with individual ownership towards individual goals) and collaboration (working as a team with shared ownership towards a goal of shared interest). Once Scrum implementation has commenced, the findings suggest that novice SMs should pay attention to continually building relationships and trust with team members (Richardson et al., 2019). This can be achieved through open communication and collective decision-making on team goals and values.

7.6 Recommendations for Practice and Further Research

The researcher has several recommendations for the practical implementation of Scrum among curriculum design teams, who also wish to document their journey and conduct research on their practice. Firstly, the study revealed the importance of clarifying Scrum roles from the onset of Scrum implementation. While the roles of the Scrum master and development team member were emphasised in this study, the researcher also recommends clearly defining the roles and responsibilities of the product owner. This recommendation is especially important for curriculum design projects in HE, where uncertainties may arise given existing roles and titles and challenges around curriculum ownership.

Secondly, in this study, retrospectives were often conducted through Google Docs comments due to the limited time academics had available; however, the researcher recommends having monthly virtual or in-person retrospectives, given the benefits it held for team members.

Thirdly, since the writing up of the findings, the product owner has initiated the inclusion of student and industry consultations as part of the curriculum conceptualisation process to represent stakeholder voices more actively. The researcher also recommends this practice for future Scrum implementation, given that it could lead to an enhanced end product tailored to the student's and industry's needs.

Finally, one Scrum master has actively started discussing the Scrum values during the orientation sprint with new teams, allowing them to collaboratively decide how to define and commit to these values throughout the project. For future practice, it is recommended that teams new to Scrum be encouraged to commit to the team's set of agreed values from the outset of the project.

For further research, it is recommended that a larger number of institutions using either Scrum, other Agile frameworks or waterfall methodologies to manage curriculum design teams be included in these studies. Access to a larger and more diverse population will aid in determining how these project management frameworks impact the social interactions of varied development

teams. A larger sample will also ensure that more quantitative data collection and analysis can occur, strengthening any inferential conclusions drawn.

The researcher further recommends additional research on groups with a greater emphasis on diligently using the Scrum terminology. Such research would aim to determine whether the Scrum terms when closely followed, influence the teams' perceptions of communication, coordination and collaboration.

Finally, given that curriculum development projects for accredited HE programmes in the South African context often extend well beyond a year, it is recommended that future studies include more than one individual interview with development team members. These additional interviews will allow time to analyse the first interview's data and prepare follow-up questions. As the team matures, these follow-ups might reveal interesting findings on how initial interview responses differ from or correspond with those in the later parts of the project.

7.7 Conclusion

While the COVID-19 pandemic made for a remarkable setting, forcing all the teams to engage fully online for the duration of the study, the researcher believes the findings remain relevant to several on-site, blended and fully online contexts. The nature of the framework and easily accessible online collaboration tools used in this study mean that Scrum can be implemented by teams that already operate remotely, need to transition to working fully online, or have a preference for continued online engagement, regardless of their return to on-site work.

In the sphere of the study, managing projects could not solely be focused on delivering artefacts in minimum time. Without focusing on social interactions, teams would have quickly lost motivation, especially amidst the challenges of lockdown and transitioning to emergency remote teaching. Creating a sense of community and having people-centric goals was just as important as having a detailed plan and following a structured approach. In addition to initiating, guiding and maintaining motivation, the study revealed that a Scrum team also needs to be fully aware of the socio-emotional project elements that will lead to overall success.

White et al. (2019) have found that leaders with greater emotional and social intelligence can better manage the relationships of their teams, build trust among members, and reduce team burnout. Thus, in addition to Scrum masters adhering to the values of Scrum, i.e. courage, focus, openness, respect and commitment, the findings suggest that it is also worthwhile developing their emotional and social intelligence through professional development opportunities. Important however, is that institutions, departments or directorates, such as the one from which the participants were sampled, must be willing to give up tendencies for highly structured procedures, rigid rules and outdated performance management systems in exchange for rewarding collaboration, trustworthiness and open communication (Patrucco et al., 2022). To conclude,

project managers, who plan to implement Scrum among learning design teams, should themselves reflect on social and emotional intelligence by continuously observing and engaging with the individual Scrum masters to best establish how to encourage these individuals to embrace Scrum to the full. While this study has established that Scrum enhances communication, coordination and collaboration among e-learning teams, it remains highly dependent on the extent to which Scrum masters are willing to implement the people-centric and organisation-centric elements.

References

Abdous, M., & He, W. (2008). Streamlining the online course development process by using project management tools. *The Quaterly Review of Distance Education*, *9*(2), 181–188. https://eric.ed.gov/?id=EJ875096

Abubaker, Q. (2018). Using Gagne ' s Theory and Peyton ' s Four - Step Approach to Teach Inferior Alveolar Nerve Block Injection. *Journal of Dental Research and Review*, *5*(3), 75–79. https://doi.org/10.4103/jdrr.jdrr

Agbejule, A., & Lehtineva, L. (2022). The relationship between traditional project management, agile project management and teamwork quality on project success. *International Journal of Organizational Analysis*, *30*(7), 124–136. https://doi.org/10.1108/IJOA-02-2022-3149

Agh, H., & Ramsin, R. (2021). Scrum metaprocess: a process line approach for customizing Scrum. *Software Quality Journal*, 337–379. https://doi.org/10.1007/s11219-021-09551-4

Akansha, A. (2016). *The Evolution of e-learning: from Baby Steps to Giant Leaps*. Ispring E-learning Blog. https://www.ispringsolutions.com/blog/the-evolution-of-e-learning-from-baby-steps-to-giant-leaps

Akasha, H., & Elsayegh, H. O. (2020). Quality Standards in E-learning of Textile printing design VS Traditional learning methods. *Journal of Architecture, Art & Humanistic Science*, *5*(23–1), 1004–1022. https://doi.org/10.21608/mjaf.2020.38394.1796

Akhmetshin, E. M., Romanov, P. Y., Zakieva, R. R., Zhminko, A. E., Aleshko, R. A., & Makarov, A. L. (2019). Modern approaches to innovative project management in entrepreneurship education: A review of methods and applications in education. *Journal of Entrepreneurship Education*, *22*(1S). https://www.abacademies.org/articles/modern-approaches-to-innovative-project-management-in-entrepreneurship-education-a-review-of-methods-and-applications-in-education-8010.html

Aldoobie, N. (2015). ADDIE Model. *American International JOurnal of Contemporary Research*, *5*(6), 68–72.

Alkahtani, A. (2017). Curriculum change management and workload. *Improving Schools*, *20*(3), 209–221. https://doi.org/10.1177/1365480217706789

Allen, I. E., & Seaman, J. (2003). Sizing the opportunity: The quality and extent of online education in the United States, 2002 and 2003. *The Sloan Consortium*. https://files.eric.ed.gov/fulltext/ED530060.pdf

Almeida, F. (2017). Challenges in Migration from Waterfall to Agile Environments. *World Journal*

of Computer Application and Technology, *5*(3), 39–49. https://doi.org/10.13189/wjcat.2017.050302

Alzoubi, Y., & Gill, A. (2021). The critical communication challenges between geographically distributed agile development teams: Empirical findings. *IEEE Transactions on Professional Communication*, *64*(4), 322-337. https://doi.org/10.1109/TPC.2021.3110396.

American Psychological Association. (2017). Ethical Principles of Psychologists and Code of Conduct. *American Psychologist*, *57*(12). https://www.apa.org/ethics/code

Amri, M., Angelakis, C., & Logan, D. (2021). Utilizing asynchronous email interviews for health research: overview of benefits and drawbacks. *Bmc Research Notes*, *14*(148), 1–5. https://doi.org/10.1186/s13104-021-05547-2

Andrei, B.-A., Casu-Pop, A., Gheorghe, S.-C., & Boiangiu, C.-A. (2019). A Study on Using Waterfall and Agile Methods in Software Project Management. *Journal of Information Systems & Operations Management*, *13*(1), 125–135. http://0-search.proquest.com.ditlib.dit.ie.tudublin.idm.oclc.org/docview/2237828314?accountid=10594

Arcos-Medina, G., & Mauricio, D. (2019). Aspects of software quality applied to the process of agile software development: a systematic literature review. *International Journal of System Assurance Engineering and Management*, *10*(5), 867-897. https://doi.org/10.1007/s13198-019-00840-7

Arefazar, Y., Nazari, A., Hafezi, M. R., & Maghool, S. A. H. (2019). Prioritizing agile project management strategies as a change management tool in construction projects. *International Journal of Construction Management*, *22*(4), 678–689. https://doi.org/10.1080/15623599.2019.1644757

Armat, M. R., Assarroudi, A., Rad, M., Sharifi, H., & Heydari, A. (2018). Inductive and deductive: Ambiguous labels in qualitative content analysis. *Qualitative Report*, *23*(1), 219–221. https://doi.org/10.46743/2160-3715/2018.2872

Armstrong, A. M. (2004). Instructional Design in the Real World: A View from the Trenches. *United States of America by Information Science Publishing*, *53*(9), 1689–1699.

Aston, B. (2019). *9 Of The Most Popular Project Management Methodologies Made Simple*. Digital Project Manager. https://thedigitalprojectmanager.com/project-management-methodologies-made-simple/

Aurisch, R., Ahmed, M., & Barkat, A. (2021). An outlook at Agile methodologies for the independent games developer. *International Journal of Computers and Applications*, *43*(8),

812–818. https://doi.org/10.1080/1206212X.2019.1621463

Austin, C., Browne, W., Haas, B., Kenyatta, E., & Zulueta, S. (2013). Application of project management in higher education. *Journal of Economic Development, Management, IT, Finance, and Marketing*, *5*(2), 75.

Avcu, Y. E., & Er, K. O. (2020). Developing an Instructional Design for the Field of ICT and Software for Gifted and Talented Students. *International Journal of Educational Methodology*, *6*(1), 161–183. https://doi.org/https://doi.org/10.12973/ijem.6.1.161

Avila, D. T., Van Petegem, W., & Snoeck, M. (2022). Improving Teamwork in Agile Software Engineering Education: The ASEST + Framework. *Ieee Transactions on Education*, *65*(1), 18–29.

Azanha, A., Argoud, A. R. T. T., de Camargo Junior, J. B., & Antoniolli, P. D. (2017). Agile project management with Scrum: A case study of a Brazilian pharmaceutical company IT project. *International Journal of Managing Projects in Business*, *10*(1), 121–142. https://doi.org/10.1108/IJMPB-06-2016-0054

Azungah, T. (2018). Qualitative research: deductive and inductive approaches to data analysis. *Qualitative Research Journal*, *18*(4), 383–400. https://doi.org/10.1108/QRJ-D-18-00035

Bach, S., Haynes, P., & Smith, J. L. (2007). *Online Learning and Teaching in Higher Education*. McGraw-Hill Education. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=316249.

Ballim, Y., Mabizela, S., & Mubangizi, J. C. (2016). Professional Bodies and Quality Assurance of Higher Education Programmes in South Africa: Towards an Appropriate Framework. *South African Journal of Higher Education*, *28*(4), 1140–1155. https://doi.org/10.20853/28-4-386

Bampton, R., & Cowton, C. J. (2002). The e-interview. *Forum Qualitative Social Research*, *3*(2). https://doi.org/10.17169/fqs-3.2.848

Batra, D., Xia, W., & Zhang, M. (2017). Collaboration in agile software development: Concept and dimensions. *Communications of the Association for Information Systems*, *41*(1), 429–449. https://doi.org/10.17705/1cais.04120

Bawa, P., & Watson, S. (2017). The Chameleon Characteristics: A Phenomenological Study of Instructional Designer, Faculty, and Administrator Perceptions of Collaborative Instructional Design Environments. *Qualitative Report*, *22*(9).

Baxter, P. E., & Jack, S. M. (2010). Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers. *The Qualitative Report*, *13*(4), 544–559.

https://doi.org/10.46743/2160-3715/2008.1573

Beatty, P. C., Collins, D., Kaye, L., Padilla, J. L., Willis, G. B., & Wilmot, A. (Eds.). (2019). *Advances in questionnaire design, development, evaluation and testing*. John Wiley & Sons, Incorporated. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=5964414

Bebbington, W. (2021). Leadership strategies for a higher education sector in flux. *Studies in Higher Education*, *46*(1), 158–165. https://doi.org/10.1080/03075079.2020.1859686

Beck, K., Beedle, M., Van Bennekum, A., Cockburn, A., Cunningham, W., Fowler, M., ... & Thomas, D. (2001). The agile manifesto. Agile Alliance. https://www.agilealliance.org/wp-content/uploads/2019/09/agile-manifesto-download-2019.pdf

Bellis, P., Trabucchi, D., Buganza, T., & Verganti, R. (2022). How do human relationships change in the digital environment after COVID-19 pandemic? The road towards agility. *European Journal of Innovation Management*, *25*(6), 821–849. https://doi.org/10.1108/EJIM-02-2022-0093

Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The Case Research Strategy in Studies of Information Systems. *Management Information Systems Quaterly*, *11*(3), 369–386.

Benjamin, D. J., Berger, J. O., Johannesson, M., Nosek, B. A., Wagenmakers, E., Berk, R., Bollen, K. A., Brembs, B., Brown, L., Camerer, C., Cesarini, D., Chambers, C. D., Clyde, M., Cook, T. D., Boeck, P. De, Dienes, Z., Dreber, A., Easwaran, K., Efferson, C., … Johnson, V. E. (2018). Redefine statistical significance. *Nature Human Behaviour*, *2*(January), 6–10. https://doi.org/10.1038/s41562-017-0189-z

Bhavsar, K., Shah, V., & Gopalan, S. (2020). Scrum: An Agile Process Reengineering in Software Engineering. *International Journal of Innovative Technology and Exploring Engineering*, *9*(3), 840–848. https://doi.org/10.35940/ijitee.c8545.019320

Bick, S., Spohrer, R. Hoda, R. Scheerer, A. & Heinzl, A. (2018). Coordination Challenges in Large-Scale Software Development: A Case Study of Planning Misalignment in Hybrid Settings. *Iee Transactions on Software Engineering*, 44(10), 932-950. https://doi.org/10.1109/TSE.2017.2730870

Blackburn, G. (2017). A university's strategic adoption process of an PBL-aligned e-learning environment: an exploratory case study. *Educational Technology Research and Development*, *65*(1), 147–176. https://doi.org/10.1007/s11423-016-9472-3

Bleakley, A. (2021). Embracing ambiguity: Curriculum design and activity theory. *Medical Teacher*, *43*(1), 14–18. https://doi.org/10.1080/0142159X.2020.1795099

Bobby, C. R. (2016). Sample size for qualitative research. *Wualitative Market Research*, *19*(4), 426–432. https://doi.org/10.1108/QMR-06-2016-0053

Bonoma, T. V. (1983). A Case Study in Case Re- search: Marketing Implementation. In *Working Paper 9* (pp. 85–142). Harvard University Graduate School of Business Administration.

Brandon, B. (2004). Closing the Loop in e-Learning Development: How to reconnect instructional design and project management. *Learning Solutions*. https://learningsolutionsmag.com/articles/283/closing-the-loop-in-e-learning-development-how-to-reconnect-instructional-design-and-project-management

Branstiter, A. (2019). *Systematic, Specific and Scalable Instructional Design*. Medium. https://medium.com/@ABranstiter/systematic-specific-and-scalable-instructional-design-1e49b4b3fc90

Brewer, J. L., & Dittman, K. C. (2018). *Methods of IT project management* (Third Edit). Purdue University Press. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/reader.action?docID=5515329#

Brown, A. H., & Green, T. D. (2016). *The Essentials of Instructional Design: Connecting Fundamental Principles with Process and Practice* (3rd ed.). Routledge. https://doi.org/10.4324/9781315757438

Brown, L. (2022). *7 Cs of Effective Communication*. Invensis Global Learning Services. https://www.invensislearning.com/blog/7-rules-of-effective-communication-with-examples/

Bruno, M. (1975). *Mind ascribed: an elaboration and defence of interpretivism*. John Benjamins Publishing Company. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=623376

Burrows, J. (2020). Improving Team Collaboration as a Project Manager. *The Kabod*, *6*(2). https://digitalcommons.liberty.edu/kabod/vol6/iss2/4

Bybee, R. W. (2014). The BSCS 5E Instructional Model: Personal Reflections and Contemporary Implications. *Science and Children*, *51*(4), 10–13. https://newscenter.sdsu.edu/education/projectcore/files/05329-5E_instructional_Model_R_Bybee.pdf

Cassell, C., Buehrins, A., Symon, G., & Johnson, P. (2006). Qualitative methods in management research: an introduction to the themed issue. In C. Cassell, A. Buehrins, & G. Symon (Eds.), *Qualitative methods in management research* (p. 148). Emerald Publishing Limited. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=258136&query=qualitative research

Cherry, K. (2022). *What is Motivation?* Behavioural Psychology. https://www.verywellmind.com/what-is-motivation-2795378

Cheung, L. (2016). Using the ADDIE Model of Instructional Design to Teach Chest Radiograph Interpretation. *Journal of Biomedical Education*, *2016*, 1–6. https://doi.org/10.1155/2016/9502572

Chukwuere, J. E. (2018). The Application of a Culture-Oriented E-Learning System Framework for Developers: An Approach for Developing Countries. *Journal of Gender, Information and Development in Africa*, *7*(2), 9–37. https://journals-co-za.uplib.idm.oclc.org/doi/epdf/10.10520/EJC-10c9330ed3

Ciancarini, P., Farina, M., Masyagin, S., Succi, G., Yermolaieva, S., & Zagvozkina, N. (2021). Non Verbal Communication in Software Engineering-An Empirical Study. *IEEE Access*, *9*, 71942–71953. https://doi.org/10.1109/ACCESS.2021.3075983

Ciric, D., Lalic, B., Gracanin, D., Tasic, N., Delic, M., & Medic, N. (2020). Agile vs. Traditional Approach in Project Management: Strategies, Challenges and Reasons to Introduce Agile. *Procedia Manufacturing*, *39*(2019), 1407–1414. https://doi.org/10.1016/j.promfg.2020.01.314

Clapp, A. (2017). An e-Learning Team's Life On and Offline: A Collaborative Self- Ethnography in Postgraduate Education Development. *The Electronic Journal of E-Learning*, *15*(1), 33–45. https://files.eric.ed.gov/fulltext/EJ1140096.pdf

Clapp, A., Reynolds, A., Bell, B., Lockhart, E., Todd, G., & Connell, T. (2019). Planning the Development and Maintenance of Online Distance Learning Courses. *Online Journal of Distance Learning Administration*, *22*(1), 1–6.

Clark, D. (2006). *Gagne's Nine Dull Commandments*. Donald Clark Plan B. http://donaldclarkplanb.blogspot.com/2006/09/gagnes-nine-dull-commandments.html

Clark, D. R. (2015). *Instructional System Design: The ADDIE Model - A Handbook for Learning Designers*. A Big Dog, Little Dog and Knowledge Jump Production. http://www.nwlink.com/~donclark/hrd/sat.html

Clark, O., & Koppy, S. (2020). Tackling a rewrite with Scrum. *Talent Development*, *74*(4), 21–24. https://www.proquest.com/trade-journals/tackling-rewrite-with-scrum/docview/2432562957/se-2

Cobb, C. G. (2015). *The project manager's guide to mastering agile : Principles and practices for an adaptive approach.* John Wiley & Sons, Incorporated. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=1895876

Cohen, L., Manion, L., & Morrison, K. (2007). *Research Methods in Education* (6th Editio). Taylor and Francis Group. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/reader.action?docID=308686&ppg=22

Conrad, K., & TrainingLinks. (2000). *Instructional Design for Web-Based Training*. HRD Press. http://search.ebscohost.com.uplib.idm.oclc.org/login.aspx?direct=true&db=nlebk&AN=135932&site=ehost-live&scope=site

Corbin, J., & Strauss, A. (2015). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (4th Editio). SAGE Publications, Inc.

Cormier, C. J., McGrew, J., Ruble, L., & Fischer, M. (2022). Socially distanced teaching: The mental health impact of the COVID-19 pandemic on special education teachers. *Journal of Community Psychology*, *50*(3), 1768–1772. https://doi.org/10.1002/jcop.22736

Costa, A., Ramos, F., Perkusich, M., Neto, A. D. E. S., Silva, L., Cunha, F., Rique, T., Almeida, H., & Perkusich, A. (2022). A Genetic Algorithm-Based Approach to Support Forming Multiple Scrum Project Teams. *IEEE Access*, *10*, 68981–68994. https://doi.org/10.1109/ACCESS.2022.3186347

Council for Higher Education (CHE). (2014). *Distance Higher Education Programmes in a Digital Era: Good Practice Guide.* https://www.saide.org.za/documents/CHE_-_Distance_Higher_Education.pdf

Cram, W. A., & Marabelli, M. (2018). Information & Management Have your cake and eat it too? Simultaneously pursuing the knowledge- sharing bene fi ts of agile and traditional development approaches. *Information & Management*, *55*(3), 322–339. https://doi.org/10.1016/j.im.2017.08.005

Creswell, J. W. (2013). *Qualitative Inquiry & Research Design: Choosing Among Five Approaches* (3rd Editio). SAGE Publications.

Creswell, J. W., & Creswell, J. D. (2017). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (5th Editio). SAGE Publications.

Cross, J. (2004). An informal history of e-learning. *On the Horizon*, *12*(3), 103–110. https://doi.org/10.1108/10748120410555340

Dahlin, E. (2021). Email Interviews: A Guide to Research Design and Implementation. *International Journal of Qualitative Methods*, *20*, 1–10. https://doi.org/10.1177/16094069211025453

Darko, C. (2021). An evaluation of how students use blackboard and the possible link to their grades. *Sage Open*, *11*(14). https://doi.org/10.1177/21582440211067245

Dassanayaka, D. M. C., Weerasinghe, I. M. S., Dahanayaka, S. N. S., Dedunu, H. H., Athurupana, K. A. H. M. K., & Muthuweera, N. K. G. (2022). Academics ' attitudes towards online education amidst the Covid-19 outbreak. *Nternational Journal of Educational Management*, *36*(5), 661–677. https://doi.org/10.1108/IJEM-10-2021-0414

De Matos-Ala, J. (2019). Unlocking curriculum design: Experiences in constructing a dynamic ir undergraduate curriculum in South Africa. *International Studies Perspectives*, *20*(3), 287–299. https://doi.org/10.1093/isp/ekz010

De Sa, F. R., Godoi Vieira, R., & Da Cunha, A. M. (2022). Learning Lessons From the Scrum Adoption in the Brazilian Air Force. *IT Professional*, *24*(1), 49–55. https://doi.org/10.1109/MITP.2021.3132310

De Vos, A. S. (2002). *Research at grass roots: for the social sciences and human services professions* (2nd Editio). Van Schaik. https://univofpretoria.on.worldcat.org/v2/oclc/1085690749

Degn, L. (2015). Identity constructions and sensemaking in higher education – a case study of Danish higher education department heads. *Studies in Higher Education*, *40*(7), 1179–1193.

Dempsey, M., Brennan, A., & Holzberger, A. (2022). A review of the most significant challenges impacting conventional Project Management success. *IEEE Engineering Management Review*, *PP*(99), 1–5. https://doi.org/10.1109/EMR.2022.3187168

Denzin, N. K. (1989). *Interpretive biography*. SAGE Publications, Inc. https://doi.org/https://dx.doi.org/10.4135/9781412984584

Department of Education. (2008). *Classification of Educational Subject Matter (CESM)*. http://www.education.gov.za/LinkClick.aspx?fileticket=b8Jt+Fy1HGY=&tabid=452&mid=1034

Doshi, H. (2016). *The Three Pillars of Empiricism (Scrum)*. Scrum.Org. https://www.scrum.org/resources/blog/three-pillars-empiricism-scrum

Drew, B. C. J., Hardman, M. L., & Hosp, J. L. (2008). *Designing and Conducting Research in Education Descriptive Statistics*. SAGE Publications, Inc. https://dx.doi.org/10.4135/9781483385648

Dumay, J. (2011). The qualitative research interview. *Qualitative Research in Accounting and Management*, *8*(3), 238–264. https://doi.org/10.1108/11766091111162070

Durak, G., & Ataizi, M. (2016). The ABC's of Online Course Design According to Addie Model. *Universal Journal of Educational Research*, *4*(9), 2084–2091.

https://doi.org/10.13189/ujer.2016.040920

Dworkin, S. L. (2012). Sample size policy for qualitative studies using in-depth interviews. *Archives of Sexual Behavior*, *41*(6), 1319–1320. https://doi.org/10.1007/s10508-012-0016-6

Ebneyamini, S., & Moghadam, M. R. S. (2018). Toward Developing a Framework for Conducting Case Study Research. *International Journal of Qualitative Methods*, *17*, 1–11. https://doi.org/10.1177/1609406918817954

Eby, G., & Yuzer, T. V. (2013). Project Management-Based Design for Online Learning. In G. Eby & T. V. Yuzer (Eds.), *Project Management Approaches for Online Lerning Design* (pp. 1–10). IGI Global. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/reader.action?docID=3312338

Efe, P., & Demirors, O. (2019). A change management model and its application in software development projects. *Computer Standards and Interfaces*, *66*(January), 103353. https://doi.org/10.1016/j.csi.2019.04.012

Ellingson, L. L. (2009). *Engaging crystallization in qualitative research: an introduction.* SAGE. https://dx.doi.org/10.4135/9781412991476

Elliott, V. (2018). Thinking about the coding process in qualitative data analysis. *Qualitative Report*, *23*(11), 2850–2861. https://doi.org/10.46743/2160-3715/2018.3560

Engeström, Y. (2001). Expansive Learning at Work : Toward an activity theoretical reconceptualization. *Journal of Education and Work*, *14*(1), 133–156. https://doi.org/10.1080/13639080020028747

Engeström, Y. (2009). The future of activity theory: A rough draft. In A. Sannino, H. Daniels, & D. Gutierrez (Eds.), *Learning and expanding with activity theory* (pp. 303–328). Cambridge Univrsity Press. http://lchc.ucsd.edu/MCA/Mail/xmcamail.2012_01.dir/pdfHqmCdPgVef.pdf

Engeström, Y. (2015). *Learning by Expanding: An Activity-Theoretical Approach to Developmental Research* (Second Edi). Cambridge University Press.

Erickson, A. J. (2018). *Agile Development in Instructional Design : A Case Study at BYU Independent Study* [Brigham Young University]. https://scholarsarchive.byu.edu/cgi/viewcontent.cgi?article=7780&context=etd

Erlingsson, C., & Brysiewicz, P. (2017). A hands-on guide to doing content analysis. *African Journal of Emergency Medicine*, *7*(3), 93–99. https://doi.org/10.1016/j.afjem.2017.08.001

Espinosa-Curiel, I. E., Rodríguez-Jacobo, J., Vázquez-Alfaro, E., Fernández-Zepeda, J. A., & Fajardo-Delgado, D. (2018). Analysis of the changes in communication and social

interactions during the transformation of a traditional team into an agile team. *Journal of Software: Evolution and Process*, *30*(9), 1–24. https://doi.org/10.1002/smr.1946

Espinoza, D. M., Ferre, X., Guerrero, G. and Juristo, N. (2020) An Agile-Based Integrated Framework for Mobile Application Development Considering Ilites. *IEEE Access, 8, 72461-72470.*

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics*, *5*(1), 1-4.

Farooq, M. S., Hamid, A., Alvi, A., & Omer, U. (2022). Blended Learning Models , Curricula , and Gamification in Project Management Education. *IEEE Access*, *10*, 60341–60361. https://doi.org/10.1109/ACCESS.2022.3180355

Farrugia, L. (2019). WASP (write a scientific paper): The ongoing process of ethical decision-making in qualitative research: Ethical principles and their application to the research process. *Early Human Development*, *133*(2019), 48–51. https://doi.org/10.1016/j.earlhumdev.2019.03.011

Fernandes, G., O' Sullivan, D., Pinto, E. B., Araujo, M., & Machado, R. J. (2020). Value of project management in university – industry R & D collaborations. *International Journal of Managing Projects in Business*, *13*(4), 819–843. https://doi.org/https://doi.org/10.1108/IJMPB-08-2019-0191

Ferrer, D. (2019). *History of Online Education*. The Best Schools. https://thebestschools.org/magazine/online-education-history/

Fito-Bertran, A., & Martinez-Arguelles, M. (2019). From Content- To Competence-oriented Design of HE Curricula: Leadership in Times of Transition. In A. Visvizi, M. D. Lytras, & A. Sarirete (Eds.), *Management and Administration of Higher Education Institutions in Times of Change* (pp. 31–45). Emerald Publishing Limited. https://www.perlego.com/book/971792/management-and-administration-of-higher-education-institutions-in-times-of-change-pdf

Flewelling, P. (2018). *The agile developer's handbook: Get More Value from Your Software Development: Get the Best Out of the Agile Methodology*. Packt Publishing. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/reader.action?docID=5314635#

Foot, K. A. (2001). Cultural-Historical Activity Theory as Practice Theory : Illuminating the Development of a Conflict-Monitoring Network. *Communication Theory*, *11*(1), 56–83. https://academic.oup.com/ct/article-abstract/11/1/56/4201763?redirectedFrom=fulltext

Fowler, F. M. (2019). *Navigating Hybrid Scrum Environments: Understanding the Essentials , Aviding the Pitfalls*. Apress. https://doi.org/https://doi.org/10.1007/978-1-4842-4164-6

Fraser, J., Fahlman, D., Arscott, J., & Guillot, I. (2018). Pilot testing for feasibility in a study of student retention and attrition in online undergraduate programs. *International Review of Research in Open and Distance Learning*, *19*(1), 260–278. https://doi.org/10.19173/irrodl.v19i1.3326

Friess, E. (2019). Scrum Language Use in a Software Engineering Firm : An Exploratory Study. *IEEE Transactions on Professional Communication*, *62*(2), 130–147. https://ieeexplore-ieee-org.uplib.idm.oclc.org/stamp/stamp.jsp?tp=&arnumber=8713495

Gagné, R. M. (2005). *Principles of instructional design* (Fifth). Thomson/Wadsworth.

Gardner, J., Chongwony, L., & Washington, T. (2018). Investigating Instructional Design Management and Leadership Competencies - a Delphi Study. *Online Journal of Distance Learning Administration*, *18*(1). https://www.westga.edu/~distance/ojdla/spring211/gardner_chongwony_washington211.html

Garraway, J., & Winberg, C. (2020). Incorporating principles of expansive learning and activity theory in curriculum design to bridge work and education contexts for vocational teachers. *Journal of Vocational, Adult and Continuing Education and Training*, *3*(1), 21. https://doi.org/10.14426/jovacet.v3i1.121

Gibbons, A. S. (2013). *An architectural approach to instructional design*. Taylor & Francis Group. https://ebookcentral-proquest-com.uplib.idm.oclc.org

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology. *Organizational Research Methods*, *16*(1), 15–31. https://doi.org/10.1177/1094428112452151

Gloger, B., Pfarl, W., Mittermayr, R., & Opelt, A. (2013). *Agile Contracts: Creating and Managing Successful Projects with Scrum*. John Wiley & Sons, Incorporated. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=1191572

Gökdemir, A., Akdemir, O., & Vural, O. F. (2013). Using Gagne's nine events in learning management systems. *Procedia - Social and Behavioral Sciences*, *106*, 3268–3272. https://doi.org/10.1016/j.sbspro.2013.12.376

Gonçalves, L. (2018). Scrum: The methodology to become more Agile. *Controlling & Management Review*, *62*, 40–42. https://doi-org.uplib.idm.oclc.org/10.1007/s12176-018-

0020-3

Gordon, J., & Zemke, R. (2000). The attack on ISD. *Training*, *37*(4), 42–45. https://www-proquest-com.uplib.idm.oclc.org/trade-journals/attack-on-isd/docview/203411741/se-2

Green, J. L., Camili, G., & Elmore, P. B. (2006). *Handbook of Complementary Methods in Education Research* (3rd Editio). Taylor & Francis Group. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=446575

Gregory, K. (2018). Online Communication Settings and the Qualitative Research Process: Acclimating Students and Novice Researchers. *Qualitative Health Research*, *28*(10), 1610–1620. https://doi.org/10.1177/1049732318776625

Guba, E. E., & Lincoln, Y. S. (2005). Paradigmatic controversies, contradictions, and emerging confluences. In M. Denzin & Y. Lincoln (Eds.), *The SAGE handbook of qualitative research* (3rd Editio, pp. 191–216). Sage.

Guba, E. G., & Lincoln, Y. S. (1981). *Effective evaluation: Improving the usefulness of evaluation results through responsive and naturalistic approaches.* Jossey-Bass.

Guo, K., Bussey, F., & Adachi, C. (2020). Digital learning across cultures: an account of activity theory. *Intercultural Education*, *31*(4), 447–461. https://doi.org/10.1080/14675986.2020.1747259

Gupta, R. K., & Awasthy, R. (2015). *Qualitative Research in Management: Methods and Experiences*. SAGE Publications. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=2007211

Gustafson, K. (2002). Instructional design tools: A critique and projections for the future. *Educational Technology Research and Development*, *50*(4), 59–66. https://doi.org/10.1007/bf02504985

Gustafson, K. L., & Branch, R. M. (1997). Revisioning models of instructional development. *Educational Technology Research and Development*, *45*(3), 73–89. https://doi.org/10.1007/BF02299731

Gustafson, K. L., & Branch, R. M. (2002). *Survey of instructional development models* (4th ed.). ERIC Clearinghouse on Information Technology.

Haaskjold, H., Andersen, B., Lædre, O., & Aarseth, W. (2019). Factors affecting transaction costs and collaboration in projects. *International Journal of Managing Projects in Business*, *13*(1), 197–230. https://doi.org/10.1108/IJMPB-09-2018-0197

Halupa, C. (2019). Differentiation of roles: Instructional designers and faculty in the creation of online courses. *International Journal of Higher Education*, *8*(1), 55–68.

https://doi.org/10.5430/ijhe.v8n1p55

Hamzane, I., & Abdessamad, B. (2019). Project management metamodel construction regarding IT departments. *International Journal of Advanced Computer Science and Applications*, *10*(10), 208–212. https://doi.org/10.14569/ijacsa.2019.0101029

Hannafin, M. (1987). The effects of orienting activities, cueing and practice on learning of computer based instruction. *Journal of Educational Research*, *81*(1), 48–53.

Harrison, R. G. (2000). Temperature-compensated meteorological barometer. In *Review of Scientific Instruments* (4th Editio, Vol. 71, Issue 4). SAGE Publications, Inc. https://doi.org/10.1063/1.1150549

Hashim, N. H., & Jones, M. (2007). Activity Theory : A framework for qualitative analysis. *Research Online*. http://ro.uow.edu.ac/commpamper/408

Haugan, G. T. (2011). *Project management fundamentals: key concepts and methodology* (2nd editio). Management Concepts, Inc. https://app.knovel.com/hotlink/pdf/id:kt00UBFQJ2/project-management-fundamentals/comparing-agile-traditional

Hawkins, A. (2014). Applying Gagné's Nine Events of Instruction to Facilitate Online and Hybrid Learning. In A. Hirumi (Ed.), *Grounded designs for online and hybrid learning: Designs in action.* (pp. 24–54). International Society of Technology in Education.

He, L., & Liu, E. (2018). Cultural influences on the design and management of transnational higher education programs in China: A case study of three programs. *International Journal of Educational Management*, *32*(2), 269–283. https://doi.org/10.1108/IJEM-02-2017-0044

Hedding, D. W., Greve, M., Breetzke, G. D., Nel, W., & Jansen Van Vuuren, B. (2020). COVID-19 and the academe in South Africa : Not business as usual. *South African Journal of Science*, *116*(7/8), 1–3. https://www.sajs.co.za/article/view/8298

Hidalgo, E. S. (2019). Adapting the scrum framework for agile project management in science: case study of a distributed research initiative. *Heliyon*, *5*(3), 1–34. https://doi.org/10.1016/j.heliyon.2019.e01447

Hirumi, A. (2021). IAMSE 2021 — Plenary Session: Top 10 Ways an Instructional Designer Can Help You Define the New Normal. *Medical Science Educator*, *31*, 9–16. https://doi.org/10.1007/s40670-021-01400-0

Hitchcock, G., & Hughes, D. (1995). *Research and the Teacher: A Qualitative Introduction to School-Based Research* (2nd Editio). Routledge. https://doi.org/https://doi.org/10.4324/9780203424605

Hogle, P. (2017). *Consider Scrum Framework for Efficient e-learning Development*. Learning Solutions. https://learningsolutionsmag.com/author/pamela-hogle

Hrivnak, G. A. (2019). The Increasing Importance of Curriculum Design and Its Implications for Management Educators. *Journal of Management Education*, *43*(3), 271–280. https://doi.org/10.1177/1052562918822068

Hubackova, S. (2015). History and Perspectives of E-learning. *Procedia - Social and Behavioral Sciences*, *191*, 1187–1190. https://doi.org/10.1016/j.sbspro.2015.04.594

Huberman, M., & Miles, M. B. (1994). Data management and analysis methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research*. Sage.

Hudson, L. A., & Ozanne, J. L. (1988). Alternative Ways of Seeking Knowledge in Consumer Research. *Journal of Consumer Research*, *14*(4), 508–521. https://academic.oup.com/jcr/article-abstract/14/4/508/1811971?redirectedFrom=fulltext

Hughes, L. (2017). ‘ Hinged ’ activity systems : Expanding the utility of activity theory. *Nordic Journal of Vocational Education and Training*, *7*(2), 104–127. https://doi.org/10.3384/njvet.2242-458X.1772104

Inayat, I., Salim, S. S., Marczak, S., Daneva, M., & Shamshirband, S. (2015). A systematic literature review on agile requirements engineering practices and challenges. *Computers in Human Behavior*, *51*, 915–929. https://doi.org/10.1016/j.chb.2014.10.046

Jacobs, L., Wimpenny, K., Mitchell, L., Hagenmeier, C., Beelen, J., Hodges, M., George, V., DeWinter, A., Slambee, C., Obadire, S., Viviani, A., Samuels, L., Jackson, L. M., Klamer, R., & Adam, N. (2021). Adapting a capacity-development-in-higher-education project: Doing, being and becoming virtual collaboration. *Perspectives in Education*, *39*(1), 353–371. https://doi.org/10.18820/2519593X/pie.v39.i1.22

Jeffery, A. B., & Bratton-Jeffery, M. F. (2011). Integrated Training Requires Integrated Design and Business Models. *Instructional Design in the Real World*. https://doi.org/10.4018/9781591401506.ch013

Jelsma, J., & Clow, S. (2005). Ethical issues relating to qualitative research. *SA Journal of Physiotherapy*, *61*(1), 3–6. https://doi.org/10.1002/0471711705.ch9

Johansson, R. (2007). On Case Study Methodology. *Open HOuse International*, *32*(3), 48–54. https://doi-org.uplib.idm.oclc.org/10.1108/OHI-03-2007-B0006

Johnson, B. J. (2021). Reflections on the South African Higher Education Leadership and Management (HELM) first virtual summit, 9-11 december 2020: leadership for a sustainable and resilient higher education system in an age of complexity and change.

Journal for Students Affairs in Africa, *9*(1), 235–238. https://doi.org/10.24085/jsaa.v9i1.1442

Johnson, J. L., Adkins, D., & Chauvin, S. (2020). A Review of the Quality Indicators of Rigor in Qualitative Research. *American Journal of Pharmaceutical Education*, *84*(1), 138–146. https://doi.org/10.5688/ajpe7120

Jones, T. S., & Richey, R. C. (2000). Rapid prototyping methodology in action: A developmental study. *Educational Technology Research and Development*, *48*(2), 63–80. https://doi.org/10.1007/BF02313401

Kapitsaki, G. ., & Christou, M. (2014). Where Is Scrum in the Current Agile World ? *9th International Conference on Evaluation of Novel Approaches to Software Engineering*. https://ieeexplore.ieee.org/abstract/document/7077124/authors#authors

Kaplan, A. (1973). *The Conduct of Inquiry*. Transaction Publishers. https://books.google.co.za/books?id=ks8wuZHSKs8C

Kaptelinin, V., & Nardi, B. A. (2006). *Acting with technology: Activity theory and interaction design*. MIT Press. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=3338521

Keller, J. M. (1983). Motivational design of instruction. In C. M. Riegeluth (Ed.), *Instructional design theories and models* (pp. 383–434). Lawrence Erlbaum.

Kentnor, H. (2015). Distance Education and the Evolution of Online Learning in the United States. *Curriculum and Teaching Dialogue*, *17*(1), 22–34. https://digitalcommons.du.edu/cgi/viewcontent.cgi?article=1026&context=law_facpub

Kerzner, H. (2018). *Project Management Best Practices Achieving Global Excellence* (4th ed). Wiley. https://www.perlego.com/book/994031/project-management-best-practices-achieving-global-excellence-pdf

Khaldi, M., & Erradi, M. (2019). Design of an e-Learning project management system. *International Conference on Big Data and Internet of Things*, 1–5. https://doi.org/10.1145/3372938.3372978

Khan, B. (2004). The People-Process-Product Continuum in E-Learning: The E-Learning P3 Model. *Educational Technology: The Magazine for Managers of Change in Education*, *44*(5), 33–40.

Khayyat, M. (2016). A Proposed Model for the Fourth Generation of Activity Theory to be Applied on the Smart City Research. *Thirty Seventh International Conference on Information Systems*, 1–9.

https://www.researchgate.net/profile/Mashael_Khayyat/publication/311677620_A_proposed_model_for_the_fourth_generation_of_Activity_Theory_to_be_applied_on_the_Smart_City_Research_Arena/links/5853ef3108ae95fd8e1ff46b/A-proposed-model-for-the-fourth-generati

Khoza, H. H., Khoza, S. A., & Mukonza, R. M. (2021). The Impact of Covid-19 in Higher Learning Institutions in South Africa: Teaching and Learning under Lockdown Restrictions. *Journal of African Education (JAE)*, *2*(3), 107–131. https://doi-org.uplib.idm.oclc.org/10.31920/2633-2930/2021/v2n3a5

Klein, J. D., & Mendenhall, A. (2018). Applying the First Principles of Instruction in a short-term, high volume, rapid production of online professional development modules. *Journal of Computing in Higher Education*, *30*(1), 93–110. https://doi.org/10.1007/s12528-017-9166-9

Korstjens, I., & Moser, A. (2018). Series : Practical guidance to qualitative research . Part 4: Trustworthiness and publishing. *European Journal of General Practice*, *24*(1), 120–124. https://doi.org/10.1080/13814788.2017.1375092

Kothari, C. R. (2004). *Research Methodology: Methods and Techniques* (Second rev). New Age International (P) Ltd., Publishers. https://www.modares.ac.ir/uploads/Agr.Oth.Lib.17.pdf

Kruger, L. J., Rodgers, R. F., Long, S. J., & Lowy, A. S. (2019). Individual interviews or focus groups? Interview format and women's self-disclosure. *International Journal of Social Research Methodology*, *22*(3), 245–255. https://doi.org/10.1080/13645579.2018.1518857

Kurt, S. (2016). *Kemp Design Model*. Educational Technology. https://educationaltechnology.net/kemp-design-model/

Kussunga, F., & Ribeiro, P. (2019). Proposal of a Visual Environment to Support Scrum. *Procedia Computer Science*, *164*, 491–497. https://doi.org/10.1016/j.procs.2019.12.211

Larini, M., & Barthes, A. (2018). *Quantitative and statistical data in education* (Ser. Educa). ISTE, Ltd. https://doi.org/10.1002/9781119451457

Lathen, L., & Laestadius, L. (2021). Reflections on Online Focus Group Research With Low Socio-Economic Status African American Adults During COVID-19. *International Journal of Qualitative Methods*, *20*, 1–10. https://doi.org/10.1177/16094069211021713

Lavalle, A., & Casale, O. (2020). Project Managers Are the Best Candidates to Manage Innovation. *International Journal of Advanced Corporate Learning*, *13*(1), 48–61. https://doi.org/10.3991/ijac.v13i1.12357

Layton, M. C., & Morrow, D. (2018). *Scrum For Dummies* (2nd ed.). Wiley. https://www.perlego.com/book/991951/scrum-for-dummies-pdf

Lee, J., & Jang, S. (2014). A methodological framework for instructional design model development: Critical dimensions and synthesized procedures. *Educational Technology Research and Development*, *62*(6), 743–765. https://doi.org/10.1007/s11423-014-9352-7

Lee, J. W., & Song, Y. (2021). Effective employee job crafting in the workplace: Intrinsic motivation and knowledge sharing are key. *Development and Learning in Organizations: An International JOurnal*, *35*(3), 25–27. https://doi.org/10.1108/DLO-05-2020-0118

Lee, K. (2017). Rethinking the accessibility of online higher education: A historical review. *Internet and Higher Education*, *33*, 15–23. https://doi.org/10.1016/j.iheduc.2017.01.001

Leont'ev, A. N. (1978). *Activity, consciousness, and personality.* Englewood Cliffs: Prentice-Hall.

Levers, M.-J. D. (2013). Philosophical paradigms, grounded theory, and perspectives on emergence. *SAGE Open*, *3*(4), 1–6. https://doi.org/10.1177/2158244013517243

Lies, J. (2020). Imagining Niklas Luhmann as a " change manager ": scrum as an example of a closed system for the self-organized stabilization of corporate agility. *Journal of Organizational Change Management*, *33*(7), 1417–1429. https://doi.org/10.1108/JOCM-11-2019-0355

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. SAGE Publications.

Linneberg, S. M., & Korsgaard, S. (2019). Coding qualitative data: a synthesis guiding the novice. *Qualitative Research Journal*, *19*(3), 259–270. https://doi.org/10.1108/QRJ-12-2018-0012

Lowell, V. L., & Ashby, I. V. (2018). Supporting the development of collaboration and feedback skills in instructional designers. *Journal of Computing in Higher Education: Research & Integration of Instructional Technology*, *30*(1), 72–92. https://doi.org/10.1007/s12528-018-9170-8

Lu, T., & Franklin, A. L. (2018). A Protocol for Identifying and Sampling From Proxy Populations. *Social Science Quarterly*, *99*(4), 1535–1546. https://doi.org/10.1111/ssqu.12519

Lucia, V., Scaglione, T., & Meyer, V. (2019). Improvisation in Higher Education Management: Coping with Complexity and Organizational Dynamics. *Global Journal of Flexible Systems Management*, *20*(4), 291–302. https://doi.org/10.1007/s40171-019-00215-8

Merrill, M.D. (2002). First principles of instruction. *Educational Technology Research and Development,* 50, 43–59. https://doi.org/10.1007/BF02505024

Maassen, M. A. (2018). Product development models in the IT sector-From Waterfall to Agile Project Management Model s in the case of AVIRA SOFT S.R.L. *Proceedings of the International Conference on Business Excellence*, *12*(1), 568–578.

https://doi.org/10.2478/picbe-2018-0051

Magana, A. J., Seah, Y. Y., & Thomas, P. (2018). Fostering cooperative learning with Scrum in a semi-capstone systems analysis and design course. *Journal of Information Systems Education*, *29*(2), 75–92.

Mahnic, V. (2012). A capstone course on agile software development using scrum. *IEEE Transactions on Education*, *55*(1), 99–106. https://doi.org/10.1109/TE.2011.2142311

Makani, J., Durier-Copp, M., Kiceniuk, D., & Blandford, A. (2016). Strengthening Deeper Learning through Virtual Teams in E-Learning: A Synthesis of Determinants and Best Practices. *International Journal of E-Learning & Distance Education*, *31*(2).

Malczyk, B. R. (2019). Introducing Social Work to HyFlex Blended Learning: A Student-centered Approach. *Journal of Teaching in Social Work*, *39*(4–5), 414–428. https://doi.org/10.1080/08841233.2019.1652226

Malterud, K., Siersma, V. D., & Guassora, A. D. (2016). Sample Size in Qualitative Interview Studies: Guided by Information Power. *Qualitative Health Research*, *26*(13). https://doi.org/10.1177/1049732315617444

Manning, J. (2017). In vivo coding. In J. Matthes (Ed.), *The international encyclopedia of communication research methods*. Wiley-Blackwell. https://doi.org/10.1002/9781118901731.iecrm0270

Maree, K., & Pietersen, J. (2011). Surveys and the use of questionnaires. In K. Maree (Ed.), *First Steps in Research* (9th Impres, pp. 154–170). Van Schaik Publishers.

Marsden, N., Ahmadi, M., & Holtzblatt, K. (2021). Surfacing Challenges in Scrum for Women in Tech. *Ieee Software*, *1*(1), 1–8. https://doi.org/10.1109/MS.2021.3115461

Martin, E., Nolte, I., & Vitolo, E. (2016). The Four Cs of disaster partnering: communication, cooperation, coordination and collaboration. *Disasters*, *40*(4), 621–643. https://doi.org/10.1111/disa.12173

Martin, F., Klein, J. D., & Sullivan, H. (2007). The impact of instructional elements in computer-based instruction. *British Journal of Educational Technology*, *38*(4), 623–636. https://doi.org/10.1111/j.1467-8535.2006.00670.x

Matthews, J., Stanley, T., & Davidson, P. (2018). Human factors and project challenges influencing employee engagement in a project-based organisation (PBO). *International Journal of Managing Projects in Business*, *11*(4), 873–885. https://doi.org/10.1108/IJMPB-04-2017-0043

Maulana, F. R., & Raharjo, T. (2021). Identification of Challenges , Critical Success Factors ,

and Best Practices of Scrum Implementation: An Indonesia Telecommunication Company Case Study. *Journal of Physics: Conference Series*, *1811*(1), 1–12. https://doi.org/10.1088/1742-6596/1811/1/012120

Maxwell, J. A. (2013). *Qualitative Research Design: An Interactive Approach* (3rd Editio). SAGE Publications, Inc.

May, A. (2018). *Instructional Design Models: Comparing ADDIE, Bloom, Gange, & Merrill*. Dashe & Thomson. https://www.dashe.com/blog/instructional-design-models-comparing-addie-bloom-gagne-merrill

Mazer, K. E., Erwin, A., Popovici, R., BocardoDelgado, E., Bowling, L. C., Ma, Z., Prokopy, L. S., & Zeballos-velarde, C. (2020). Creating a Collaboration Framework to Evaluate International University-led Water Research Partnerships. *Journal of Contemporary Water Research & Education*, *171*, 9–26. https://doi.org/10.1111/j.1936-704X.2020.3342.x

McDonald, G. (2010). Ethical relativism vs absolutism: Research implications. *European Business Review*, *22*(4), 446–464. https://doi.org/10.1108/09555341011056203

Mcgrath, C., Palmgren, J., & Liljedahl, M. (2018). Twelve tips for conducting qualitative research interviews. *Medical Teacher*, *41*(9), 1002–1006. https://doi.org/10.1080/0142159X.2018.1497149

Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative Research: A Guide to Design and Implementation* (4th Editio). Jossey-Bass Inc.

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative Research : A Guide to Design and Implementation* (4th Editio). Jossey-Bass.

Meyer, K., & Willis, R. (2019). Looking back to move forward: the value of reflexive journaling for novice researchers. *Journal of Gerontological Social Work*, *62*(5), 578–585. https://doi.org/10.1080/01634372.2018.1559906

Microsoft. (2021). *OneNote for Windows 10*. https://www.microsoft.com/en-za/p/onenote-for-windows-10/9wzdncrfhvjl?activetab=pivot:overviewtab

Miller, S., & Stein, G. (2016). Finding Our Voice: Instructional Designers in Higher Education. *Educase Review*. https://er.educause.edu/articles/2016/2/finding-our-voice-instructional-designers-in-higher-education

Minaya, P. (2020). *4 Important differences between Agile and ADDIE in L&D*. Infopro Learning. https://www.infoprolearning.com/blog/4-important-differences-between-agile-and-addie-in-ld/

Mishra, D., Mishra, A., & Ostrovska, S. (2012). Impact of physical ambiance on communication,

collaboration and coordination in agile software development: An empirical evaluation. *Information and Software Technology*, *54*(10), 1067–1078. https://doi.org/10.1016/j.infsof.2012.04.002

Mizock, L., & Harkins, D. (2014). *Researcher Race : Social Constructions in the Research Process*. ProQuest Ebook Central.

Moghadam, M. R. S., Arabi, N. G., & Khoshsima, G. (2021). A Review of Case Study Method in Operations Management Research. *International Journal of Qualitative Methods*, *20*, 1–11. https://doi.org/10.1177/16094069211010088

Morin, J. (2020). Strategy: Scrum Iterative Development Practices for Team-Based Active Learning. *The Journal of Faculty Development*, *34*(3), 96–98. https://search.proquest.com/openview/2cfe20bcffcb2086a978bcbc228036d2/1?pq-origsite=gscholar&cbl=39886

Morrison, G. R., Ross, S. J., Morrison, J. R., & Kalman, H. K. (2019). *Designing Effective Instruction* (8th ed.). Wiley.

Morrow, S. L. (2005). Quality and trustworthiness in qualitative research in counseling psychology. *Journal of Counseling Psychology*, *52*(2), 250–260. https://doi.org/10.1037/0022-0167.52.2.250

Muslihat, D. (2018). *7 Popular Project Management Methodologies And What They're Best Suited For*. Zenkit Blog. https://zenkit.com/en/blog/7-popular-project-management-methodologies-and-what-theyre-best-suited-for/

Mutekwe, E. (2020). The importance of shepherd leadership practices on easing the text book burden on south african university students. *Perspectives in Education*, *38*(1), 100–114. https://doi.org/10.18820/2519593X/pie.v38i1.8

Nayak, M. S. D. P., & Narayan, N. K. (2019). Strengths and Weakness of Online Surveys. *IOSR Journal of Humanities and Social Sciences (IOSR-JHSS)*, *24*(5), 31–38. https://doi.org/10.9790/0837-2405053138

Nepal, R., & Rogerson, A. M. (2020). From Theory to Practice of Promoting Student Engagement in Business and Law-Related Disciplines : The Case of Undergraduate Economics Education. *Education Sciences*, *10*(8), 205. https://doi.org/https://doi.org/10.3390/educsci10080205

Neufeld, S. D., Chapman, J., Crier, N., Marsh, S., McLeod, J., & Deane, L. A. (2019). Research 101: A process for developing local guidelines for ethical research in heavily researched communities. *Harm Reduction Journal*, *16*(1), 1–11. https://doi.org/10.1186/s12954-019-

0315-5

Neumann, Y., & Neumann, E. (2016). *Lessons about online learning*. Inside Higher Education. https://www.insidehighered.com/views/2016/05/03/what-weve-learned-after-several-decades-online-learning-essay

Nickholson, P. (2007). A History of E-Learning. In Fernández-Manjón B., J. M. Sánchez-Pérez, J. A. Gómez-Pulido, M. A. Vega-Rodríguez, & J. Bravo-Rodríguez (Eds.), *Computers and Education* (pp. 1–11). Springer. https://doi.org/https://doi.org/10.1007/978-1-4020-4914-9_1

Nicolettou, A., & Soulis, S. (2014). Creating agile curriculum design patterns: The global learning by design project. *Proceedings of ASCILITE 2014 - Annual Conference of the Australian Society for Computers in Tertiary Education*, *November*, 726–729.

Nieuwenhuis, J. (2011a). Analysing qualitative data. In K. Maree (Ed.), *First Steps in Research* (9th Impres, pp. 98–122). Van Schaik Publishers.

Nieuwenhuis, J. (2011b). Introducing Qualitative Research. In K. Maree (Ed.), *First Steps in Research* (9th Impres, pp. 46–68). Van Schaik Publishers.

Nieuwenhuis, J. (2011c). Qualitative Research Designs and Data Gathering Techniques. In K. Maree (Ed.), *First Steps in Research* (9th Impres, pp. 79–97). Van Schaik Publishers.

Nkoala, S. (2022). Educators' Experiences of using multilingual pedagogies during emergency remote teaching: a case study of South African universities. *International Journal of Multilingualism*, *May*, 1–14. https://doi.org/10.1080/14790718.2022.2074012

Nobrega, S., Ghaziri, M. El, Giacobbe, L., Rice, S., Punnett, L., & Edwards, K. (2021). Feasibility of Virtual Focus Groups in Program Impact Evaluation. *International Journal of Qualitative Methods*, 1–10. https://doi.org/10.1177/16094069211019896

Nortvig, A.-M., Petersen, A. K., & Balle, S. H. (2018). A Literature Review of the Factors Influencing E-Learning and Blended Learning in Relation to Learning Outcome , Student Satisfaction and Engagement. *The Electronic Journal of E-Learning*, *16*(1), 46–55.

Nyumba, T. O., Wilson, K., Derrick, C. J., & Mukherjee, N. (2018). *The use of focus group discussion methodology: Insights from two decades of application in conservation*. https://doi.org/10.1111/2041-210X.12860

O'Grady, P. (2002). *Relativism*. Taylor & Francis Group. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=1900152

Olaisen, J., & Revang, O. (2017). Working smarter and greener : Collaborative knowledge sharing in virtual global project teams. *International Journal of Information Management*,

37(1), 1441–1448. https://doi.org/10.1016/j.ijinfomgt.2016.10.002

Oliver, P. (2010a). Introducing research questions and aims. In *Understanding the research process* (pp. 30–48). SAGE Publications, LTD. https://www-doi-org.uplib.idm.oclc.org/10.4135/9781446279373

Oliver, P. (2010b). The idea of research. In *Understanding the research process* (pp. 1–15). SAGE Publications, LTD. https://www-doi-org.uplib.idm.oclc.org/10.4135/9781446279373

Olsen, W. K. (2012). *Data collection: Key debates and methods in social research*. SAGE Publications Ltd. https://dx.doi.org/10.4135/9781473914230

Orb, A., Eisenhauer, L., & Wynaden, D. (2001). Ethics in qualitative research. *Journal of Nursing Scholarship*, *33*(1), 93–96. https://doi.org/10.1111/j.1547-5069.2001.00093.x

Ortlipp, M. (2008). Keeping and Using Reflective Journals in the Qualitative Research Process. *The Qualitative Report*, *13*(4), 695–705. https://doi.org/10.46743/2160-3715/2008.1579

Ovesen, N. (2013). Facilitating Problem-Based Learning in Teams with Scrum. In E. Bohemia, W. Ion, A. Kovacevic, J. Lawlor, M. McGrath, C. McMahon, B. Parkinson, G. Reilly, M. Ring, R. Simpson, & D. Tormey (Eds.), *Design Education - Growing Our Future: Proceedings of the 15th International Conference on Engineering and Product Design Education* (pp. 856–861). https://vbn.aau.dk/ws/portalfiles/portal/80762497/812.pdf

Owen, J., & Wasiuk, C. (2020). *Micro-sprints: An agile approach to curriculum development in partnership with students*. Student & Teaching Engagement through Partnerships. https://medium.com/student-teaching-engagement-through-partnerships/micro-sprints-an-agile-approach-to-curriculum-development-in-partnership-with-students-efdb91f4fde0

Palinkas, L. A., Aarons, G. A., Horwitz, S., Chamberlain, P., Hulburt, M., & Ladsverk, J. (2011). Mixed Method Designs in Implementation Research. *Adm Policy Ment Health*, *38*, 44–53. https://doi.org/10.1007/s10488-010-0314-z

Papke, T., & Wagner, D. N. (2017). Agile Workplace Innovation. *European Journal of Workplace Innovation*, *3*(2), 67–86. https://www.researchgate.net/publication/324922893_Agile_Workplace_Innovation

Parsons, D., & MacCallum, K. (2019). *Agile and Lean Concepts for Teaching and Learning: Bringing Methodologies from Indus-try to the Classroom*. Springer.

Patanakul, P., & Rufo-McCarron, R. (2018). Transitioning to agile software development: Lessons learned from a government-contracted program. *Journal of High Technology Management Research*, *29*(2), 181–192. https://doi.org/10.1016/j.hitech.2018.10.002

Patrucco, A. S., Canterino, F., & Minelgaite, I. (2022). How do scrum methodologies influence

the team's cultural values? a multiple case study on agile teams in nonsoftware industries. *Ieee Transactions on Engineering Management*. https://doi.org/10.1109/TEM.2022.3146717

Patton, M. (2015). *Qualitative Research and Evaluation Methods* (4th Editio). SAGE Publications.

Patton, M. Q. (1985). Quality in qualitative Research: Methodological principles and recent developments. *Division J of the American Educational Research Association*.

Persson, M., Kruzela, I., Allder, K., Johansson, O., & Johansson, P. (2011). On the use of scrum in project driven higher education. *Proceedings of the …*, *April*. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.217.9885&rep=rep1&type=pdf

Petersen, K., & Wohlin, C. (2009). A Comparison of Issues and Advantages in Agile and Incremental Development between State of the Art and an Industrial Case. *Journal of Systems and Software*, *82*(9), 1479–1490. https://www.wohlin.eu/jss09.pdf

Petrucco, C., & Ferranti, C. (2017). Design smart city apps using activity theory. *Knowledge Management & E-Learning*, *9*(4), 499–511. https://www.researchgate.net/publication/322400052_Design_smart_city_apps_using_activity_theory

Pietersen, J., & Maree, K. (2011). Statistical analysis I: descriptive statistics. In K. Maree (Ed.), *First Steps in Research* (9th Impres, pp. 183–196).

Pillay, A., Khosa, M., Sheik, A., Campbell, B., Mthembu, B., & Nyika, N. (2021). How Home Contexts of South African University Students Shape their Experiences of Emergency Remote Teaching and Learning. *Student Success*, *12*(2), 37–47. https://doi.org/10.5204/ssj.1779

Piña, A. A., & Sanford, B. K. (2017). The ID Database : Managing the Instructional Development Process. *TechTrends: Linking Research and Practice to Improve Learning*, *61*(4), 331–340. https://doi.org/10.1007/s11528-017-0162-8

Piskurich, G. M. (2015). *Rapid Instructional design: Learning ID Fast and Right* (3rd ed.). John Wiley & Sons. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=1895845

Pope-Ruark, R. (2012). We Scrum Every Day: Using Scrum Project Management Framework for Group Projects. *College Teaching*, *60*(4), 164–169. https://doi.org/10.1080/87567555.2012.669425

Porter, S. (2019). Project management in higher education: a grounded theory case study.

Library Management, *40*(5), 338–352. https://doi.org/10.1108/LM-06-2018-0050

Posselt, T., Abdelkafi, N., Fischer, L., & Tangour, C. (2019). Opportunities and challenges of Higher Education institutions in Europe: An analysis from a business model perspective. *Higher Education Quarterly*, *73*(1), 100–115. https://doi.org/10.1111/hequ.12192

Pritchard, C. (2013). *Project management communications toolkit* (2nd Editio). Artech House. https://doi.org/10.1201/b18265-6

Project Management Institute, I. (2017). *Guide to the Project Management Body of Knowledge (PMBOK® Guide)* (6th Editio). Project Management Institute, Inc. (PMI). https://app.knovel.com/hotlink/pdf/id:kt011DXH02/guide-project-management/project-communications

Quigley, E. (2019). ADDIE: 5 Steps To Effective Training. *LearnUpon*. https://www.learnupon.com/blog/addie-5-steps/

Rad, S. K., & Kermanshachi, S. (2018). Construction Research Congress 2018. *Proceeding of Construction Research Congress*, *Vdc*, 429–438. https://doi.org/10.1213/01.ANE.0000149897.87025.A8

Ragas, M. & Ragas, T. (2021). Understanding Agile for Strategic Communicators: Foundations, Implementations, and Implications. *International Journal of Strategic Communiction, 15*(2), 80-92*. https://doi.org/10.1080/1553118X.2021.1898147*

Rahman, S. A., Tuckerman, L., Vorley, T., & Gherhes, C. (2021). Resilient Research in the Field: Insights and Lessons From Adapting Qualitative Research Projects During the COVID-19 Pandemic. *International Journal of Qualitative Methods*, *20*, 1–16. https://doi.org/10.1177/16094069211016106

Ramaphosa, C. (2020, March 23). Statement by president Cyril Ramaphosa on escalation of measures to compat COVID-19 epidemic. *Parliment of the Republic of South Africa*.

Rashid, M., Hodgson, C. S., & Luig, T. (2019). Ten tips for conducting focused ethnography in medical education research. *Medical Education Online*, *24*(1). https://doi.org/10.1080/10872981.2019.1624133

Reiser, R. A. (2001). A history of instructional design and technology: Part II: A history of instructional design. *Educational Technology Research and Development*, *49*(2), 57–67. https://doi.org/10.1007/BF02504928

Reyes, V., Mclay, K., Thomasse, L., Olave-Encina, K., Karimi, A., Rahman, T. M., Seneviratne, L., & Tran, T. L. N. (2021). Enacting Smart Pedagogy in Higher Education Contexts: Sensemaking through Collaborative Biography. *Technology, Knowledge and Learning*.

https://doi.org/10.1007/s10758-021-09495-5

Richard, B., Sivo, S. A., Ford, R. C., Murphy, J., Boote, D. N., Witta, E., & Orlowski, M. (2021). A Guide to Conducting Online Focus Groups via Reddit. *International Journal of Qualitative Methods*, *20*, 1–9. https://doi.org/10.1177/16094069211012217

Richards, H. M., & Schwartz, L. J. (2002). Ethics of qualitative research: Are there special issues for health services research? *Family Practice*, *19*(2), 135–139. https://doi.org/10.1093/fampra/19.2.135

Richardson, J. C., Ashby, I., Alshammari, A. N., Cheng, Z., Johnson, B. S., Krause, T. S., Lee, D., Randolph, A. E., & Wang, H. (2019). Faculty and instructional designers on building successful collaborative relationships. *Educational Technology Research and Development*, *67*(4), 855–880. https://doi.org/10.1007/s11423-018-9636-4

Roberts, K., Dowell, A., & Nie, J. B. (2019). Attempting rigour and replicability in thematic analysis of qualitative research data; A case study of codebook development. *BMC Medical Research Methodology*, *19*(1), 1–8. https://doi.org/10.1186/s12874-019-0707-y

Rodriguez, G., Gasparini, I., Kemczinski, A., & Veloso De Matos, A. (2021). Students' Perception of Scrum in a Course Project. *IEEE Revista Iberoamericana de Tecnologias Del Aprendizaje*, *16*(4), 329–336. https://doi.org/10.1109/RITA.2021.3136436

Romero-Ivanova, C., Shaughnessy, M., Otto, L., Taylor, E., & Watson, E. (2020). Digital Practices & Applications in a Covid-19 Culture. *Higher Education Studies*, *10*(3), 80–87. https://doi.org/10.5539/hes.v10n3p80

Rothwell, W. J., Benscoter, B., King, M., King, S. B., & King, S. B. (2015). *Mastering the instructional design process : A systematic approach*. Center for Creative Leadership. https://ebookcentral-proquest-com.uplib.idm.oclc.org/

Rowland, G. (1992). What do instructional designers actually do? An initial investigation of expert practice. *Performance Improvement Quarterly*, *5*(2), 65–86.

Rozkwitalska, M. (2020). Social interactions and workplace learning: The influence of job demands and job resources. *Development and Learning in Organizations: An International JOurnal*, *34*(3), 31–33. https://doi.org/10.1108/DLO-11-2019-0275

Ryan, G. (2018). Introduction to positivism, interpretivism and critical theory. *Nurse Researcher*, *25*(4), 14–20. https://doi.org/10.7748/nr.2018.e1466

Sakulvirikitkul, P., Sintanakul, K., & Srisomphan, J. (2020). The Design of a Learning Process for Promoting Teamwork using Project-Based Learning and the Concept of Agile Software Development. *International Journal of Emerging Technologies in Learning*, *15*(3), 207–223.

https://doi.org/10.3991/ijet.v15i03.10480

Saldana, J. (2011). *Fundamentals of Qualitative Research*. Oxford University Press, Incorporated. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=665394

Saldana, J. (2021). *The Coding Manual for Qualitative Researchers* (4th Editio). SAGE Publications, LTD.

San, C. J. R., Diaz, E., Carral, L., Fraguela, J. A., & Iglesias, G. (2019). Complexity and Project Management: Challenges, Opportunities, and Future Research. *Complexity*, *2019*. https://doi.org/10.1155/2019/6979721

Sandberg, A. B., & Crnkovic, I. (2017). Meeting Industry-Academia Research Collaboration Challenges with Agile Methodologies. *IEEE/ACM 39th International Conference on Software Engineering: Software Engineering in Practice Track (ICSE-SEIP)*, 73–82. https://doi.org/10.1109/ICSE-SEIP.2017.20

Sanjari, M., Bahramnezhad, F., Fomani, F. K., Sho-Ghi, M., & Cheraghi, M. A. (2014). Ethical challenges of researchers in qualitative studies: the necessity to develop a specific guideline. *Journal of Medical Ethics and History of Medicine*, *7*(14), 1–6. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4263394/pdf/jmehm-7-14.pdf

Saunders, F. C., Brooks, J., & Dawson, M. (2020). Exploring staff attitudes to distance learning – what are the opportunities, challenges and impacts on engineering academics and instructional designers. *European Journal of Engineering Education*, *45*(5), 675–690. https://doi.org/10.1080/03043797.2019.1677562

Scanlon, S. (2019). *Using the Scrum process to manage e-learning projects*. Dashe & Thomson. https://www.dashe.com/blog/using-the-scrum-process-to-manage-e-learning-projects

Schramm, W. (1971). *Notes on Case Studies of Instructional Media Projects.* https://files.eric.ed.gov/fulltext/ED092145.pdf

Schreier, M. (2014). Qualitative content analysis. In *The SAGE handbook of qualitative data analysis* (pp. 170–183). SAGE Publications Ltd. https://dx.doi.org/10.4135/9781446282243.n12

Schuit, O. (2019). *Addressing the gap between instructional design and project management*. ELearning Industry. https://e-learningindustry.com/instructional-design-and-project-management-addressing-gap

Schwaber, K. (2004). *Agile Project Management with Scrum*. Microsoft Press, Redmond, WA.

Schwaber, K., & Sutherland, J. (2017). *The Scrum Guide - The Definitive Guide to Scrum: The Rules of the Game* (Issue November). Scrum.org. https://www.scrumguides.org/docs/scrumguide/v2017/2017-Scrum-Guide-US.pdf

Schwaber, K., & Sutherland, J. (2020). *The Scrum Guide - The Definitive Guide to Scrum: The Rules of The Game*. *November*. https://scrumguides.org/docs/scrumguide/v2020/2020-Scrum-Guide-US.pdf#zoom=100

Seale, O., & Cross, M. (2016). Leading and managing in complexity: the case of South African deans. In *Studies in Higher Education* (Vol. 41, Issue 8, pp. 1514–1532). https://doi.org/10.1080/03075079.2014.988705

Seel, N. M., Lehmann, T., Blumschein, P., & Podolskiy, O. A. (2017). *Instructional Design for Learning: Theoretical Foundations*. BRILL. https://doi.org/10.1007/978-1-4419-1428-6_3089

Sener, J. (2015). *Updated E-Learning definitions*. Online Learning Community Insights. https://online-learningconsortium.org/updated-e-learning-definitions-2/

Shahin, M., Hussain, W. Nurwidyantoro, A., Perera, H. Shams, R Grundy, J. & Whittle, J. (2021). Operationalizing Human Values in Software Engineering: A Survey. *IEEE Access, 19, 75269-75295. https://doi.org/10.1109/ACCESS.2022.3190975*

Sharif, A., & Cho, S. (2015). Bridging the Perceptual Gaps between Identity, Practice, Impact and Professional Development. *RUSC. Universities and Knowledge Society Journal*, *12*(3), 72–85. http://dx.doi.org/10.7238/rusc.v12i3.2176

Sharma, M., Luthra, S., Joshi, S., & Joshi, H. (2022). Challenges to agile project management during COVID - 19 pandemic : an emerging economy perspective. *Operations Management Research*, *15*, 461–474. https://doi.org/10.1007/s12063-021-00249-1

Shelton, K., & Saltsman, G. (2006). Using the Addie Model for Teaching Online. *International Journal of Information and Communication Technology Education (IJICTE)*, *2*(3), 14–26. https://doi.org/10.4018/jicte.2006070102

Sim, J., & Sharp, K. (1998). A critical appraisal of the role of triangulation in nursing research. *International Journal of Nursing Studies*, *35*(1–2), 23–31. https://doi.org/10.1016/S0020-7489(98)00014-5

Sjøberg, D. I. K., Johnsen, A., & Solberg, J. (2012). Quantifying the Effect of Using Kanban versus Scrum: A Case Study. *Ieee Software*, *29*(5), 47–53. https://doi.org/10.1109/MS.2012.110

Slagter van Tryon, P. J., McDonald, J., & Hirumi, A. (2018). Preparing the next generation of

instructional designers : a cross-institution faculty collaboration. *Journal of Computing in Higher Education: Research & Integration of Instructional Technology*, *30*(1), 125–153. https://doi.org/10.1007/s12528-018-9167-3

Smith, J., Billot, J., Clouder, L. & King, V. (2020). Juggling competing activities: academic staff as doctoral candidates. *Higher Education Research & Development,* 39(4), 591-605. https://doi.org/10.1080/07294360.2019.1685945

Söderback, J., Hrastinski, S., & Öberg, L.-M. (2016). Using Distributed Scrum for Supporting an Online Community - A Qualitative Descriptive Study of Students ' Perceptions. *10th International Conference on Networked Learning*, 397–404. https://www.networkedlearningconference.org.uk/abstracts/pdf/P43.pdf

Soundy, A., & Heneghan, N. R. (2022). Meta-ethnography. *International Review of Sport and Exercise Psychology*, *15*(1), 266–286. https://doi.org/10.1080/1750984X.2021.1966822

Spencer, D., Zimmerman, A., & Abramson, D. (2011). Special Theme: Project Management in E-Science: Challenges and Opportunities. *Computer Supported Cooperative Work*, *20*, 155–163. https://doi.org/10.1007/s10606-011-9140-4

Spencer, R., Pryce, J. M., & Walsh, J. (2014). Philosophical Approaches to Qualitative Research. In P. Leavy (Ed.), *The Oxford Handbook of Qualitative Research* (p. 759). Oxford University Press.

Spinuzzi, C., & Guile, D. (2019). Fourth-Generation Activity Theory: An Integrative Literature Review and Implications for Professional Communication. *IEEE International Professional Communication Conference (ProComm)*. https://doi.org/10.1109/ProComm.2019.00012

Stauffer, B. (2020). *Online Learning vs. Distance Learning*. Applied Educational Systems. https://www.aeseducation.com/blog/online-learning-vs-distance-learning

Stefaniak, J. E. (2017). The Role of Coaching Within the Context of Instructional Design. *TechTrends*, *61*(1), 26–31. https://doi.org/10.1007/s11528-016-0128-2

Steinbinder, A., & Sinsneros, D. (2020). Achieving Uncommon Results Through Caring Leadership. *Nurse Leader*, *18*(3), 243–247. https://doi.org/10.1016/j.mnl.2020.03.010

Stellman, A., & Greene, J. (2015). *Learning agile: understanding Scrum, XP, Lean, and Kanban* (First edit). O'Reilly.

Stevens, D., & Cooper, J. (2009). *Journal Keeping : How to Use Reflective Writing for Learning, Teaching, Professional Insight and Positive Change* (1st ed.). Stylus Publishing. http://search.ebscohost.com.uplib.idm.oclc.org/login.aspx?direct=true&db=nlebk&AN=326896&site=ehost-live&scope=site

Stewart, H., Gapp, R., & Harwood, I. (2017). Exploring the alchemy of qualitative management research: Seeking trustworthiness, credibility and rigor through crystallization. *Qualitative Report*, *22*(1), 1–19.

Steyn, H., Carruthers, M., Dekker, A., Du Plessis, Y., Kruger, D., Kuschke, B., Sparrius, A., Van Eck, S., & Visser, K. (2016). *Project Management- A Multi-Disciplinary Approach* (Fourth, Re). FPM Publishing.

Suresh, K. D. N. (2017). *9 e-learning Trends For 2018*. E-learning Industry. https://e-learningindustry.com/e-learning-trends-for-2018-9

Swann, J., & Pratt, J. (2003). *Educational Research in Practice*. Bloomsbury Publishing Plc. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=436128

Tabatabaei, M., Cuellar, M., & Williams, J. A. (2019). Practitioners ' Perception of Skills in Effective Project Management. In *International Research Workshop on IT Project Management. Association for Information Systems AIS Electronic Library (AISeL)* (pp. 1–21).

Tahirkheli, S. K., & Ajigini, O. A. (2022). Factors Influencing Digital Innovation Strategy in Organizations: An Empirical Analysis. *Information Resources Management JOurnal*, *35*(1), 1–23. https://doi.org/10.4018/IRMJ.287900

Takagi, K. (2018). Accommodating project-based professionals in higher education institutions in Japan. *Journal of Higher Education Policy and Management*, *40*(3), 272–286. https://doi.org/10.1080/1360080X.2018.1462434

Taylor, D., Grant, J., Hamdy, H., Grant, L., Marei, H., & Venkatramana, M. (2020). Transformation to learning from a distance. *MedEdPublish*, *9*(1), 1–12. https://doi.org/10.15694/mep.2020.000076.1

Taylor, M. L., & Søndergaard, M. (2017). *Unraveling the mysteries of case study research : a guide for business and management students*. Edward Elgar Publishing.

Thanh, N. C., Thi, T., & Thanh, L. (2015). The Interconnection Between Interpretivist Paradigm and Qualitative Methods in Education. *American Journal of Educational Science*, *1*(2), 24–27. http://www.aiscience.org/journal/ajes

Thomas, E., & Maglivy, J. K. (2011). Qualitative Rigor or Research Validity in Qualitative Research. *Ournal for Specialists in Pediatric Nursing*, *16*, 151–155.

Tong, A., & Dew, M. A. (2016). Qualitative Research in Transplantation: Ensuring Relevance and rigor. *Transplantation*, *100*(4), 710–712.

https://doi.org/10.1097/TP.0000000000001117

Topping, M., Douglas, J., & Winkler, D. (2021). General Considerations for Conducting Online Qualitative Research and Practice Implications for Interviewing People with Acquired Brain Injury. *International Journal of Qualitative Methods*, *20*, 1–15. https://doi.org/10.1177/16094069211019615

Torrance, M. (2019). *Agile for Instructional Designers : Iterative Project Management to Achieve Results*. Association for Talent Development. http://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=2294628&site=ehost-live&scope=site

Torrence, M. (2019). *Agile for Instructional Designers: Iterative Project Management to Achieve Results*. Association for Talent Development. http://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=2294628&site=ehost-live&scope=site

Tracy, S. J., & Hinrichs, M. M. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, *5*(1), 1–10. https://doi.org/10.11648/j.ajtas.20160501.11

Tracy, S. J., & Hinrichs, M. M. (2017). Big Tent Criteria for Qualitative Quality. *The International Encyclopedia of Communication Research Methods*, 1–10. https://doi.org/10.1002/9781118901731.iecrm0016

Tripp, S. D., & Bichelmeyer, B. (1990). Rapid Prototyping: An Alternative Instructional Design Strategy. *Educational Technology Research and Development*, *38*(1), 33–44. https://doi.org/https://doi.org/10.1007/BF02298246

Troxel, D., & Inge, E. (2020). Collaborating with an instructional designer for online training. *Nursing*, *50*(1), 64–66. https://doi.org/10.1097/01.NURSE.0000615116.70468.35

Turley, F., & Rad, N. K. (2018). *Agile Scrum Handbook* (2nd ed). Van Haren Publishing. https://www.perlego.com/book/1100567/agile-scrum-handbook-pdf

U.S. Army. (2011). *Army Learning Policy and Systems* (TRADOC Reg). U.S. Government Printing Office.

Vaid, K., & Ghose, U. (2020). Predictive analysis of manpower requirements in scrum projects using regression techniques. *Procedia Computer Science*, *173*, 335-344. https://doi.org/10.1016/j.procs.2020.06.039

Van de Schoot, R., & Miočevic, M. (2020). Small Sample Size Solutions: A guide for applied researchers and practitioners. In R. Van de Schoot & M. Miočevic (Eds.), *Small Sample*

Size Solutions. Routledge. https://doi.org/10.4324/9780429273872-6

Van der Hoorn, B., & Killen, C. P. (2021). Preparing project managers for the human aspects of project work: fostering sensemaking abilities. *International Journal of Managing Projects in Business*, *14*(6), 1314–1334. https://doi.org/10.1108/IJMPB-06-2020-0195

Van Maanen, J. (1979). Reclaiming qualitative methods for organizational research: A preface. *Administrative Science Quarterly*, *24*(4), 520–526.

Van Zeeland, I., Van den Broeck, W., Boonen, M., & Tintel, S. (2021). Effects of digital mediation and familiarity in online video interviews between peers. *Methodological Innovations*, *14*(3). https://doi.org/10.1177/20597991211060743

van Zyl, H. M., Burger, Y., Carstens, L., & Geyser, M. (2020). Curriculum design as an enabler of student involvement and success in higher education. *South African Journal of Higher Education*, *35*(4), 177–191. https://doi.org/10.20853/34-5-4267

Vandenhouten, C., Gallagher-Lepak, S., Reilly, J., & Ralston-Berg, P. (2014). Collaboration in E-Learning : A Study Using the Flexible E-Learning Framework. *Online Learning Consortium*, *18*(3), 1–14. https://files.eric.ed.gov/fulltext/EJ1043168.pdf

Vasilache, R., Capatina, A., & Schin, G. C. (2018). Information Technology – the key enabler of multiple project management in higher education institutions. *Proceedings of the International Conference on Business Excellence*, *12*(1), 1002–1011. https://doi.org/10.2478/picbe-2018-0090

VersionOneSurvey. (2010). *The state of Agile development*. http://www.scribd.com/doc/45835357/2010-State-of-Agile-Development-Survey- Results

Vijayasarathy, L. R., & Turk, D. (2008). Agile Software Development: A Survey of Early Adopters. *Journal of Information Technology Management*, *XIX*(2). http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.502.2564&rep=rep1&type=pdf

Vinopal, J. (2012). Project portfolio management for academic libraries: A gentle introduction. *College and Research Libraries*, *73*(4), 379–389. https://doi.org/10.5860/crl-277

Vishnubhotla, S. A., Mendes, E., & Lundberg, L. (2020). Investigating the relationship between personalities and agile team climate of software professionals in a telecom company. *Information and Software Technology*, *126*. https://doi.org/10.1016/j.infsof.2020.106335

Vogelzang, J., Admiraal, W. F., & Van Driel, J. H. (2020). A teacher perspective on Scrum methodology in secondary chemistry education. *Chemistry Education Research and Practice*, *21*(1), 237–249. https://doi.org/10.1039/c9rp00111e

Walford, G. (2001). *Doing Qualitative Educational Research*. Bloomsbury Publishing Plc.

https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=1749450

Walford, G. (2005). Research ethical guidelines and anonymity. *International Journal of Research and Method in Education*, *28*(1), 83–93. https://doi.org/10.1080/01406720500036786

Waltmunson, K. (2011). SCRUM : A Tool from the Software World Can Improve Analytical Project Outcomes. *Government Finance Review; Chicago*, *Vol. 27*(Iss. 4), 24–30.

Wang, X., Chen, Y., Ritzhaupt, A. D., & Martin, F. (2021). Examining competencies for the instructional design professional: An exploratory job announcement analysis. *International Journal of Training and Development*, *25*(2), 95–123. https://doi.org/10.1111/ijtd.12209

Ward, M. R. M., & Delamont, S. (2020). *Handbook of qualitative research in education*. Edward Elgar Publishing Limited. https://ebookcentral-proquest-com.uplib.idm.oclc.org/lib/pretoria-ebooks/detail.action?docID=6317815

Warner, G., Kervin, E., Pesut, B., Urquhart, R., Duggleby, W., & Hill, T. (2021). How do inner and outer settings affect implementation of a community-based innovation for older adults with a serious illness: a qualitative study. *BMC Health Services Research*, *21*(1), 1–14. https://doi.org/10.1186/s12913-020-06031-6

Wedman, J., & Tessmer, M. (1993). Instructional designers' decisions and priorities: A survey of design practice. *Performance Improvement Quarterly*, *6*(2), 43–57.

White, B. A. A., Bledsoe, C., Hendricks, R., & Arroliga, A. C. (2019). A leadership education framework addressing relationship management, burnout, and team trust. *Baylor University Medical Center Proceedings*, *32*(2), 298–300. https://doi.org/10.1080/08998280.2018.1550346

Williams van Rooij, S. (2011). Instructional design and project management: Complementary or divergent? *Educational Technology Research and Development*, *59*(1), 139–158. https://doi.org/10.1007/s11423-010-9176-z

Williams van Rooij, S. (2013). The career path to instructional design project management: An expert perspective from the US professional services sector. *International Journal of Training and Development*, *17*(1), 33–53. https://doi.org/10.1111/j.1468-2419.2012.00414.x

Wilson, B., Jonassen, D., & Cole, P. (1993). Cognitive Approaches to Instructional Design. *The ASTD Handbook of Instructional Technology*, *3*, 21.1-21.22. http://www.cudenver.edu/~bwilsonhttp://carbon.cudenver.edu/~bwilson/training.html

Wilson, M. R., & Corr, P. J. (2018). Managing 'academic value': the 360-degree perspective. *Perspectives: Policy and Practice in Higher Education*, *22*(1), 4–10. https://doi.org/10.1080/13603108.2016.1181117

Winaldi, W., Roza, Y., & Maimunahm, M. (2020). Mathematical Learning Resources Using Android Applicatioan for Online Learning during Pandemic Covid-19. *Journal of Physics: Conference Series*, *1655*, 1–12. https://doi.org/10.1088/1742-6596/1655/1/012092

Winstead, S. (2021). *Five scenarios that urge course authors to turn to Agile*. My E-learning World. https://mye-learningworld.com/5-scenarios-that-urge-course-authors-to-turn-to-agile/

Wu, P., Morris, L., & Ma, M. (2014). *Agile innovation: The revolutionary approach to accelerate success, inspire engagement, and ignite creativity*. John Wiley & Sons, Inc.

Wu, Z., Li, J., & Cheng, L. (2022). Understanding EFL Teacher Engagement in TDTs' Collaborative Curriculum Design: A Chinese Case Study From the Activity Theory Perspective. *Frontiers in Psychology*, *13*(March). https://doi.org/10.3389/fpsyg.2022.825274

Xie, J., Gulinna, A., & Rice, M. F. (2021a). Instructional designers ' roles in emergency remote teaching during COVID-19. *Distance Education*, *42*(1), 70–87.

Xie, J., Gulinna, A., Rice, M. F., & Griswold, D. E. (2021b). Instructional designers ' shifting thinking about supporting teaching during and post-COVID-19. *Distance Education*, *42*(3), 331–351. https://doi.org/10.1080/01587919.2021.1956305

Yin, R. K. (2003). *Case Study Research: Design and methods* (3rd ed.). SAGE.

Yin, R. K. (2013). Applications of case study research. In *Applied Social Research Methods Series* (3rd Editio, Vol. 34). SAGE Publications. https://doi.org/10.1097/FCH.0b013e31822dda9e

Yin, R. K. (2020). The Case Study Crisis : Some Answers. *Administrative Science Quarterly*, *26*(1), 58–65.

Yuan, L., & Powell, S. (2013). "MOOCs and Open Education: Implications for Higher Education. *JISC CETIS Publications*. https://doi.org/10.4324/9781315751108-1

Yuksel Oktay, E. (2016). Distance Education in Work Life: The Case of Turkey. *The Online Journal of Distance Education and E-Learning*, *4*(3), 1–23. https://tojdel.net/journals/tojdel/articles/v04i03/v04i03-01.pdf

Zahedi, M., Tessier, V., & Hawey, D. (2017). Understanding Collaborative Design Through Activity Theory. *The Design Journal*, S4611–S4620.

https://doi.org/10.1080/14606925.2017.1352958

Zimmerman, E. (2019). Higher Education Revamps Online Education in 2019 as Traditional Enrollment Declines. *EdTech Focus On Higher Education*. https://edtechmagazine.com/higher/article/2019/02/higher-education-revamps-online-education-2019-traditional-enrollment-declines

8 Appendices

8.1 Appendix A: Concept clarification

In this study, the following concepts and their working definitions were applied.

Agile project management (APM): A project management methodology governed by principles of team collaboration, self-organisation and cross-functionality. Teams are supported as they work through multiple iterations, in small increments, and with frequent reflection to allow adaptation of plans and outputs. Interaction among teams and stakeholders is emphasised (Aston, 2019; Muslihat, 2018).

BlackBoard: A learning management system used by many Universities to host learning content, conduct assessments, promote student engagement in online courses and facilitate synchronous online sessions via BlackBoard Collaborate (Darko, 2021). In this study teams used Collaborate as video conferencing tool for Scrum events because of its recording capabilities.

Classification of educational subject matter (CESM): In South Africa, public higher education institutions must classify their modules and programmes according to the subject matter fields, given that qualification titles may be unique. These classification of education subject matter (CESM) fields are then reported to the Higher Education Management Information System (HEMIS), as there are funding implications (Department of Education, 2008).

Contemporary research journal: While traditional research journals are often written or typed documents that comprise of paragraphs of text, the contemporary journal took on the form of WhatsApp voice notes, hand written reminders, pages in OneNote, post-its on a study wall, observation tables (Nieuwenhuis, 2011c), and mind maps of how different aspects of the evolving study tied together. A combination of shorter and longer texts, visual representations of thoughts and voice recordings of various lengths were captured primarily for the researcher to track her decision making.

Development team (DT): A small team (3-9 members) of individuals responsible for the development of curriculum products (known as increments) throughout the life-cycle of an e-learning programme. The development team may include curriculum specialists, instructional designers, educational developers and subject matter experts, however Scrum does not recognise these titles and simply refers to members as the development team (Schwaber & Sutherland, 2017). In this study the development teams comprised a programme coordinator and any number of subject matter experts employed full- or part-time by the university as academic staff.

E-learning: In this study, e-learning refers to any combination of technology-enhanced learning programmes (Makani et al., 2016). This covers contact, blended, hybrid, distance and fully online modes of provisioning which incorporate learning and teaching technologies ranging from computer-integrated, to internet-supported and interned-dependent offering. e-learning is also referred to as Virtual Education or Education via the Web (Yuksel Oktay, 2016). Universities often use learning management systems (LMS) to host learning content, activities and assessments in conjunction *wíth* or in the absence *óf* a physical classroom. Students are able to study asynchronously, semi-synchronously and synchronously any place, time and pace depending on the extent of internet integration (Nortvig et al., 2018).In cases where entirely internet-dependent, remote e-learning is referred to, the researcher uses the terminology, *fully online learning*.

Google Suite: In this study, Google Suite with its various applications was used to store and share all project artefacts, work collaboratively on artefacts, and schedule and host meetings. The project owner (PO) used her university Google Drive account, to create Faculty, Department and programme folders that contained Google Docs, Sheets, videos and other resources necessary for each phase of the curriculum development process. During COVID Google Meet allowed free recording of video conferencing sessions and was therefore used for little more than a year to host stand-ups and other Scrum events. Gmail was the preferred tool for email communication and Google Calendar was often used to schedule events.

Increment: All the useable programme items created during a sprint are referred to as an increment (Schwaber & Sutherland, 2017). Internal approval documents, external accreditation documents, module learning activity storyboards, interactive videos, and assessment instruments are a few examples of increments required in the creation of a fully online programme.

Learning designer (LD): In this study learning designers fulfilled roles often associated with instructional design, curriculum development, and professional development facilitation of academic staff. The term instructional designer was however used interchangeably with learning designer as it is very often used at other institutions for individuals who provide curriculum, technological and pedagogical support to university staff wanting to develop online courses in a learning management system (LMS).

Product backlog: “The Product backlog is an ordered list of everything that is known to be needed in the product” (Schwaber & Sutherland, 2017:15). The Product backlog, or in this case, Programme backlog, is a living artefact, which is constantly refined, reviewed and revised by one or more Scrum team. Initial ‘best-understood’ requirements are captured by the product owner, which will then evolve as the programme and the environment for which it is developed evolves (Schwaber & Sutherland, 2017). The Programme backlog contains more general information such as the ADDIE phases and essential documents to be completed for accreditation, in addition to

more specific 'one liner statements' relating to minimum standards and design principles, such as including a payment announcement reminder in week one of a module.

Product owner (PO): The product owner is accountable for the management of the Product backlog. In consultation with the Scrum master and development team, the product owner determines and refines the content of the Product backlog, indicating the items to be developed, and in which order. The product owner ensures visibility, transparency and clarity of the Product backlog to both the Scrum team and stakeholders. Finally the product owner is responsible for value optimisation of the development team's work (Schwaber & Sutherland, 2017). In this study, the researcher fulfils the role of product owner, in her capacity as e-learning project manager. She will work closely with the Scrum masters to refine the Programme backlog with each new Scrum team that joins the e-learning project.

Project management (PM): The practice of effectively coordinating groups of individuals through various means of communication in order to realise specified task objectives (Hamzane & Abdessamad, 2019). Various processes including 'initiating, planning, executing, monitoring and controlling and closing' (Williams van Rooij, 2011:140) form part of PM. In this study PM will entail the oversight and support of Scrum teams as they embark on the journey of developing fully online learning programmes.

Scrum framework: An Agile project management framework for teams involved in complex development projects, where enhanced creativity and productivity is required. The framework maximises opportunities for self-organisation of teams as well as feedback from stakeholders and team members. Scrum is ideally suited for management of small teams who must collaboratively share knowledge and expertise in order to design, develop, implement and sustain a product. This framework provides transparency, flexibility and adaptability as teams work iteratively and incrementally (Schwaber & Sutherland, 2017). In this study the Scrum framework will be implemented to manage e-learning teams from various departments who are involved in the development of fully online higher education programmes.

Scrum master (SM): Scrum masters are responsible for supporting development team members to understand Scrum values and practices. By acting as servant-leader, the Scrum master assists stakeholders and development teams to optimise knowledge transfer through social interactions. The Scrum master practices agility, facilitates Scrum events, serves as coach and helps the team to self-organise, become cross-functional and develop high-value products (Schwaber & Sutherland, 2017). In this study, the learning designers will fulfil the role of scrum master to the development teams who are responsible for the development of fully online qualifications.

Scrum team members: The product owner (project manager), Scrum master (learning designer) and development team (programme coordinator and subject matter experts) make up the Scrum team (Schwaber & Sutherland, 2017).

Social interactions: Social interactions include knowledge sharing elements such as communication, coordination and collaboration which contribute to the formation of a dynamic web of relationships and information exchange between people, technology and the environment. The role of project manager is to facilitate and balance these social interactions as they continually transform and evolve, among role-players involved in the design, development and implementation of e-programmes (D. Spencer et al., 2011).

Sprint backlog: A detailed set of items selected from the Product backlog (known as the Programme backlog in this study), to be completed as Increment (e.g. internal approval documentation, accreditation documentation, learning activity storyboards, etc.) at the end of a Sprint. Further the Sprint Backlog contains the real-time plan of action and division of labour for achieving the Sprint Goal. This document belongs to the Development Team.

Stakeholders: Numerous individuals, including directors, deans, department heads, systems administrators, student administrators, library staff and pilot students form part of the project stakeholders (Clapp, 2017; Khaldi & Erradi, 2019; Khan, 2004). Steyn et al., (2016) categorise stakeholders as *low to high interest* and *low to high power* stakeholders depending on the impact they have on a project. Inputs from the aforementioned stakeholders play an important role in the success of the e-learning project, however most are not directly involved in the design and development of the learning programme.

WhatsApp: In this study, the cross-platform application WhatsApp was used for instant messaging purposes to communicate with Scrum team members. The researcher, also used WhatsApp mobile to capture voice recording reflections on methodological decisions, ponderings and ideas.

Zoom: A video conferencing tool used to host virtual meetings among remote team members. In this study Zoom was used as alternative to Google Meet and BlackBoard Collaborate upon stakeholder requests

8.2 Appendix B: Consent letters

Scrum master's consent letter

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

FACULTY OF EDUCATION
DEPARTMENT OF SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION
Groenkloof Campus
Pretoria 0002
Republic of South Africa
Tel: +27 12 420 –5572
Fax: +27 12 420-5621
http:// www.up.ac.za

Dear Scrum team member,

I am a Doctor of Philosophy student studying through the University of Pretoria, and would like to invite you to participate in a research project titled — *Using the Scrum Project Management Framework to promote social interactions in e-learning projects*.

If you are willing to participate in this study, you will be asked to complete a series of Scrum related training opportunities, which may include video watching and quiz completion. You will be asked to make reflective notes on each of these training sessions. In addition, you will be asked to participate in four 60 minute focus group interviews (virtual or on campus) with your fellow development team members. I will schedule a time to meet with the group (either virtually or physically) depending on the most convenient time and venue selected by the majority of participants for the focus group. Note the focus group will be audio taped and transcribed for analysis purposes. You will also be asked to respond to a 20 minute electronic questionnaire, about the social interactions you experienced while designing a fully online qualification.

The results of this research project will be submitted as part of my PhD thesis and may be published in a scientific journal, non-science mediums or presented at conferences. As the data sets are the intellectual property of the University of Pretoria, the data, may also be used, confidentially and anonymously, for further research purposes. You do not have to participate in this study and may withdraw your participation at any time should you wish to do so. Participation is entirely voluntary.

With your help, I hope to determine:

- To what extent a Scum framework can be used to promote social interactions in the analysis and design phases of an e-learning project in the higher education context.

It is my hope that the data collected through this study, will contribute to a shared understanding of the collaborative techniques necessary for self-organisation and value-laden participation within e-learning project teams. Academics, instructional designers, curriculum developers and project managers could benefit from a Scrum framework adapted for Higher Education Agile e-learning project management which depicts social interaction strategies from onset to the development phase of e-learning projects.

Should you agree to take part in this study, the following terms will apply:

1. The names of Faculties and Departments, at which participating academics are employed, will be treated confidentially.
2. You will not be asked to write nor state your real name at any point of the study.
3. Only the researcher (Ms Eugenie Wolff) and fellow participants will know your real identity if you agree to participate in the focus group interview.
4. Your responses will be treated confidentially. Only you (the participant), the researcher (Ms Eugenie Wolff) and the supervisor (Prof Linda van Ryneveld) will access your raw data responses.
5. Pseudonyms for Faculties, Departments and Academics will be used in all spoken and written reports.
6. The information you provide will be used for academic purposes only.
7. Participation in this project is entirely voluntary. You have the right to withdraw at any time, and without any prejudice, and the information collected will be discarded.
8. You will not be exposed to acts of deception throughout the research study.
9. You will not be placed at risk of any kind.

Should you agree to participate in the study under the above stated terms, please fill in the **voluntary consent section below.**

Agreement:

I have read the research information section provided above and voluntarily agree to participate in the study.

Participant signature:…….

Date:…….

If you have any questions or concerns, please contact me at the contact number or e-mail address given below.

Ms Eugenie Wolff
Comprehensive Online Education Services
University of Pretoria
Hatfield Campus
Pretoria

Tel: 071 948 3764
Email address: eugenie.wolff@up.ac.za

Yours truly,
Eugenie Wolff

Supervisor: Prof. L van Ryneveld

…… Signature

…….. Date

…….. Signature

……. Date

Development team member's consent letter

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

FACULTY OF EDUCATION
DEPARTMENT OF SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION
Groenkloof Campus
Pretoria 0002
Republic of South Africa
Tel: +27 12 420 –5572
Fax: +27 12 420-5621
http:// www.up.ac.za

Dear programme development team member,

I am a Doctor of Philosophy student studying through the University of Pretoria, and would like to invite you to participate in a research project titled — *Using the Scrum Project Management Framework to promote social interactions in e-learning projects*. The results of this research project will be submitted as part of my PhD thesis and may be published in a scientific journal, non-science mediums or presented at conferences.

You do not have to participate in this study and may withdraw your participation at any time should you wish to do so. Participation is entirely voluntary.

With your help, I hope to determine:

- To what extent a Scum framework can be used to promote social interactions in the analysis and design phases of an e-learning project in the higher education context.

Accompanying this letter is a questionnaire that asks a variety of questions about the social interactions experienced while forming part of an e-learning team designing a fully online qualification. If you agree to participate in this study, you will be required to complete the questionnaire, which should take approximately 10 minutes to complete.

Development team members that agree to participate in the completion of the questionnaire will be asked to participate in a 60 minute interview. If you agree to participate in the interview, the researcher will schedule a time, selected by you, to meet with you (virtually). The interview will be recorded and transcribed for analysis purposes. Participation in the interview is entirely voluntary and you may withdraw at any time.

Should you agree to take part in this study, **the following terms will apply**:

10. Only the researcher (Ms Eugenie Wolff) will know your real identity if you agree to participate in the interview.
11. Your responses will be treated confidentially. Only you (the participant), the researcher (Ms Eugenie Wolff) and the supervisor (Prof Linda van Ryneveld) will access your raw data responses.
12. Pseudonyms will be used in all spoken and written reports.
13. The information you provide will be used for academic purposes only.
14. Participation in this project is entirely voluntary. You have the right to withdraw at any time, and without any prejudice, and the information collected will be discarded.
15. You will not be exposed to acts of deception throughout the research study.
16. You will not be placed at risk of any kind.

Should you agree to participate in the study under the above stated terms, please fill in the voluntary consent section of the questionnaire and sign the consent section below.

Agreement:

I have read the research information section provided above and voluntarily agree to participate in the study.

Participant signature:

Date:

If you have any questions or concerns, please contact me at the contact number or e-mail address given below.

Ms Eugenie Wolff
Comprehensive Online Education Services
University of Pretoria
Hatfield Campus
Pretoria

Tel: 071 948 3764
Email address: eugenie.wolff@up.ac.za

Yours truly,
Eugenie Wolff

Supervisor: Prof. L van Ryneveld

…… Signature

…….. Date

…….. Signature

……. Date

8.3 Appendix C: Email reflection questions

Email 1:

Dear Learning Designers,

I hope everyone is doing well.

Will you kindly write a free reflection about the course that you recently completed. You can reflect on Agile in general as well as your initial thoughts on Scrum implementation in online programme development. The course touched on pillars, principles, roles, events and Scrum increments. I'd love to know your thoughts. Are there any aspects in your implementation that you would like to change?

Thank you for your willingness to contribute to this study.

Email 2:

Dear Learning Designers,

Hope everyone is well.

Can I request that each of you please watch these two videos as brief reminders of the Scrum principles and values we are working towards. When you are ready, please write a brief reflection about your Scrum journey these past few months? Please think about whether you have been implementing the values and principles or which ones are you battling with and why.

- Scrum values (4:48)
- Scrum principles (1:48)

As always, thanks for your participation.

Email 3:

Dear Learning Designers,

Will you kindly work through the Scrum Guide by Schwaber and Sutherland, before our next focus group, and send through your reflections/notes/ideas in due course.

As you reflect, please think about:

1. If you could advise management on how to ensure that a framework such as Scrum is implemented successfully, what advice would you give?
2. Do you think you could improve on the implementation of Scrum? What would you change in the next month of programme design/ development?

As always, thank you for your time and effort. I hope, this journey will assist us all in becoming more efficient at our project management.

Email 4:

Dear Learning Designers,

For the past 2 years you have been working as project manager of various programme development teams designing fully online programmes. Over the last few months, more structures

were co-developed and put in place to attempt to assist you in your role and you were exposed to the concept of Scrum as project management framework.

Kindly complete the Agile Project Leadership short course (41min) by Kelly O'Connell and then answer the questions below. The course consists of short videos and quizzes, and can be accessed via *clickUP > LinkedIn Learning UP Staff*.

1. What do you perceive to be essential to ensure successful **communication** *in* a programme development project?

2. What do you perceive to be essential to ensure successful **coordination** *of* a programme development project?

3. What do you perceive to be essential to encourage successful **collaboration** *between* individuals working on developing a programme?

4. What aspects of Higher Education and the Academic environment *hinder* the success of the **social interaction strategies** mentioned above?

Self-transformation (DARLA)

1. **D**efine your goal as leader and project manager?

2. **A**ssess your leadership on a scale of 1-10? You can either self-assess or you can ask others for feedback, with reasons for the score please.

3. **R**eflect on your management over last 7 months. What aspects of what you did were *aligned* to your goal and what things would you like to *change*? Please think in terms of communication, coordination and collaboration efforts (social interactions).

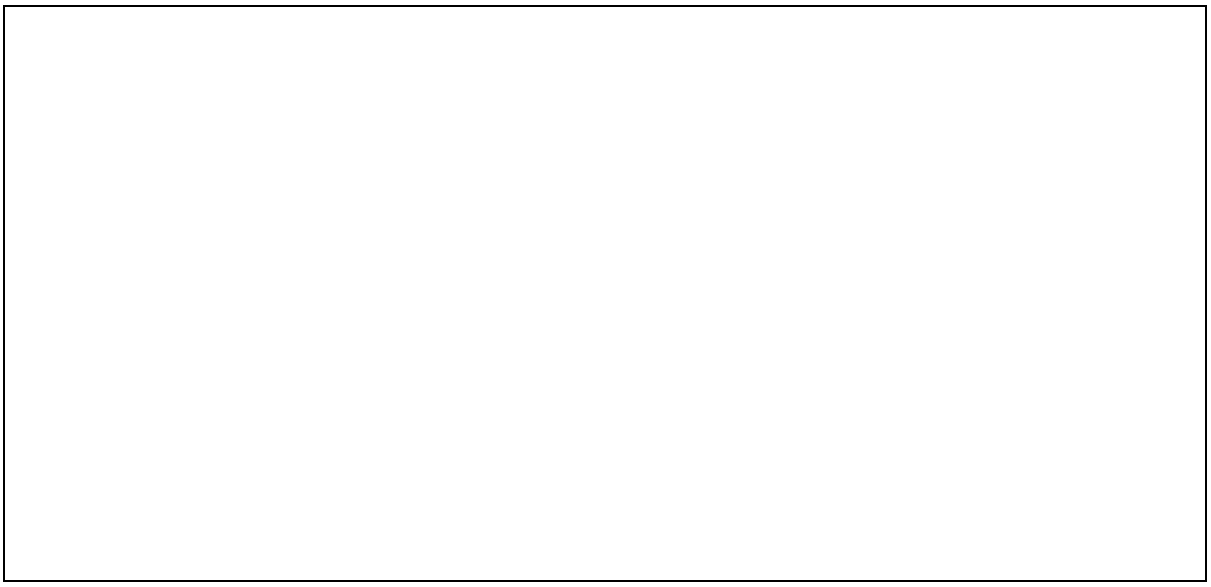
4. **L**earn - what is your preferred way to learn about project management? Courses, experience (trial and error), reading articles, YouTube videos, collaborative efforts, etc. Please justify.

5. **A**cknowledge success - What steps do you feel have you taken in the right direction? What are you most proud of for achieving as leader and project manager? Has being involved in this study, contributed in any way?

Please define **Scrum** in your own words.

Free writing/drawing space.

You are welcome to write or doodle any other thoughts you have on Scrum and your project management journey in the space provided below.



8.4 Appendix D: Group Interview Protocol

1st Interview

Dear Scrum Masters,

Thank you for your willingness to participate in this study. Once a month, over a four month period, I would like to conduct focus group interviews with you. This session should not take longer that 1hr and will be recorded. This is our first focus group after you completed the Basic Scrum training (completed 15 March).

Interviewer notes

Date*: 2021/03/30*

Names of programmes currently being worked on: [redacted]

Current phase in curriculum design and development process:

[redacted] *- Design to start*

[redacted] *- Conceptualisation*

[redacted] *- Conceptualisation*

[redacted] *- Conceptualisation*

The following questions will be used as guidelines:

Questions:

1. What do you like about Scrum?
2. What don't you like about Scrum?
3. Do you think Scrum as a project management framework can be applied in our line of work (HE Online programme development)? Why/why not?
4. How do think Scrum can be adapted for our line of work (HE Online programme development)?
5. Do you think Scrum is a good framework to enhance social interactions? Please elaborate? By social interactions, I mean the following:
    a. Communication (information exchange)
    b. Coordination (the organisation of project components to enable effective teamwork)
    c. Collaboration (working with others to achieve a common goal).
6. Would you be willing to implement Scrum or an adaptation thereof with one or more of your teams? If not, why?
7. Is there anything else you would like to share about your feelings towards Scrum implementation (even if it is, in terms of the request from the product owner, to implement it)?

Thank you for contributing to this study. You are appreciated.

2nd Interview:

Dear Scrum Masters,

Thank you for your willingness to continue participating in this study. This is our second (of four) interviews. This session should not take longer than 1hr and will be recorded. This is our follow-up focus group after you learnt more about the Scrum principles and Scrum

values (sent 14 April) and have been implementing (to some extent) Scrum with one or more teams.

Interviewer notes
Date: 5 May 2021
Names of programmes currently being worked on: [redacted]
Current phase in curriculum design and development process:
[redacted]- *Design to start*
[redacted]- *Conceptualisation*
[redacted]- *Conceptualisation*
[redacted]- *Conceptualisation*
[redacted]- *Conceptualisation*
[redacted]- *Conceptualisation*
[redacted]- *Conceptualisation*
[redacted]- *Conceptualisation*

The following questions will be used as guidelines:

Questions:

I'd like to start with some follow up questions based on the responses of the 1st interview.

1. The Scrum framework distinguishes between 3 roles. The product owner, scrum master and development team member. At this stage, which role do you see yourself fulfilling, and why? How can we improve?

2. Mention was made of not liking the terminology. Which ones would you like to replace, and with what? Do you think that there is value in the Scrum terminology, *e.g. if a development team member wanted to learn more about Scrum or could we develop a connection with a term and what it means, e.g. daily-stand up and its three questions.*

3. Mention was made of not having enough feedback sessions and reflections. How does everyone feel about this? Are you able to implement **Retrospective** sessions *(where you talk with the team about things that went well in the Sprint and potential improvements on how to work together in the next sprint?)* And are you implementing **Sprint reviews**, and if so how? *(This is where outputs are presented to stakeholders for feedback and collaboration.)*

In this second part of the interview, I'd like to chat about the content of the videos, i.e. principles and values.

4. As you have learnt, Scrum has a number of underlying principles. Could you **briefly define**/or explain the principle according to your understanding and then mention how you have been **implementing** each with your team? *Please provide practical examples*. (We can address each principle individually.)

   a. Communication related principles
      i. transparency
      ii. inspection
   b. Coordination related principles
      i. adaptation
      ii. self-organisation
      iii. time-boxing
   c. Collaboration related principles
      i. Collaboration
      ii. value-based prioritisation
      iii. iterative development
5. You have also learnt about the Scrum values. As reminder, the values include: Courage, focus, commitment, respect, openness.
   a. Did the Scrum values influence the way in which you interacted with others socially? Why/why not?
   b. Reflect on whether you consciously tried to uphold these values and whether you encouraged your teams to uphold them as well.
   c. What was the influence on the overall project outcomes (to date in your project), so far, if any?
   d. What are the biggest challenges in your working environment, to implement the Scrum values?

6. Is there anything else you would like to share about your overall experience of Scrum implementation?

Thank you for your valuable contributions today. Already it is helping me to think about how we can improve the way we serve our development teams.

3rd Interview:

Dear Scrum Masters,

Thank you for your willingness to continue participating in this study. This is our third (of four) interviews over a 4 month period. This session should not take longer that 1hr and will be recorded. This month you read the Scrum Guide by Schwaber and Sutherland (shared 19 May) and continued to implement some of the principles, practices and values of Scrum in your work as Learning Designers.

Interviewer notes

Date: **8 June 2021**

Names of programmes currently being worked on: [redacted]

Current phase in curriculum design and development process:

[redacted] - *Design to start*

[redacted] - *Design to start*

[redacted] - *Design & Development*

[redacted] - *Conceptualisation*

[redacted] - *Design to start*

[redacted] - *Design to start*

[redacted] - *Conceptualisation*
[redacted] - *Conceptualisation*
[redacted] - *Conceptualisation*

Part 1:
From the last interview, a few responses were given related to coordination. Amongst other things, mention was made that the Scrum values and principles are being followed, but not so much the **processes (workflow)**. I'd like for us to talk a bit about your project **coordination**.

1. How did implementation of the Scrum framework influence **coordination**?
    a. Coordination, amongst other things, relates to identifying the project vision, **roles and responsibilities, rules of engagement, issues of hierarchy**, reaching shared goals, etc.
    b. Think of the **process**, i.e. sprints, Scrum sessions, reflection sessions.
    c. Think of the **Scrum documents and apps** (such as the product backlog – ClickApp, and sprint backlog) and how (if at all) they **influenced productivity, decision making, work flow consistency and levels of awareness**.

2. If Scrum coordination strategies are not what are guiding you, what is?
    i. Where do you get your processes or steps from?
    ii. What determines duration of tasks?
    iii. What guides roles and responsibilities?
    iv. What determines when something is 'done'?

3. On the topic of **coordination**.
    a. What has it been like for you to coordinate the development of programmes in a fully online (or virtual) environment? *So without contact/face to face interaction.*

Part 2:

Questions:
4. Do you believe that your development teams share a similar understanding of the framework that you are following? Why or why not?
5. If you could advise other Scrum Masters and development teams on how to improve their social interactions, what strategies would you recommend?
    a. communication,
    b. coordination and
    c. collaboration
6. Is there anything else you would like to share about your overall experience of Scrum implementation?

Thank you for taking the time to be here today to talk about your project management experiences with Scrum. It is really appreciated.

4th Interview:
Dear Scrum Masters,

Thank you for your willingness to continue participating in this study. This is our final interview over a 6 month period. This session should not take longer that 1hr and will be recorded. This month you completed the Agile Project Leadership course , read the Agile Manifesto and continued to implement Scrum as project management framework in your work as Learning Designers.

Interviewer notes
Date: 8 Sept 2021
Names of programmes currently being worked on: [redacted]
Current phase in curriculum design and development process:
[redacted]- *Design*
[redacted]- *Design*
[redacted]- *Design & Development*
[redacted]- *Conceptualisation*
[redacted]- *Design*
[redacted]- *Design*
[redacted]- *Conceptualisation*
[redacted]- *Conceptualisation*
[redacted]- *Conceptualisation*
[redacted]- *Conceptualisation*

The following questions will be used as guidelines:

Questions:

1. Briefly explain your role as Scrum Master? What commitments do you have to the Product Owner/Project Manager and Development teams?
2. What impact (if any) does the individual DTM's commitment/interest/buy-in have on the success of social interactions?
3. Can implementing Scrum change this?
4. How has this process (of the unit attempting to implement a project management framework such as Scrum) changed (if at all) your project management practice? 2019 vs now?
5. How has learning about Scrum, observing Scrum, and working with process documents based on Scrum, influenced your **communication** with your development teams? (2019 vs now)
6. How has learning about Scrum, observing Scrum, and working with process documents based on Scrum, influenced your **coordination** of your development teams? (2019 vs now)
7. How has learning about Scrum, observing Scrum, and working with process documents based on Scrum, influenced your ability to foster **collaboration** among your development team members? (2019 vs now)
8. Please describe your overall experience of supporting the development teams in a fully virtual environment?
9. Did any aspects of the Scrum framework aid with virtual communication?
    a. *Communication related principles*
        i. *transparency*
        ii. *inspection*
8. Did any aspects of the Scrum framework aid with virtual coordination?
    a. *Coordination related principles*

   i. *adaptation*
   ii. *self-organisation*
   iii. *time-boxing*
9. Did any aspects of the Scrum framework aid with virtual collaboration?
   a. *Collaboration related principles*
      i. *value-based prioritisation*
      ii. *iterative development*
10. What strategies do you implement to encourage virtual collaboration?
11. Do you ever refer to Scrum practices to gain insights into how to better encourage collaboration?
12. Do you ever refer to Scrum guides/videos/training to adapt your project management practice?
13. To what extent, would you say, are you implementing Scrum?
14. Discuss whether Scrum helped/hindered you to provide an organised and enabling environment for development teams to work together.
15. Is there anything else you would like to share about your overall experience of Scrum implementation?

Topics arising from DTMs interviews:

Some DTMs mentioned that they would have liked to have a thorough project orientation (discussing the project goals, objectives, scope, risks, timeline, budget and approach).

1. How do you conduct your project orientation? Has it changed over time?

Some SMEs mentioned wanting project schedules, indicating an uncertainty of timeframes and where they are in process? 'So, there was no specific if I can say, target, or specific objectives that we had to meet over time. For me, it would help. If you know, the weeks are attached to activities.'

2. How do you communicate timelines/progress? Has this changed over time?

'I wish we had defined expectations'

3. How do you communicate roles and responsibilities? Has this changed over time?

Some SMEs mentioned a lack of individual motivation and a sense of accountability.

4. How do you deal with team motivation and accountability? Are the Scrum values helpful? Courage, focus, commitment, respect, openness

Thank you! You are appreciated!

8.5 Appendix E: Questionnaire

Online Programme Development - Social Interactions Experience Survey

Start of Block: Background information

The purpose of this study is to investigate how the Scrum project management framework can be used to promote social interactions among higher education e-learning project teams. In this study, social interactions include knowledge sharing factors such as communication, coordination and collaboration. Please note that this survey should take approximately 10 minutes to complete. Your participation in this survey is entirely voluntary and all information will remain confidential. The results of this study will be submitted as part of a PhD thesis and may be published in a scientific journal, non-science mediums or presented at conferences. If you have any questions please contact Eugenie Wolff at eugenie.wolff@up.ac.za.

Page Break

End of Block: Background information

Start of Block: Consent

Q1 Please indicate your agreement with the following:

I hereby voluntarily grant my permission for participation in the study as has been explained to me in the previous section.

- ○ Agree (1)
- ○ Disagree (2)

End of Block: Consent

Start of Block: Demographic information

Q2 2. Select the gender you identify most with.

- ○ Male (1)
- ○ Female (2)
- ○ Non-binary / third gender (3)
- ○ Prefer not to say (4)

Q3 3. Select the most appropriate age range.

- ○ Younger than 20 (1)
- ○ 21-30 (2)
- ○ 31-40 (3)
- ○ 41-50 (4)
- ○ 51-60 (5)
- ○ 61-70 (6)
- ○ 71 and older (7)
- ○ Prefer not to say (8)

Q4 4. Select your highest qualification obtained.

- ○ Higher Certificate (NQF Level 5) (1)
- ○ Diploma or Advanced Certificate (NQF Level 6) (2)
- ○ 3 year Bachelor's Degree or Advanced Diploma (NQF Level 7) (3)
- ○ Honour's Degree, Postgraduate Diploma or 4 year Bachelor's Degree (NQF Level 8) (4)
- ○ Master's Degree (NQF Level 9) (5)
- ○ Doctorate Degree (NQF Level 10) (6)
- ○ Other (7) _____
- ○ Prefer not to say (8)

Q5 5. Select the title which suits your role in the e-learning (online programme creation) project best. Multiple roles can be selected.

- [ ] Learning designer (1)
- [ ] Programme coordinator (2)
- [ ] Subject matter expert (3)
- [ ] Other (4) _____

Q6 6. Select the e-learning programme/s in which you were a team member.

- ○ HCert (Sports Sciences) (1)
- ○ PGDip (Craniofacial Orthodontics) (2)
- ○ PGDip (Health Systems Management) (3)
- ○ PGDip (Public Care Nursing) (4)
- ○ PGDip (Animal Welfare) (5)
- ○ Other (6) _____

Q7 7. With how many *contact* (face-to-face) programmes have you been involved in the curriculum design and development process?

- ○ None (1)
- ○ 1-3 (2)
- ○ 4-6 (3)
- ○ 7-9 (4)
- ○ 10 or more (5)

Q8 8. With how many *fully online* (distance) programmes have you been involved in the curriculum design and development process?

- None (1)
- 1-3 (2)
- 4-6 (3)
- 7-9 (4)
- 10 or more (5)

Q9 9. Select the option which most appropriately describes your level of appointment.

- Teaching assistant (1)
- Junior lecturer (2)
- Lecturer (3)
- Senior lecturer (4)
- Associate professor (5)
- Professor (6)
- Prefer not to disclose (7)
- Other (8) _____

Q10 10. Before starting on the design and development process for this e-learning programme, did you have any experience of the Scrum project management framework? (Scrum is an agile project management framework promoting transparency, inspection and adaptation to help interdisciplinary teams work together to produce end products of of high-value.) If yes, please elaborate.

- No (1)
- Yes (2) _____

End of Block: Demographic information

Start of Block: e-learning Project Management Experience

Q11 11. How would you describe your overall satisfaction with how the e-learning project was managed by your learning designer?

	Very unsatisfied (1)	Unsatisfied (2)	Neutral (3)	Satisfied (4)	Very satisfied (5)
Project management experience (1)	○	○	○	○	○

Q12 12. Rank the following components from most positive (1) to least positive (8) influence on your e-learning project experience.

_____ Transparency (knowing what needs to be done, how, by whom and when) (1)
_____ Adaptation (flexibility in the processes to respond to change) (2)
_____ Inspection (frequent reviews, reflection, feedback) (3)
_____ Self-organisation (autonomy in the team to decide how work should be done) (4)
_____ Collaboration (working as a team towards a common goal) (5)
_____ Value-based prioritisation (working to produce valuable outputs early in each phase, so that useable products are created on a continuous basis) (6)
_____ Workflow or time-boxing (working according to phases, timeframes and deadlines, supported by workshops and meetings) (7)
_____ Iterative development (repeating a step, revisiting a step or reworking a document to ensure the best output) (8)

End of Block: e-learning Project Management Experience

Start of Block: e-learning Project Communication

Q13 13. How would you describe the overall communication (exchange of information) practices among the programme team members (including the learning designer, programme coordinator and subject matter experts) throughout the e-learning project?

	Very inefficient (1)	Inefficient (2)	Average (3)	Efficient (4)	Very efficient (5)
Communication practices (1)	○	○	○	○	○

Q14 14. Rank from highest (1) to lowest (7) how effectively communication contributed to each of these components.

_____ Enhancing transparency (knowing what should be done, by whom and by when and what the minimum criteria are) (1)
_____ Encouraging adaptation (exchanging ideas so that changes could be made to processes) (2)
_____ Improvement of end products through reviews and feedback (3)
_____ Fast and effective information transfer (think of tools used, e.g. email, WhatsApp, Google Drive, virtual conferencing software and videos) (4)
_____ Building relationships and a sense of community (5)
_____ Empowering individuals (6)
_____ Solving problems (7)

Q15 15. To what extent was Scrum terminology used during the e-learning project, e.g. sprints, product backlog, sprint backlog, daily stand-ups, or retrospectives

	Never (1)	Sometimes (2)	About half the time (3)	Most of the time (4)	Always (5)
Scrum terminology use (1)	○	○	○	○	○

End of Block: e-learning Project Communication

Start of Block: e-learning Project Coordination

Q16 16. How would you describe the overall coordination of the e-learning project, by the learning designer? Coordination refers to the manner in which the e-learning project was organised to provide an enabling and unified environment for individuals to work together.

	Very inefficient (1)	Inefficient (2)	Average (3)	Efficient (4)	Very efficient (5)
Coordination experience (1)	○	○	○	○	○

Q17 17. Rank the following coordination components from most positive (1) to least positive (5) influence on the overall project outcome to date.

_____ Project staffing (having a sufficient number of staff with appropriate expertise) (1)
_____ Project organisation (structuring of project into phases and steps with prescribed outputs, individual & group responsibilities, and review & feedback opportunities) (2)
_____ Servant leadership (having a dedicated learning designer who attempts to facilitate progress, maintain good relationships, motivate the team and provide guidance) (3)
_____ Project orientation (discussing the project goals, objectives, scope, risks, timeline, budget and approach) (4)
_____ Defined expectations (knowing what the minimum standards are and being held accountable to meet the standards) (5)

End of Block: e-learning Project Coordination

Start of Block: e-learning Project Collaboration

Q18 18. How would you describe the overall collaboration between the programme team members (including the learning designer, programme coordinator and subject matter experts) which took place during the e-learning project? Collaboration refers to individuals working together to achieve a common goal.

	No collaboration (1)	Infrequent collaboration (2)	Uncertain (3)	Somewhat collaborative (4)	Highly collaborative (5)
Collaboration experience (1)	○	○	○	○	○

Q19 19. Rank these assumed collaboration benefits from most (1) to least (7) experienced throughout your e-learning project journey.

_____ Contributing to a openness to change (being more open minded to new ideas) (1)
_____ Creating a sense of shared ownership of the programme being developed (2)
_____ Embracing a culture of learning (3)
_____ Increasing individual motivation and a sense of accountability (4)
_____ Developing unique solutions to complex challenges (providing a richer end product) (5)
_____ Improving team efficiency (faster learning, faster feedback, faster output delivery) (6)
_____ Fostering healthy relationships (mutual trust and interdependence) (7)

Q20 20. Were various tools used by the learning designer throughout the e-learning project to support social interactions (communication, coordination and collaboration)?

○ Yes (1)

○ No (2)

Q21 21. To what extent did the tools used throughout the e-learning project support collaboration? Tools include email, WhatsApp, Google Drive and virtual conferencing software.

	No support (1)	Infrequent support (2)	Uncertain (3)	Somewhat supportive (4)	Highly supportive (5)
Tool support for collaboration (1)	○	○	○	○	○

End of Block: e-learning Project Collaboration

Start of Block: Recommendations

Q22 22. Please provide recommendations to improve the manner in which the e-learning project was managed.

_____

End of Block: Recommendations

8.6 Appendix F: Individual interview protocol

Hi (DTM name),

Thank you for your willingness to participate in this study. This interview should take approximately 1hr and will be recorded. I'd appreciate it if you could share your experience of being a member of the development team for the fully online (programme name).

Interviewer notes
Date:
Name/s of programmes currently being worked on:
Current phase in curriculum design and development process:

The focus of our discussion will be on the **social interactions** you experienced during the conceptualisation of the online programme. By social interactions, I refer to the *communication, coordination and collaboration strategies* in particular.
5min

In the conceptualisation and design of the online (programme name):

Communication

1. **How** did project information communication take place?
2. What do you perceive to be essential to **successful** communication?
3. What were the **best and worst** communication practices you experienced? *This can be in terms of communication frequency, clarity, mode (online), etc.*
4. Please share your experience of the **tools** used for communication purposes e.g. Google Meets, Google Docs, email, video recordings, etc.
5. Do you believe working **virtually** (remotely) helped or hindered the team to achieve their goal?
6. Did you feel as if the curriculum design and development process was sufficiently transparent? (Did you know what to do, how to do it, why it was being done, etc.) Please elaborate?
7. **Scrum terminology** such as sprints, backlogs and Scrum sessions were sometimes used? Did this have any impact on your experience of communication? Please explain.
8. What strategies would you recommend to **improve** communication?

20min

Coordination

9. What was your overall experience of the **Coordination** strategies (project organisation) used by the LD?
    a. **What** strategies were used?
10. What do you perceive to be essential to **successful** coordination?
11. Did you have a proper project **orientation**? (discussing the project goals, objectives, scope, , timeline, and approach). Please elaborate.
12. Please share your experience of the **workflow** (sprints, Scrum sessions, frequency of meetings).
13. Did it **help or hinder** to work according to phases, with steps, deadlines and feedback sessions?

14. In your experience, did the coordination practices influence the **sense of community**? In what way?
15. The LD used certain **tools** to aid in project coordination (e.g. the sprint backlog with a list of tasks to be completed, the programme outline with all the SAQA related information, and module descriptor templates), etc. What was your experience of using these organisational tools?
16. The process entailed quite a lot of **iteration** (revisiting a step, reworking documents, etc.). How do you think it influenced the outputs produced? Please talk about your *positive and negative experiences* of iteration.
17. How did you experience the balance between **fixed** processes and **flexibility** in processes to respond to change?
18. Were you comfortable with the **responsibilities** assigned to you and others in the e-learning project? Why or why not? What would you have liked to change?
19. To what extent did you experience your LD as a **Servant-leader**? Did it help or hinder to have a learning designer involved in the project coordination?
20. What strategies would you recommend to **improve** coordination?

40min

Collaboration

21. Please describe your **working relationship** (on this project) with your LD and fellow team members. *E.g. equal contributor (coach; mentor; protector; team); or top-down (manager; boss); or strictly professional/corporate or inclusive of personal/emotional*
22. Did your LD implement **strategies** to encourage individuals to work together to achieve a common goal? Please elaborate.
23. What do you perceive to be essential to **successful** collaboration?
24. What **impact** did making this a collaborative project from the conceptualisation stage have on the overall programme (qualification) and your overall experience?
    a. Would you have preferred working individually? Please elaborate.
25. What aspects of the process **aided** in the team working collaboratively? *Think of aspects such as knowing who needs to do what, sharing a common vision, having opportunities for everyone to express their opinions, sharing ownership of the programme, embracing a culture of learning, etc.*
26. What collaboration related **challenges** did you face when conceptualising your module?
27. What strategies would you recommend to improve collaboration?

55min

PM in general

28. What knowledge and skills do you think, should a LD as **Project Manager** have?
29. Do you consider yourself more **empowered** after your involvement in this project? Please elaborate?
30. Please share any **recommendations** for how social interactions in future projects on programme development can be better managed?

60min

8.7 Appendix G: Product Backlog

PRODUCT BACKLOG

Fully Online Programme Development

Description

A list of everything known to be needed in the process of accrediting, registering, designing and developing a fully online programme. This is a living document which will continually be updated. The document will evolve as the Higher Education environment evolves, including CHE legislation changes, University's policy updates, shifts in students' needs, technological improvements, and development team ownership. Generally the process of fully online programme development, including the implementation of the 1st module, takes approximately **18 months** to complete. Numerous stakeholders are involved in this process at varying phases, with the Scrum Master and development team (especially the programme coordinator) working across all phases. The information provided below serves as a guideline and may vary from programme to programme depending on a number of elements, such as whether an accredited contact equivalent programme already exists and the number of SMEs working on the programme. **Weekly commitments** are captured per phase, while hourly commitments per week will vary between **5-15 hours** depending on the phase.

Scrum Team

Product Owner: [redacted]

Manager of the ProductBacklog (content & ordering) to ensure the desires of external stakeholders (Senate, DHET, CHE, SAQA, and most importantly, the students) are met.

Scrum Masters: [redacted]

Servant-leader, there to support the development team (DT) in adhering to Scrum practices & values. Coaches DT in self-organising, removes impediments to progress, facilitates Scrum events (as needed) and ensures that project scope and goals are understood by everyone. She will help everyone (including stakeholders & the DT) to understand how their interactions can add value to the Scrum Team.

Development Team: Programme coordinator and subject matter experts

Team members responsible for the creation of all programme deliverables (increments such as the UP Section B document, DHET document, HEQC document, SAQA document, programme outline, module maps, storyboards and Blackboard modules). Self-organising (organise and manage own work) in between the weekly workshops and Scrum sessions.

Team Vision

To provide students with an online learning programme, which provides flexibility, caters for diversity, includes high-quality, relevant and engaging content and meaningful assessment opportunities.

Phases

ADDIE + 3

To simplify the curriculum development and instructional design process, we will work according to the ADDIE + 3 model as described below. Note that each stage will have multiple iterations, reflection and feedback sessions to ensure that the increments abide by the definition of 'Done' i.e. outputs are in a usable condition.

1. Analysis (including Onboarding)

Market research and international comparability research should be conducted to determine the demand for the programme and its graduates. The onboarding and needs analysis phase should focus on the prospective student, staff, university, DHET, CHE, and SAQA requirements. Meetings with Deans, HoDs, the PC, the [redacted] directorate head (Prof [redacted]), Product Owner and Scrum Master usually takes place before design commences. **+- 1 month**

2. Conceptualisation

Conceptualisation entails strategising about the programme purpose, exit level outcomes (ELOs), assessment criteria, admission requirements, structure (module carousel), and the like. In addition module maps containing the module title, credits, purpose, LOs, content topics, intended learning activities, assessment strategy and e-resources are briefly documented. **+- 6 months**

*Note continuous reflection & feedback will form part of this phase.

3. Readiness

The Readiness phase is used to ensure that all human resource requirements are in place for the design phase. During this phase the carousel is finalised and a production schedule drawn up. The entire development team contributes to this phase, before module development with smaller groups of 2-4 SMEs commences. **+- 1 month**

4. Design

During the design phase, storyboarding of the individual modules takes place. Storyboarding the module maps entails creating a blueprint of a module, thus adding 'flesh to the skeleton'. SMEs will write a narrative and visual outline of the module, including weekly outcomes, activity instructions, assessment instruments and tools, assessment summaries (with weighting), and finalising the e-resources to be used. **+- 3 months**

*Note continuous reflection & feedback will form part of this phase.

5. Development

SMEs start creating course materials such as videos, voice notes, case studies and other resources during this phase. Building of the modules in clickUP then commences by both SMEs and interns. Setting up the Grade centre, creating badges, creating assessments (in HP5 for example) and completing the study guide occurs. Strong learning design support will be provided for this phase. **+- 1 month**

*Note continuous reflection & feedback will form part of this phase.

6. Reviews

In addition to the continued review of each increment designed by the development team up to this phase, more formal review processes take place once modules have been developed. Internal moderation (content review) and external evaluations (instructional design review) of the clickUP modules and study guides will occur. Evaluations typically focus on course navigation, links working, sufficient student engagement, and the length of activities (notional hours) and may even require language editing of course materials. **+- 2 months**

7. Implementation

During the implementation phase, the first module goes live. Online facilitation must now occur as students engage with the content, peers and the facilitator. Typically facilitators spend 2hrs a day, participating in discussion forums, answering queries regarding assessments, fixing minor glitches that form part of the first iteration of a module and grading assignments. Facilitation time typically reduces after every iteration of the module if facilitators *keep track of* and *implement* updates based on feedback received from students. **+- 3 months**

8. Evaluation

Upon completion of a module, students have the opportunity to fill in an evaluation form. Facilitators are also encouraged to keep a diary of their challenges and triumphs experienced throughout the course as well as changes they would like to make before the next iteration. The facilitator should work through the student evaluations and determine which feedback is valuable in enhancing the module and future students' learning experience. Content revision is also important to ensure that current and relevant resources form part of the module. Facilitators are encouraged to make notes on any academic, technical or administrative review matters they would like to address with their Learning Designer. **+- 1 month**

Increments

Phase	Sprint goal	Increment	Description	Definition of Done	Stakeholders
Analysis & Onboarding	2 weeks - 5 weeks based on [redacted] approval	New programme review form	A introductory presentation by [redacted], followed by a series of emails leading to the completion of a document containing descriptions of the intended programme audience, academic staff involved, programme information (faculty, programme origins, etc.) and module information.	All role players have a sound understanding of the demand for the programme, who will develop it, support offered and the extent of the time commitment required.	Dean, HoD, PC PO, Scrum Master
Phase	**Sprint goal**	**Increment**	**Description**	**Definition of Done**	**Stakeholders**
Design: Conceptualisation	4 weeks	Programme Outline	Phase 2 is started with a kick-off meeting and series of videos & meetings follow. A document containing the programme title, CESM, purpose, ELOs and AC, admission requirements, articulation options, knowledge to be in place, rationale, international comparability and module titles.	All elements are appropriate to the programme type, NQF level and CESM. Elements are constructively aligned. Elements are ready for integration into Senate, PQM and Accreditation documentation.	Scrum Master & Dev Team
	3 weeks	Module map	Module titles, credits, CESMs, purpose, LOs,	All elements are appropriate to the programme type, NQF level and CESM. Elements are constructively aligned. Elements are ready for integration into Senate, PQM and Accreditation documentation.	Scrum Master & Dev Team
	1 week	Sec B form	Internal UP document prepared by the programme	Document is approved by T&LC	PC and SM

		(Senate doc)	coordinator, to serve at the Faculty Teaching & Learning Committee, Faculty Board, SCAC, Senex and Senate. The problem statement and motivation should be clear, in addition to Yearbook and course catalogue information.	meeting, FB and Senate.	Head Student Admin, T&L Committee, DESA, SCAC, Faculty Board, Senex, Senate
	6 weeks	Module Descriptor	ELO alignment, content (topics), intended learning activities, assessment plan and list of e-resources is completed.	Elements are constructively aligned to programme purpose, ELOs and AC. Elements are ready for integration into Senate and Accreditation documentation. Module elements lend themselves well to online pedagogy.	Scrum Master & Dev Team
Phase	**Sprint goal**	**Increment**	**Description**	**Definition of Done**	**Stakeholders**
Design: Accreditation	4 weeks	External Board Doc (e.g. SANC, ECSA, MRTEC)	Programme specific information must be provided to professional bodies governing professional degrees.	Meets professional body minimum requirements.	PC Governing bodies
	2 weeks	DHET Document	Information required for Programme Qualification Mix clearance by DHET	All fields completed and submitted to Agreed	SM
	2 weeks	SAQA Document	Information required by SAQA to register the qualification and upload information to the SAQA website.	All fields completed and submitted to Agreed	SM
	4 weeks	HEQC Online	Comprehensive form covering all programme aspects from design, student recruitment, the	All fields completed, appendices completed and submitted to	PC and SM

		Form	teaching & learning strategy to assessment, postgraduate procedures and distance mode delivery.	Agreed	
Programme Readiness	4 weeks	Carousel & Production schedule, Common Programme Elements, MOU	Programme readiness meeting & workshop followed by common programme elements worksop and production schedule discussion.	Carousel finalised, Production schedule finalised, Common Programme elements finalised, SMEs sign MOU	Dev Team & SM
Design: Storyboarding	1 week	Needs analysis	Project Initiation meeting		SMEs & SM
Phase	**Sprint goal**	**Increment**	**Description**	**Definition of Done**	**Stakeholders**
Design: Storyboarding cont.	3 weeks	Module map	Module planning - Online orientation & module outcomes; module assessment & activities	Module map finalised including module outcomes, planned multimedia, planned assessment and intended activities	SMEs & SM
	7 weeks	Storyboards for weeks 1-7 Assessment instruments and tools	Content development (e.g. resources, assessment instruments and marking tools)	Week 1-7 complete all narratives, instructions, assessment instruments and grading tools, and resources; Complete about this course, study guide, and grade centre.	SMEs & SM
	1 week	Resource list	Finalising prescribed resources & software meeting	Resource & software discussions including providers and costs are	PC & SM

				finalised.	
Development	4 weeks	clickUP Module and Study guide	Building of storyboard content in Blackboard, including finalisation and upload of study guide.	Module is ready for content review and external review.	SMEs & SM
	1 week	Fee structure	Fee finalisation meeting	All inclusive module and programme fee list is produced.	PC & SM
Evaluation	7 weeks	Evaluation reports	Internal content reviews are conducted as well as external learning design reviews.	All corrections are made in accordance with feedback received from reviewers.	SMEs (moderators) & Quality Matters reviewers
Phase	**Sprint goal**	**Increment**	**Description**	**Definition of Done**	**Stakeholders**
Implementation	8 weeks	Mark sheet	Typically facilitators spend 2hrs a day, participating in discussion forums, answering queries regarding assessments, fixing minor glitches that form part of the first iteration of a module and grading assignments. Week 8 might require more hours as the module marking is finalised.	Module is successfully facilitated and grades submitted.	SMEs & SM

[redacted] is committed to streamlining the curriculum design and development process and will continue to revise the phases, supporting documentation and available resources to support development teams in managing the workload.