



Postgraduate Students' Experiences on the Use of Moodle and Canvas Learning Management System

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Abstract

It is argued that learning management systems (LMS) are mainly used for formal and informal learning at the expense of non-formal learning. This ignites reluctance in students to use LMS to their maximum potential in institutions of higher education (IHE). Through two contrasting qualitative case studies in two IHEs, ways in which LMS can be used for non-formal learning are proposed. Data were generated using reflective activities, Zoom group meetings and one-on-one semi-structured interviews with 31 students who were purposively and conveniently sampled from teacher education programmes at a South African and an American university. The theoretical framework of connectivism was used as a lens to make meaning of data that were thematically analysed. Findings suggest that students did not have a love of using LMS but used the Moodle and Canvas LMS primarily for downloading readings and participating in discussion forums. The study therefore, proposes a non-formal learning framework for self-direction, and concludes that ignoring students' personal (non-formal) experiences which stimulate a love of using LMS may result in IHE to needing to change from one LMS to another.

Keywords Curriculum · Formal · Informal · Non-formal · Moodle/Canvas LMS · Students' experiences

1 Introduction

The advancement of technology has led universities and other institutions of higher education (IHE) to adopt and use learning management systems (LMS) for student learning. LMS are defined as a type of application software where programmed instructions drive all learning activities; they act as a repository where learning resources can be stored

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and retrieved (Davis et al. 2009; Lamichhane et al. 2007). These studies further outline that LMS continue to influence what students share, learn and negotiate, and even have an impact on the way students think about knowledge production. This involves students' experiences of a phenomenon, which is defined as the state of having gained information through direct observation or participation in order to make meaning thereof (Dewey 1938; Khoza 2015b). Mpungose (2020a) further argue that experiences of the use of LMS can be drawn from the discipline/subject (subject experience), society (social experience) and student (personal experience) in order to address the needs of formal and informal learning through the lens of non-formal learning.

Pappas (2014) posits that LMS can be used in different sectors, which includes but is not limited to the educational sector, and business and industrial spheres, but education is the leading sector with 14.2% of LMS use around the globe. LMS in education can be viewed as the carrier of the curriculum (plan for/of teaching/learning), because they allow space for interaction or sharing of content among students and lecturers (Van den Akker et al. 2012). This is evident from the evolution of LMS in IHE, which started back in the 1990s when the traditional/face-to-face classroom was transformed into using online options. Blackboard and Saba were among of the earliest emerging LMS in the IHE (Davis et al. 2009; Pappas 2019). These studies further assert that open-source software LMS such as Moodle, Open edX, Chamilo and others are those most used in IHE because they can be installed on the IHE servers, so that maintenance costs are their responsibility. Cloud-based LMS such as Canvas, Sakai, dotLearn and others are least used in IHE because they have start-up costs and are installed and controlled on the providers' server, with chargeable maintenance. Recent research shows even though Moodle and Canvas are not of the same type, they share the same LMS features for learning and are among the top 10 most used in IHE (Elabnody 2015; Pappas 2019).

It has been argued that LMS have primarily been adopted for formal learning in order to serve the needs of a certain discipline/subject (Davis et al. 2009; Mpungose 2020c). These latter studies further posit that lecturers use LMS as a depository where the learning process requires students to be driven by knowledge experiences, in order to be able to download those deposited readings/resources. However, others argue that only a small portion of an LMS is used by lecturers for effective informal learning in order to engage students' social experiences to share ideas (discussion forums) in the digital age (Bates 2018; Khoza 2019).

Complicating this discourse is a total lack of non-formal learning, where students' personal experiences (love/passion, flexibility/creativity, courage and others) as digital natives are considered for individual knowledge construction; this creates reluctance, hatred and ignorance on the use LMS for effective learning (Khoza and Mpungose 2018; Prensky 2001). Similarly, little exploration has been done into balancing and making connections between formal, informal and non-formal learning, particularly on the use of Moodle and Canvas LMS in IHE. It is for this reason that this article argues for alternative ways of using LMS for non-formal learning, in order to blend formal and informal learning. The section that follows theorises the use of LMS in IHE.

2 Theorising the Use of LMS in IHE

This study utilises the learning framework of connectivism as depicted in Table 1 to theorise the use of LMS in IHE.

Table 1 Connectivism learning framework (Siemens and Downes 2009)

Connectivism principles

1. Learning and knowledge rest in the diversity of opinions
2. Learning is a process of connecting specialised nodes or information sources
3. Learning may reside in non-human appliances
4. The capacity to know more is more critical than what is currently known
5. Nurturing and maintaining connections is needed to facilitate continual learning
6. The ability to see connections between fields, ideas, and concepts is a core skill
7. Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities
8. Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. Although there is a right answer now, it may be wrong tomorrow because of alterations in the information climate, affecting the decision

Siemens and Downes (2009) founded connectivism (Table 1) as a new framework for understanding learning for the digital age, and they have done a great deal of work in the areas of network and connectedness in integration of technology into the curriculum. Siemens (2007) further argues that the rapid development of connectivity and technology seek a balance between theory and practice through distributed web-based technologies (social media sites) (SMS), LMS, and others). As such, the connectivism framework uses the metaphor of learning ecologies and learning networks to ensure that knowledge is created and shared during teaching and learning (Kop and Hill 2008; Siemens 2007). In other words, learning should be formally, informally and non-formally contextualised (learning ecology) through the use of networks/internet (learning networks).

Kop and Hill (2008) argue that connectivism is an emerging theory which does not discard old learning theories but acts as a successor to them (behaviourism, cognitivism, and constructivism) and can be used for non-formal learning since reality is interpreted and knowledge is negotiated through personal experience. In connectivism, learning begins when knowledge is shared among diverse members of the learning community (Siemens and Downes 2009). This suggests that learning is a connected process where students and teachers can interact, share, dialogue and think together in producing knowledge. Thus knowledge production is said to reside in a diversity of opinions (Bell 2011; Siemens 2014).

Siemens (2005) further asserts that this theory understands the learning process as the sharing of information among networks of human and non-human channels/artifacts. These networks consist of connections between nodes/relationships among individuals, groups, and technological resources (Bell 2011; Kop and Hill 2008). Further to this, connectivity seek lecturers to consider the personal experiences of each individual student, in order to gather and share information among others using different technological resources for effective learning (Kop and Hill 2008; Siemens and Downes 2009). The latter studies further argue that connectivism draws strength from incorporating personal experiences in the use of technology (LMS).

In contrast, Anderson (2016a) sees connectivism as independent theory which does not cater for students' personal experiences. However, this is not the case because it is built on the basis of three basic learning theories (behaviorism, cognitivism, and constructivism) which incorporate knowledge and social experiences for learning (Kop and Hill 2008). Thus, connectivism further generates new learning methods where the focus is

increasingly shifting from the teacher to more student-centred learning (personal experiences) approaches in the use of technology in order to produce knowledge that is up to date (Siemens and Downes 2009). Subject knowledge is always changing over time. As a result, Siemens (2008) posits that the capacity to know is more critical than what is actually known. This suggests that students should be given the opportunity to seek out current information during the learning process. Learning in the digital age seeks interdisciplinary connections for learning. As such, the ability to see connections between fields, ideas, and concepts is a core skill. In other words, learning seeks students to traverse different networks for knowledge production (Kop and Hill 2008; Siemens 2008).

On the one hand, Elabnody (2015) agrees with Bright (2014) that LMS are institutionalised and formally adopted to disseminate the content of a certain discipline/subject, and include fundamental features for effective formal learning to occur in IHE. This includes but is not limited to ways of uploading students' details and resources, with online assessment tools (quizzes, surveys, assignments) and others. This suggests that the use of LMS is structured and draws from formal learning (vertical curriculum discourse), which is influenced by school knowledge that advocates for systematic kinds of knowledge production guided by specific language from a discipline/subject (Bernstein 1971; Hoadley and Jansen 2014). Similarly, Hoadley and Jansen (2014) as well as Khoza (2016) argue that formal learning in the use of LMS is lecturer-centred because lecturers have control of what is to be learnt (selection), when it is to be learnt (sequence), and how quickly it must be learnt (pacing). This suggests that learning in LMS is driven by knowledge experiences where a lecturer transmits/instructs/deposits knowledge for students according to the prescribed subject content, and assessment is done only for grading (assessment of learning) purposes. Moreover, formal learning is similar to the conception of the traditional curriculum articulated by Dewey (1938), where learning only occurs in a demarcated environment driven by traditional hardware resources like books, desktop computers, the chalkboard and others.

On the other hand, LMS also carry some features of informal learning such as providing links with social media, communication and collaboration (chat, wikis, discussion forums) and others (Bright 2014; Elabnody 2015). In other words, LMS also draw from informal learning (horizontal curriculum discourses) where learning is influenced by everyday/commonsense knowledge (Bernstein 1971, 1999). Thus, learning is contextualised and localised, and entails a set of social-related activities, and students should use their societal experience to share information (Bernstein 1971; Hoadley and Jansen 2014). Freire (1972) also sees informal learning as the exercise of liberation guided by societal experiences instead of following lecturers' instructions. Thus, learning occurs anytime, anywhere in the social space, and assessment is developmental to maintain social growth (Black and William 2009; Hoadley and Jansen 2014).

However, recent studies have tried to problematise the discourse of formal and informal learning in relation to the use of LMS in IHE (Anderson 2016b; Bates 2018; Mpungose 2020b). The latter studies assert that formal learning is autocratic since it is controlled by a/the subject/discipline, whereas informal learning is democratic since it is controlled by a community (stakeholders in learning) to give social freedom to students. In breaking boundaries in this debate, Siemens and Downes (2009) advocate for connectedness of the two worlds of learning (formal and informal) through connectivism learning theory (non-formal learning).

Furthermore, Siemens and Downes (2009) believe that it is not useful to separate formal from informal learning because no learning is innocent, and bringing them together through connectivism, which advocates for non-formal learning in the digital age, can be the preferred solution for successful learning in IHE. Thus, non-formal learning advocates

for diversity in learning and student-centred activities in order to meet the needs of each individual student (Khoza 2015b; Van den Akker et al. 2009). Further to this, non-formal learning seeks students to be passionate and flexible in personally selecting any learning platform which is accessible, and able to use any convenient/affordable resources; and this helps students to act as researchers in order to discover more updated content (Khoza 2015b; Siemens and Downes 2009). In other words, students are flexible and able to make connections of their own choice on both human and non-human resources for effective learning (Siemens and Downes 2009). This suggests that connectivism requires students to be driven by a personal rationale (identities and values) as to what to learn and when to learn it to address their needs.

This study therefore draws from the ideas of Siemens and Downes (2009) (connectivism), Van den Akker et al. (2009) (curriculum spider web concepts) and Khoza (2015a) (professional, societal and personal curriculum needs) to make assertions. It therefore argues that students need never be reluctant to use LMS, but can be passionate about doing so for learning provided that non-formal learning is prioritised, because it connects both formal and informal learning. Non-formal learning therefore allows students to cut across formal and informal learning attributes/features and exercise authority over how they learn. Thus, this study proposes the non-formal model of learning using LMS with the guiding principles of connectivism and varying features of formal and informal learning driven by non-formal learning, as depicted in Table 2.

3 Integration of Moodle and Canvas into Curriculum

Moodle and Canvas are the most used LMS in IHE for learning, but Canvas seems to be widely used in IHE from developed countries like the United States, United Kingdom, Australia and others, whereas Moodle is much more popular in IHE from developing countries such as those in South Africa, Brazil, India and others (Cavus and Zabadi 2014; Mpungose 2020c). Even though Moodle was founded by Martin Dougiamas in 2001 and Canvas in 2008 by Josh Coates, they share the same functions (Aldiab et al. 2019) which include but are not limited to quizzes, chats, discussion forums, files, announcements, and others (Fig. 1).

Cavus and Zabadi (2014) further report that even though LMS can share similar functions, their efficiency can differ because of being unclear in terms of user-friendliness, bandwidth requirements, take-up and maintenance costs, manuals and customisation/adaptation to the local environment. Therefore, flexibility and ease of use may not be the same and the contextual factors may also differ, depending on the institutions' needs/curriculum goals. Moodle and Canvas LMS each have their own strengths and weaknesses. However, Ajlan and Pontes (2012) outline common features that any LMS must possess, which include those relating to pedagogy, learner environment, instructor tools, course and curriculum design, administrator tools, and technical specifications.

Pappas (2014) outlines that a pedagogical feature seeks students to have access to the module/course template, including readings/other resources, in order to know what content, objectives and activities should be covered in each course/programme. Further to this, learner environment features seek students to be driven by social experiences in order to share ideas among themselves and lecturers, through chat rooms, discussion forums, Zoom conferencing and email (Bright 2014; Mpungose 2020d). For this to be successful, the instructor tools feature (quizzes, assignments) requires lecturers to evaluate the progress of

Table 2 Features of the non-formal learning model

Connectivism principles	Formal learning	Non-formal learning	Informal learning
1. Learning and knowledge rest in the diversity of opinions	Subject-centred activities	Student-centred activities	Society-centred activities
2. Learning is a process of connecting specialised nodes or information sources	Face-to-face platform	Blended learning platform	Online learning platform
3. Learning may reside in non-human appliances	Hardware resources	Accessible resources	Online resources
4. The capacity to know more is more critical than what is currently known	Student as instructor	Student as researchers	Student as facilitator
5. Nurturing and maintaining connections is needed to facilitate continual learning	Institutionalised connections	Student connections	Social connections
6. The ability to see connections between fields, ideas, and concepts is a core skill	Summative evaluation	Formative evaluation	Peer evaluation
7. Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities	Formal content	Non-formal content	Informal content
8. Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. Although there is a right answer now, it may be wrong tomorrow because of alterations in the information climate affecting the decision	Professional rationale Official time Objectives	Personal rationale Spare time Aims	Social rationale Extra time Learning outcomes

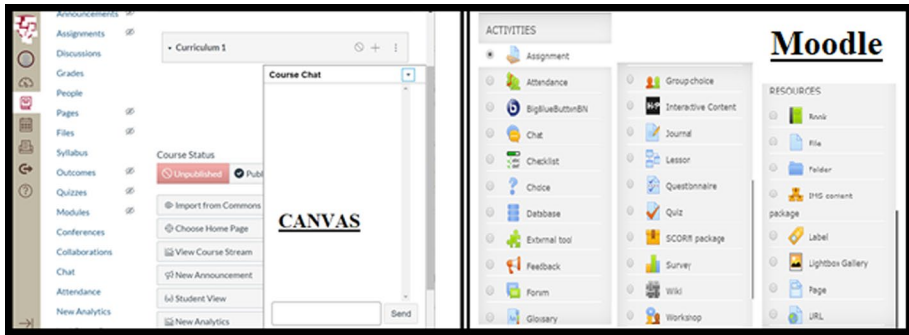


Fig. 1 Canvas/Moodle functions

students on the course/programme for grading purposes (Bates 2018; Black and William 2009). It becomes easy to evaluate student progress if the curriculum design feature is well managed, such that the module/course can be customised/contextualised to be able to add participants (teacher, student, guest, administrator) (Bright 2014; Cavus and Zabadi 2014). Thus, the LMS should also allow module administrators (administrator tools features) to automatically upload registered students in the module/programme and be able to back up the grades for module/programme statistics. All other features depend on the technical specifications, which include database and cost, technical support (hardware/software), training seminars and others.

The success or failure of any LMS further depends on the authentic connectedness of the above-mentioned features, which seem to address only the formal (subject) and informal (society) aspects of learning while ignoring the non-formal (student-related) aspects of learning (Cavus 2013; Mpungose 2020d). This is evident in the quantitative study conducted by Cheng and Yuen (2018) to investigate students' continuance of LMS use for learning among 1182 students from 25 Hong Kong IHEs who answered a survey. The findings confirmed that students were eager to use LMS at the initial stage, but gradually lost interest and later became reluctant to use them. Similarly, Mpungose (2020b) qualitative case study in a South African context to explore lecturers' reflections on the use of LMS outlines that students' reluctance to use LMS is caused by lecturers who tend to ignore non-formal learning features (love, passion, self-direction), but prioritise formal (depositing readings) and informal (discussions) features. This suggests that in the recent discourse LMS are missing non-formal learning features.

This study therefore argues for the inclusion of students' personal features (values, self-direction, and love/passion, identities) in order to blend all respective LMS features for effective learning in IHE. In support of this, Ramathan (2017) suggests that the success of an LMS lies within positive students' attitudes (students' personal features), so that they can perceive own their role as researchers during learning.

4 Research Methodology and Methods

4.1 Research Purpose and Questions

The present study explores students' experiences and proposes the non-formal learning model for the use of LMS in IHE. In doing so, the study addresses the following questions:

- What are students' experiences on the use of LMS in IHE?
- What informs students' experiences on the use of LMS in IHE?

4.2 Research Context, Design and Paradigm

The exploration of students' experiences took place in the context of two schools of education at two IHE, one in South Africa (SA) and one in the United States (US). In 2016–2018, this PhD project originally explored students' reflections on the use of Moodle LMS in a South African university context. In 2019–2020 the study was extended to the level of a post-PhD project exploring students' experiences on the use of Canvas LMS in a US university context. The South African school of education offers a broad range of degree programme courses across various fields of study. It mainly offers all lectures in face-to-face form, while the Moodle LMS is used as an online resource depository (holding lecturers' notes) for student access. In contrast, the US university school of education offers blended lectures (online and face-to-face), using the Canvas LMS to supplement face-to-face lectures.

The study used a qualitative case study design to explore students' experiences in order to generate rich data from multiple cases (SA and US) (Creswell 2014; Yin 2013). We chose to use a qualitative case study methodology because it is more expressive and allows one to give an in-depth description of the phenomenon under study (Creswell and Poth 2017; Yin 2013). This assisted us to generate rich data from students' experiences in both cases (SA and US). The latter studies further showed the benefit of the interpretive paradigm in this study, which sought to describe and understand students' experiences in use of LMS in different contexts (SA and US) and using different platforms (Moodle and Canvas). Interpretivism is described as a paradigm in which researchers do not aim to predict what people will do, but rather to describe how people make sense of their own worlds, and how they make meaning of their particular actions (Creswell and Poth 2017). Consequently, we chose this paradigm in order to explore students' experiences of the use of LMS. This paradigm gave an in-depth understanding of students' experiences and what informs them in their use of Moodle and Canvas LMS, in order to propose ways in which the LMS can be used for non-formal learning.

4.3 Selecting Focal Students

Flyers and planned sessions were used to recruit postgraduate students. We sought out accessible and purposive students by using convenient and purposive sampling (Creswell and Poth 2017; Yin 2013). After obtaining consent, a total of 36 students were conveniently selected because they enrolled in honours, master's and doctoral degree levels of study in education (SA = 19; US = 17). Their selection was based on the premise that they will share their experiences on the use of Moodle or Canvas LMS for learning. We originally had 36 students, but three students from the SA case and two from the US case suspended their

programmes, and we ended up with 31 students in the study. Table 3 represents the student demographics.

4.4 Capturing Students' Experiences in SA and the US

The data generation methods had two main objectives: to understand students' experiences and the reasons that inform their experiences. To achieve the first objective, both reflective activities and Zoom group meetings were used to explore students' experiences (Cohen et al. 2013). To achieve the second objective, WhatsApp one-on-one semi-structured interviews were administered (McMillan and Schumacher 2006). A reflective activity with a short series of questions was emailed to students to reflect on their use of LMS, and this was completed within a month in each case. In addition, two sessions of online Zoom group meetings were administered in each case for 2 months, and each meeting lasted 40 min. One-on-one semi-structured interviews were carried out and recorded for approximately 40–45 min. These multiple sources of data generation were administered for the purposes of triangulation, in order to ensure achievement of authenticity and trustworthiness (transferability, dependability, confirmability, and credibility) of the generated data (Creswell 2014; Yin 2013).

4.5 Data Analysis and Trustworthiness

Inductive and deductive processes of qualitative thematic analysis were followed to make sense of students' experiences through coding to form categories and themes (Cohen et al. 2013; Creswell 2014). Data generated by all three instruments were recorded and not transcribed, but directly and openly coded from the recorded source in order to avoid weakness of data analysis through loss of meaning during transcription. Open coding was used to connect codes to categories. We deductively mapped the codes onto categories set from the theoretical framework and the literature, in order to form themes. We sought to use an inductive process to capture any remaining codes which were not deductively analysed during the prior analysis, to form categories.

After using these processes as a guide, categories were focused and sharpened to form three themes (see Table 4 in the 'Findings' section of this article). Cohen et al. (2013) posit that triangulation, dependability, confirmability and credibility must be considered to ensure trustworthiness in a qualitative study. Consequently, we used different instruments/sources of data generation to ensure triangulation. In addition, findings were confirmed by participants to ensure confirmability. We further ensured that the same sources/instruments

Table 3 Student demographics

Case	# of students	Male/female	Black/white	H=Honours M=Master's D=Doctoral
SA case	16	10/6	14/2	H=7 M=5 D=4
US case	15	8/7	2/13	H=8 M=4 D=3

Table 4 Three themes and their categories which emerged from the data

Themes	Categories
Using LMS for subject needs	Subject-centred, activities, face-to-face platform, hardware resources, student as instructor, institutionalised connections, summative evaluation, formal content, professional rationale, official time, objectives
Using LMS for students' personal needs	Student-centred activities, blended learning platform, accessible resources, student as researchers, student connections, formative evaluation, non-formal content, personal rationale, spare time, aims
Using LMS for students' societal needs	Society-centred, activities, online learning platform, online resources, student as facilitator, social connections, peer evaluation, informal content, social rationale, extra time, learning outcomes

of data generation were used in similar contexts, so that results could be compared, and direct quotations from participants were used to ensure dependability.

5 Findings

All participants indicated their experiences through the use of emailed reflective activities, WhatsApp one-on-one semi-structured interviews and Zoom group meetings. Table 4 presents the findings framed by the three themes which emerged and their respective categories.

5.1 Using LMS for Subject Needs

A decade ago Cuban (1986) profiled the use of traditional technology for formal learning in all sectors of education, which may include but is not limited to the use of chalkboard/pens, chairs/desk, classroom/lecture hall, television, and others. However, in recent years Amory (2010) agrees with Prensky (2001) that the use of modern technology such as mobile phones/tablets, workstations/laptops, and others, by digital natives (who can use technology without training) helps them to access the content conveniently. This sentiment of using traditional and modern technology for formal learning is experienced in both contemporary cases, in SA and the US case.

A student from SA case "...before the lecturer start, I will be requested to open the laptop to access readings from Moodle...I can also see other student logged in". The other student from US case: "I prefer to bring with me hardcopies with highlighted points to be referred while I am in a lecturer hall". Moreover, many of the students admitted, "I would prefer to use official time to attend the lecture even though it is not easy to interact with a lecturer because of large number of students" (SA case). While on the other hand, most students from US case agreed "...I can access the recorded lecture on Zoom platform using either my mobile phone or laptop". Students from both cases showed vastly different experiences on the use of LMS to take assessment: "I enjoy taking a quiz...receiving assignments with comments from Canvas is fair because I can also access rubric online" (US case). Similarly, "...the feedback after completing the quiz feedback is prompt I hate attaching the turnitin certificate before I hand-submit assignments for marking" (SA case).

5.2 Using LMS for Students' Personal Needs

The use of LMS should not only be about knowledge transmission (formal learning) and democracy (informal learning), but it should be about personal activities drawn from the passion of each individual student (non-formal learning) (Bates 2018; Bright 2014). Nevertheless, students are hardly given the option to operate from a personal rationale perspective to have choices based on their strengths or limitations (Khoza 2015b). This is evident when one student noted "...even if I do not have a transport, I am forced to attend the afternoon class starting at 16h00" (SA case). In other words, the unavailability of blended learning sometimes hinders student's freedom as human beings with values/identity and this depends on a particular context because as noted, "zoom platform gives me option to attend a lecture or be connected to the lecture while I am home ...I can also access it later during my extra time because it is recorded". Students showed various experience on the use of LMS for personal use: "readings and other resources are only accessible on Canvas..." (SA case); "I can't access Moodle when I am home because of insufficient access to data bundles..." (US case); "I put focus to read studies that are only uploaded on Moodle" (US case); "...there is no way I can miss the quiz or the assignment because it is only for grading" (SA case). This shows that the use of LMS leaves students with no option other than to comply, thus it denies students' personal needs for non-formal learning.

5.3 Using LMS for Students' Societal Needs

Students from all cases seem to enjoy the informal use of LMS for learning because that is where they feel connected among themselves, with content, with lecturers, and other non-human resources (Siemens and Downes 2009). One student from SA case pointed out "I enjoy critiquing other students' work on discussion forum platform" Similarly, "Chat function linked to Canvas LMS helps me to create an interactive atmosphere by questioning the content during the content" (US case). Similarly, students outlined other online platforms which keeps them connected which are not linked to their LMS but helps them to communicate in their spare time: "...WhatsApp, Facebook, YouTube" (SA case), "Snapchat, WeChat, JoinPd, LinkedIn learning, Instagram..." (US case). In other words, techno-savvy students are exposed to social media sites, which are not officially adopted by IHE for learning but facilitates critical thinking and cater for diverse learning styles (Mudaly et al. 2015). A PhD student mentioned, "attending monthly cohorts allows me to share the progress of my study and be critiqued to achieve learning outcomes" (SA case). On the same sentiment honours students revealed, "...snacking in class creates a friendly and a social atmosphere amongst students for interactive group discussions" (US case). Thus, everyday knowledge influences informal learning because it is oral, contextualised, local, and multi-layered to attain societal needs (Bernstein 1971; Hoadley and Jansen 2014).

6 Discussion of Findings

Based on postgraduate students' individual and collective experiences from different cases (SA and US) on the use of LMS (Moodle/Canvas), they described LMS as primarily adopted and used to serve the needs of a subject/discipline/institution for formal

learning. This is because LMS enhance content delivery, tracking of learning, assessment, registration and other features (Bright 2014; Mpungose 2020c).

The findings have deepened our understanding of how to use knowledge experiences to address the needs of a subject/discipline/institution when using an LMS. It is evident from the findings that hardware resources such as mobile phones/computers were used to access LMS to serve the subject needs; Hardware resources also assists students to use their knowledge experiences to download resources like readings/videos, and others. Additionally, (Bright 2014; Greenhow and Lewin 2016) believe that the use of academic search engines like Google Scholar, Web of Science, library search engines and others serves the purpose of formal learning. However, findings showed that neither of the LMS (Moodle/Canvas) had links to such search engines for students to search the academic literature. Moreover, Hoadley and Jansen (2014) as well as Khoza (2015b) posit that the use of LMS for formal learning gives power to instructors. The findings showed that students were all subjected to following their lecturers' instructions to carry out activities this was particularly the case in SA, where students were compelled to attend only face-to-face lectures (demarcated learning environment).

Additionally, LMS (Moodle/Canvas) can have common features (curriculum design, instructor tools, leaner environment and others), but varying their use has an impact on the efficiency in achieving their maximum potential (Ajlan and Pontes 2012; Cavus 2013). Evidently, it is noted that students from the US case enjoyed the privilege of having alternative access to an online/recorded lecture on the Canvas LMS in the case of compelling conditions such as student protests or pandemic outbreak (coronavirus and others). However, in the SA case students were forced to physically attend lectures, irrespective of any difficulties (transport/crowded lectures) faced in the presence of using Moodle LMS in this way.

Moreover, the perception of evaluating students' progress (grading) for formal learning is common in all instructor tools of any LMS (Canvas/Moodle), but efficiency is always in question (Bates 2018; Black and William 2009). Thus, even though all students enjoyed the privilege of assessment using LMS from both cases (SA and US), students from the US case had more privilege than others because their assignments were submitted and marked using an online rubric, while in the SA case, theirs were hand delivered and marked manually. This shows varying use of LMS, which sometimes leads to reluctance and other challenges that hinder connectedness in the use of LMS for formal learning in the digital age (Prensky 2001; Siemens 2014). Consequently, the argument/proposal of this study is that the LMS should be used from the focal point of non-formal learning (students' personal experience) as the solution to resolve challenges in the formal use of LMS to address subject/discipline needs.

Van den Akker et al. (2009) and Khoza (2015b) share the argument that the use of any educational technology (LMS) must be driven by social experience to address the needs of the society (all stakeholders involved in learning). In line with this, Tyler (2013) posits that in order to avoid a static and systematic kind of learning, the contemporary social life of students outside the school must be considered for informal learning. This is evident from the qualitative study by Mudaly et al. (2015) in a South African context, which explored pre-service teachers' experience of the use of digital technology and social media to teach science. It was found that the use of social media sites like Wikipedia/Facebook/WeChat/WhatsApp/blog/YouTube and others caters for students' diverse learning styles, making scientific knowledge easily accessible, cheaper and creative. Similarly, Siemens and Downes (2009) as well as Cavus and Zabadi (2014) argue that LMS functions such as chat rooms/discussion forums and others creates

communal spaces for connectedness among students and others, to share their social experiences for informal learning.

In line with the above, the findings showed that students from both cases welcomed the use of the LMS chat function, because it provided them with a social space to comment on each other's work, and allowed them to share content with other students and lecturers. However, it became apparent that neither Moodle nor Canvas had links to social media sites like YouTube and Facebook for informal learning. Thus, even though the LMS provides space for social discussion and connectedness, its disconnection from SMS limits students' potential to share everyday knowledge with others (Bernstein 1999; Siemens and Downes 2009). In other words, the growing popularity of SMS plays an important role in informal learning, as argued by Greenhow and Lewin (2016, p. 23): "social media offered opportunities for young people [digital natives] to harness the power of the network and seek relevant expertise."

This suggests that it is now high time for IHE to find ways to link SMS with LMS to ensure the maximum potential to share information for informal learning, in order to fully address societal needs via social experiences (Khoza 2019; Mpungose 2020d). This current debate on LMS limitations suggests the need for a non-formal model which draws from students' personal experiences of the use of LMS.

Siemens and Downes (2009) argue that the complex nature of learning using LMS in the IHE sphere brought about conundrums and challenges from formal and informal learning, and requires connectedness of both human and non-human nodes to be successful. This can only be realised through non-formal learning, which blends formal and informal learning in the use of LMS via students' personal experiences (Amory 2010; Soykan and Şimşek 2017). Non-formal learning draws from pragmatic education—since, as argued by Dewey (1938), learning is not only about knowledge transmission (formal learning), which is autocratic, or about bringing in social activities (informal learning), which is democratic, but most importantly it is about students' personal experiences (non-formal learning).

A clear picture of using personal experience in learning is painted by (Khoza and Biyela 2019) in a study of ten first-year Bachelor of Education Mathematics Education students, involving detailed reflective activities, observation and interviews. The study explored students' knowledge of the use of technology. The conclusion detailed that self-reflection acts as a building block to acquiring pedagogical knowledge, which helps to blend content and technological knowledge for learning. In other words, the use of technology (LMS) to disseminate content should be driven by personal experiences, which draw from individual values/love/passion/self-identity. Similarly, it is further argued that non-formal learning (pragmatism) requires students to choose the best curriculum (formal/informal) according to their personal needs (strengths/weaknesses), and to take the action that works best to help them achieve desirable goals (Van den Akker et al. 2009).

Moreover, findings from different cases indicated that some students had no option and are forced to attend face-to-face lectures, and to read only uploaded readings. Thus, lecturers forget that students are human beings with values and have personal problems and choices, so channelling them to one kind of learning (formal/informal) can create chaos and disruption during learning (Khoza 2019; Ramrathan 2017). However, non-formal learning (incorporating students' personal experience) driven by the principles of connectivism proves to be the most suitable model to overcome the misunderstanding of technology (LMS) for learning, because it encourages students to strive for self-direction via their personal identities (Siemens and Downes 2009).

7 Conclusion and Implications for Education

This study draws from conceptual and theoretical frameworks and scholarship in education to explore postgraduate students' experiences of the use of LMS (Moodle/Canvas) for learning in different contexts (SA and US). The available LMS has common features (pedagogy, learner environment, instructor tools, course and curriculum design, administrator tools, and technical specifications) for learning, irrespective of the context in which they are used (Ajlan and Pontes 2012). The study concludes that these features do not give students any option but to use the LMS for formal (downloading resources) and informal learning (discussion), while non-formal (student personal experience) learning is ignored/missed. This discrepancy is a worldwide challenge, which needs further interdisciplinary research. However, maintaining LMS efficiency and maximising the potential of use is always challenging, because of varying usage, ignorance and reluctance; this forces universities to keep changing from one to another LMS (Bates 2018; Bright 2014). This study therefore proposes the adoption and use of a non-formal learning model (Table 2), which seeks to blend formal and informal learning through maintaining networks and connectedness among human and non-human nodes in use of the LMS. This model envisages that student be driven by personal experience (individual needs) rather than knowledge (subject needs) or societal experience (society needs) in the use of the LMS. Through this model, the study further recommends the addition of student features (love/passion/flexibility/self-direction) in all LMS in IHE. This has proven to be the most critical feature, which can give students options to use LMS for learning based on their strengths/limitations in IHE. Thus, adding student/human aspects/features can sustain the use of LMS in IHE in this digital age (Premsky 2006).

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Compliance with Ethical Standards

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