

University Students' Perception on the Usefulness of Learning Management System Features in Promoting Self-Regulated Learning in Online Learning

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ABSTRACT

Online learning has increasingly been adopted by most institutions of higher learning to facilitate teaching and learning as a continuum to the traditional face-to-face approach. Most of these institutions utilize Learning Management Systems which contain features that are intended to make students active participants not only by delivering learning resources to learners but also providing the environment for effective interaction in the learning process. Our examination of the literature reveals that there is limited empirical evidence that addresses how these features are being utilized by students in promoting Self-Regulated learning. To realize the usefulness of the features of Learning Management Systems in promoting Self-Regulated Learning, a structured survey was carried out among University students in Kenya. The findings reveal that the features of Learning Management Systems are underutilized by students. The qualitative results of the study illustrate that students face several challenges that obstruct them from being actively involved in online learning. There is lack of individualized feedback on students' learning habits, lack of instructor guidance, lack of interaction with course instructors, lack of peer interaction and lack of automation tools. This study provides insights for educators and researchers on the areas of focus that can be prioritized towards offering support to students in improving their Self-Regulated learning in online learning environments.

Keywords: *learning management systems, self-regulated learning, perceived challenges, features utilization, promoting, LMS, perceived usefulness*

INTRODUCTION

There is increased adoption of technology enhanced learning to support face-to-face traditional environments in what is referred to as blended learning or fully online courses in Institutions of Higher Learning (IHL). Technology enhanced learning, often known as e-learning, is seen as an alternative to meeting increased demand to access education without limitations such as lack of facilities like physical classrooms to accommodate many students and instructors (Henrie et al., 2015). This approach to teaching and learning also allows working-class professionals to advance their studies while working. Students exploit the advantage of being able to study anywhere, anytime while giving them autonomy to decide when to go online to study, what to

study and for how long, while allowing for self-paced learning at reduced costs. Institutions of learning on the other hand take advantage of compensating for the scarcity of teaching staff and less investment on infrastructural facilities (Arkorful, 2014). Subsequently, the number of students pursuing online courses has greatly increased (Bogarín et al., 2018; Broadbent & Poon, 2015; Makokha & Mutisya, 2016; Otieno, 2016). However, technology enhanced learning may lack personalized interactions between instructors and students and amongst students (Arkorful, 2014; Palomino et al., 2014). This negatively affects students' motivation, satisfaction, and success in online learning (Arkorful, 2014). Furthermore, it has been observed that keeping students engaged in online learning is challenging (Henrie et al., 2015). Consequently, the effectiveness and success of online depends on the students' capability to take control of their learning process under an educational psychology field known as Self-Regulated Learning (SRL). SRL is a constructive process through which learners play an active role in managing their own learning while they are being metacognitively guided by their own motivation (Zimmerman, 1990; Pintrich, 2000). As more institutions of higher learning adopt Learning Management Systems (LMS) for full or blended online learning (Luna et al., 2017; Bogarín et al., 2018), it is important to evaluate the usefulness of the LMS features in supporting students to take control of their learning and ensure that they are effective in promoting SRL strategies. However, prior research on students' perceived experiences of e-learning demonstrate a lack of integration of self-regulated learning strategies in relation to the LMS features (Back et al., 2016; Muuro et al., 2014; Vovides et al., 2007). It can be observed from literature that there is limited empirical evidence on how LMS features support student to enhance their self-regulatory skills.

The literature indicates that most IHL have adopted the use LMS to offer Open and Distance e-Learning (ODEL) programmes (Mtebe, 2015; Palomino et al., 2014). Despite the unrivaled benefits that online learning offers, students do not receive individualized and guided support compared to their counterparts in the traditional face-to-face mode of learning. The online learning students are required to take control of their learning while being guided by their own motivation. With the increased focus on online learning, students should possess the ability to use digital tools and LMS features effectively. Students who possess high level self-regulatory skills can engage in online activities and utilize LMS features to learn and communicate with peers and instructors (Lee et al., 2019). This reinforces the importance of ensuring that students are supported in enhancing and activating self-regulatory skills during learning.

To ensure the quality of online learning, governments and other regulatory bodies have instituted policies and guidelines to ensure that instructors spend the required time online, interacting with learners. Universities have also developed guidelines to ensure these standards are observed. For example, some universities require that instructors create and post a specific number of forums, chats, quizzes and online assignments in each semester in an online course. Students are also required to participate in these online activities, interacting with both instructors and fellow peers. Instructors are required to spend over 66 instructional hours with students. Despite these efforts, it has been established that LMS features and functionalities are underutilized by students and instructors (Vovides et al., 2007). Moreover, there is lack of empirical insights into the reasons for the underutilization of the LMS features by both students and instructors.

In examining the literature, it was established that there is need to explore how students utilize LMS features in relation to promoting SRL during online learning. It can also be observed that there is continued use of self-report tools in measuring students' engagement in technology enhanced learning environments (Henrie et al., 2015; Araka et al., 2020). However, this does not adequately address how the actual use of the LMS features helps to promote self-regulatory skills for online students. While students' interaction logs can be analyzed for inferences on how students behave during online courses (Romero et al., 2008), understanding the students' perception and challenges encountered during online learning can provide insights that can guide design of educational computing systems that promote proactivity in students' learning. As a

result, the utilization of LMS features and perceived challenges faced by students studying in online courses forms the central interest of this research. This research therefore seeks answers to the following questions:

- 1) What is the extent to which LMS features are utilized to support SRL during an online course?
- 2) What is the extent to which SRL strategies such as time management, self-evaluation, self-monitoring, help-seeking, effort management, and organization are utilized by students during an online course on an LMS?
- 3) What are students' perceived challenges associated with the utilization of LMS features in promoting SRL?

LITERATURE REVIEW

This section evaluates the previous studies with the aim of investigating how learning management systems support or enhance students' self-regulatory skills that forms the theoretical foundation for the present study.

Self-Regulated Learning

Self-Regulated learning is a theory in the field of educational psychology that comprises of various strategies that enables learners to control and monitor their traits of metacognition, behavior and motivation during learning, in order to achieve their academic goals (Zimmerman, 1990; Pintrich, 2000). The literature shows that students who possess high levels of SRL skills learn faster and perform better compared to those with low levels (Cavalcanti et al., 2018; Cicchinelli et al., 2018; Kizilcec et al., 2017). Furthermore, it has been discovered that students' academic achievement is positively influenced by the level of engagement in an LMS (Hashemyolia et al., 2014).

Since self-regulatory skills are not inherent to learners, and that there is no student, individually or collectively, who can develop self-regulation skills by themselves, there is need for learning environments that enhance the development of SRL skills (Cerezo et al., 2016; Dabbagh & Kitsantas, 2005; Järvelä & Hadwin, 2013). Karaoğlan Yılmaz, Olpak and Yılmaz (2018) also observe that when students are left on their own while studying online their motivation goes down and it is therefore less likely that they can take control of their own learning. In their study, Hashemyolia *et al.* (2014) asserted that the present technological tools in LMS are likely to motivate the students to increase engagement and enhance their self-regulatory skills such as cognitive and metacognitive skills. However, according to the study, there has been an assumption that students are naturally aware that the tools exist and therefore can be utilized. This study intends to give empirical observations on how students perceive and utilize these features in their learning processes.

Students' engagement in academic activities on e-learning environments such as a LMS plays a vital role in contributing to their academic success. According to Kim, Hong & Song (2019), helping students to perform better using online learning environments enhances their academic engagement leading to better grades. When students actively engage and take control of their learning processes, their cognitive skills develop. Learners who take control of their online learning can engage with peers, spend time online learning and are able to utilize LMS features to learn and communicate with peers and instructors (Lee, Song & Hong, 2019). This implies that the actual experiences that the students go through in online learning influences their engagement and academic performance. The literature reveals that there is a significant relationship between the learning environments utilized by the students and their impact on self-regulated learning strategies (Yilmaz et al., 2017). From our review of the literature, we have not

been able to identify studies that have examined the relationship between utilization of LMS features and SRL. It will be interesting to find out how SRL strategies are utilized by learners when learning on their own without SRL interventions using LMS features.

Recently, Martin and Bolliger (2018) carried out a study to examine the students' perceived importance of engagement strategies in online learning environments. The study revealed that the use of LMS features such as discussion forums, chats, blogs and wikis, if utilized well can promote student-to-student engagements while instructor feedback helps learners become more engaged in learning. For students to engage in online learning successfully, they should use discussion forums to collaborate amongst themselves and have regular communications from course instructors. Moreover, the discussions are more beneficial when structured with prompts or questions that deepen students understanding. The practical implication from the study is that engagement and interactions on LMS help learners become more active in controlling their learning processes.

Learning Management Systems

When previous research studies are examined, it is argued that most of the IHL utilize Learning Management Systems (LMS) to deliver learning materials and information, as opposed to using, enabling learners to actively engage in learning processes (Bogarín et al., 2018; Luna et al., 2017; Romero et al., 2008). As a result, most e-learning students are required to put much effort in to learn and achieve better outcomes. The LMS comprises inbuilt features such as forums, chats, quizzes, assignments, blogs, emails, and wikis which are anticipated to place learners in an active role during learning through effective instruction and active engagement (Sezer & Yilmaz, 2019).

Research indicates that LMS features have been found to be effective in activating SRL strategies. Dabbagh and Kitsantas (2005) classified LMS features into five categories which include collaborative and communication features such as discussion forums, chats and email which can be used to promote goal setting, help seeking and time management strategies to learners; content creation and delivery features such as content view and access, assignment resources, presentation areas and feedback upload features which support learning processes like self-evaluation, task strategies (rehearsal, elaboration and organization) and goal setting; administrative features such as tools that help administration of quizzes and tracking of student and course information and calendar that promotes SRL strategies like self-monitoring and help seeking; assessment tools such as e-portfolios, quizzes and features that allow for self and peer assessment and finally learning tools such as web links, bookmarking, note taking, course index, and to-do list features that enhance task strategies. The summary of these features and the SRL strategies they support, as reviewed from literature, are presented in Table 1.

The nature of online learning require that students become active participants in their own learning process. Since self-regulatory skills are not inherent to students, they need to be developed through learning by students engaging on metacognitive, behavioral and motivational activities that can foster growth of SRL (Cerezo et al., 2016; Dabbagh & Kitsantas, 2005). Dabbagh and Kitsantas (2005) opined that attention should be given to address how self-regulatory interventions can be provided especially using LMS features to promote SRL strategies to low self-regulatory learners. There is a lack of empirical evidence on how students self-regulate on the LMS. A study carried out by Mtshali, Maistry and Govender (2015) investigated students' experiences with the use of chats, but LMS features with perceived usefulness have not been studied. Additionally, current studies do not address how SRL measurements and interventions can be developed especially for LMS coupled by lack of a suitable model for measuring and scaffolding SRL on e-learning environments (Araka et al., 2020; Rowe & Rafferty, 2013).

Previous studies have contributed to knowledge on how students utilize the LMS in their learning and investigated the challenges students and institutions of higher learning face while using LMS (Mtebe, 2015). From a study where learners' experiences on e-learning mode of study in IHL in Kenya, it was established that some of the challenges students face while studying online included (a) inadequate lecturer assistance, (b) inadequate learning materials provided by instructors, (c) lack of feedback from course instructors and (d) slow internet connectivity (Muuro & Kihoro, 2017).

Table 1: Learning Management Systems features that promote SRL Strategies

LMS Component	LMS Feature	SRL Strategy
Collaborative & communication tools	<ul style="list-style-type: none"> • discussion forums • chats • email • wikis 	<ul style="list-style-type: none"> • Goal setting • Help seeking • Time management
Content creation & delivery	<ul style="list-style-type: none"> • Course & assignment resources • Presentation areas • Feedback uploads • View & access content features, 	<ul style="list-style-type: none"> • Self-evaluation • Goal setting • Tasks (rehearsal, elaboration and organisation)
Administrative tools	<ul style="list-style-type: none"> • administer quizzes • tracking and journaling 	<ul style="list-style-type: none"> • Self-monitoring • Help seeking
Assessment tools	<ul style="list-style-type: none"> • e-portfolios • quiz tools • peer & self-assessment tools 	<ul style="list-style-type: none"> • Self-evaluation • Self-monitoring
Learning tools	<ul style="list-style-type: none"> • Search features • to-do list • web links • bookmarking and note taking • course glossary and index • community & social networking tools 	<ul style="list-style-type: none"> • Task strategies (rehearsal, elaboration & organisation)

Mtebe (2015) and Muuro & Kihoro (2017) contribute to insights on how open and distance education can be handled by researchers and educators. However, these studies did not address how SRL strategies such as time management, self-evaluation, self-monitoring, help-seeking, and effort management are utilized within the LMS and how the various LMS tools are utilized in promoting SRL and the challenges students face while utilizing these strategies. Furthermore, from previous literature we can identify the reasons why students are not able to regulate even when the potential to do so is there (Azevedo et al., 2009). Such reasons include:

- Existence of extraneous cognitive load from the instructional load
- Failing to utilize cognitive strategies during learning
- Lack of self-regulatory skills
- Lack of prior knowledge in regards to self-regulation
- Lack of knowledge or being unaware of the learning environment features and instructional guidelines

Although the LMS contains an in-built set of tools and features, the evidence on how utilization of such features by learners affect development of self-regulatory skills remain scanty. Consequently, there is a need to explore how the LMS features are being utilized by students in

IHL. Additionally, there is a lack of empirical evidence on students' perception on the usefulness of the LMS features and functionalities in promoting the development of Self-Regulated Learning skills. This study, therefore, sought to establish if students are aware of the existence of such features and can utilize them in promoting SRL. This research investigates the students' perception on the utilization of LMS features in supporting them to employ self-regulatory skills in online courses. The findings from this study will guide the design and use of effective educational computing systems that supports teaching and learning through targeted SRL interventions.

RESEARCH METHODOLOGY

This section highlights the research design employed in the current study, the research instrument used to collect data from the study participants and how the collected data was analyzed.

A descriptive research strategy utilizing the views of University students pursuing their courses through the Open and Distance E-learning (ODEL) mode was carried out. The purposive sampling technique was used to select five universities in Kenya which offer online programmes and utilize an LMS. These include Maseno University, Mount Kenya University, Kenyatta University, Cooperative University, and KCA University. The purposive sampling technique was preferred as it allows efficiency and robustness as the researchers need to only establish what is being investigated and identify the right people and population who will provide the information required for the study (Dolores, 2007). Lecturers who facilitated online learning in the selected universities were requested to provide emails addresses for students who had studied online courses for at least two semesters using an LMS such as Moodle. A total of 700 emails for students were obtained and received voluntary invites to take part in the study via emails that contained a link to the questionnaire provided through an online survey tool. Out of the 700 students who were invited, 495 responded. This was a 71% response rate.

The study used a structured questionnaire that contained 28 items identified in the literature on student engagement of e-learning environments and self-regulated learning. To ensure the reliability and validity of the tool, the questionnaire was first sent to LMS and SRL experts for review. The experts' responses were used to restructure, add, and remove some questions. The instrument was used to collect quantitative and qualitative data as indicated in Table 2. The qualitative data was collected to establish students' perceptions and challenges they experienced in online learning.

Table 2: Summary of the Items and Information Gathered from Survey Tool

Questionnaire Item	Type of Question/Scale	Information collected
1 to 7	Multiple choice	Demographic characteristics
8 and 9	Multiple choice	The type of LMS features and tools used for communication between students and instructors
10	Likert scale	How often was the communication between students and course instructors
11	Likert scale	How often the students utilized various LMS features such as forums, quizzes, chats, blogs and wikis in an online course
12 -15	Multiple choice	Utilization of LMS features and functionalities in promoting SRL
16 and 20	Multiple choice	The LMS features and tools used by instructors

		to monitor students' learning process
17	Multiple choice	The factors that hinder students from taking an active role in online learning
18	Likert scale	How often the students received feedback aimed at improving student's learning habits
19	Multiple choice	The source of feedback received by students
21	Multiple choice	Areas that students receive little support from course instructors
22	Multiple choice	Self-Regulated Learning strategies the students utilize most in an online course
23	Likert scale	How often the students received feedback on performance in submitted of assignments and quizzes
24	Likert scale	Level of satisfaction the students received on various issues in regards to individualized support
25	Multiple choice	The SRL strategies ever utilized by students through the use of various LMS features and tools
26	Multiple choice	The various approaches that students feel will be most appropriate in promoting various SRL strategies
27	Open ended	The additional features students think the e-learning system should have for supporting individualized learning
28	Open ended	The students experience in online courses in terms of the support they receive from instructors

Data Analysis

Descriptive analysis was carried out on the quantitative data while content analysis was performed on the qualitative data. Content analysis on qualitative data was carried out to understand the students perceived challenges on the utilization of LMS features in promoting SRL in online learning environments. The data was analyzed using R studio statistical tools.

RESULTS

First, the summary of the demographic characteristics for the participants is presented in Table 3. Second, the findings on how various LMS features are utilized by students in promoting SRL are presented. Third, we describe how various SRL strategies were utilized by students using various LMS features. Lastly, the students' perceived challenges in utilizing LMS features in promoting SRL are presented.

Participants' Demographic Information

The demographic characteristics for students involved in this study are summarized in Table 3. The results indicate that 66% of the respondents are male while 34% are female. The results show that 56% of students are pursuing undergraduate programmes while 40% are postgraduate students. The results also indicate that 50% of students are engaged fully in online learning while 46% engage in blended learning where online learning supplements traditional face-to-face teaching and learning. Most of the students spend 1 to 10 hours per week in online learning

(49%) while those who spend 11-20 and 21-30 hours per week represent 29% and 15% respectively. Table 3 presents a summary of the demographic information of the participants.

Table 3: Demographic Features of Sample Population (N=495)

Demographic feature	n	%
Age		
15-25 years	71	14.34
26-35 years	279	56.36
36-45 years	113	22.83
46-55 years	28	5.66
Above 56 years	4	0.81
Gender		
Female	167	33.74
Male	328	66.26
University of Study		
KCA University	26	5.25
Kenyatta University	406	82.02
Maseno University	5	1.01
Mount Kenya University	43	8.69
The Cooperative University of Kenya	15	3.03
Level of study		
Certificate	4	0.81
Diploma	26	5.25
Postgraduate	197	39.80
Undergraduate	268	54.14
Mode of learning		
Blended learning	230	46.46
Full-Time student	9	1.82
Fully Online	248	50.10
Part-time or Evening	8	1.62
Hours spent online per week		
1-10 hours	244	49.29
11-20 hours	144	29.09
21-30 hours	72	14.55
31-40 hours	20	4.04
41 or more	15	3.03

Students' Responses on Utilization of LMS Features in Promoting SRL

From the data in able 4 it can be observed that quizzes, chats, discussion forums, and messages were regularly used by students while wikis, workshops, and blogs were least utilized amongst the students.

Table 4: Utilization of Various LMS Features and Functionalities by Students (N=495)

LMS feature	Never (%)	Often (%)	Rarely (%)	Sometimes (%)	Very Often (%)
Forums	2.83	36.57	12.32	25.45	22.83
Chats	1.62	40.00	7.47	24.44	26.46
Wikis	40.40	6.87	20.81	28.08	3.84
Emails	4.44	30.91	12.12	32.12	20.40
Messages	6.46	28.08	12.32	31.52	21.62
Quizzes	5.45	38.18	5.66	17.98	32.73
Blogs	38.38	9.49	24.24	25.45	2.42
Workshops	38.79	10.10	22.63	25.45	3.03

This study captured the purpose for which various LMS features were utilized amongst online students. The data in Table 5 represents a tabulation of the reasons for which chats, forums, and messages were utilized. As indicated, most students used chats to seek help. For example, 32% of students indicated that they use chats to seek help from other students while 30% used chats to seek help from the course instructors. The students who used chats to meet course goals represent 27%. The students used discussion forums to meet course goals (34%) and seek help from course instructors (28%) respectively while 42% of the students use messages to seek help from fellow students and 27% use messages in seeking help from instructors.

Table 5: The Purpose for Which LMS Features were Used by Students

Purpose	Chat (%)	Forum (%)	Message (%)
Meet course goals	26.94	33.52	17.86
Meet strategy goals	7.76	10.27	6.41
Seek help from course instructors	30.32	27.67	26.56
Seek help from other students	32.02	23.82	41.53
I am not aware of the tool	1.27	1.43	2.44
I have never used the tool	1.69	3.28	5.19

Students' Responses on Utilization of SRL Strategies

In Table 6, we demonstrate how various LMS features were utilized to promote the use of SRL strategies amongst students. As indicated 32% of students utilized quizzes in achieving self-evaluations while 24% indicated that they use quizzes for self-monitoring. Forums and chats were also mostly utilized by students to achieve various SRL skills. For example, 43% of students used chats to seek help from instructors and students. The discussion forums were used to utilize

almost all the SRL strategies provided in the study. The results show that emails, wikis, and workshops were least used to achieve the various SRL strategies.

Table 6: *How Various SRL Strategies were Utilized by Students using LMS Features*

SRL strategy	Chat %	Email %	Forum %	Quiz %	Wiki %	Workshop %	None of the tools %
Time management	28.11	8.43	30.52	18.74	3.48	1.74	8.97
Self-monitoring	24.82	5.92	29.44	23.81	4.18	2.45	9.38
Self-evaluation	23.1	4.45	27.69	31.99	4.59	2.30	5.88
Help seeking	42.9	12.81	25.91	6.55	4.60	2.09	5.15
Effort management	25.85	9.45	28.66	16.69	5.47	3.10	10.78
Organisation	24.89	8.35	29.21	13.71	6.41	2.68	14.75

The results on how students utilized SRL strategies in online courses are presented in Table 7. The results indicate that students have utilized self-evaluation strategy (23%), time management (19%), and help-seeking strategy (14%) while 13% utilize effort management in online learning. As indicated, 14 % of students said that they were not aware of any SRL strategies while 3% said that they have never utilized any of the SRL strategies.

Table 3: *How Students Utilized Various SRL Strategies in Online Courses*

SRL Strategy	N	%
Self-evaluation through the use of quizzes and self-assessment tools on LMS	260	22.97
Time management by using LMS features to plan time use e.g. frequent logins and when to respond to various activities shared by instructors	216	19.08
Help-seeking by seeking assistance from peers or instructors through question and answer	154	13.60
Not aware of any SRL strategies	154	13.60
Effort management by actively participating in online learning by having frequent logins and reminders to view learning materials. Know the effort to put towards achieving your course goals	145	12.81
Organization by scheduling learning activities for the day or week	108	9.54
Self-monitoring through the use of tracking or journaling tools to monitor learning progress	58	5.13
None of the above	37	3.27

Students' Perceived Challenges in Utilizing LMS Features in Promoting SRL

The students' perceived challenges associated with the use of LMS features in promoting SRL are presented in this section. Table 8 presents the challenges that hinder the students from playing an active role during an online course. From the results it can be observed that 28% of students indicated that "lack of adequate internet" is a major hindrance to engaging in online study. "Lack of interaction with course instructors" and "lack of individualized feedback on students' learning habits" were the main factors that hinder students from actively being involved in online learning at 19% and 15% respectively.

Table 8: Factors that Hinder Students from Actively Participating in Online Learning

Hindrance to active participation in online learning	N	%
Lack of adequate internet	234	28.47
Lack of interaction with course instructors	154	18.73
Lack of individualized feedback on learning habits	127	15.45
Lack of instructor guidance	113	13.75
Lack of peer interaction	90	10.95
Others	62	7.54
Lack of adequate learning	42	5.11

The study also captured the areas students perceived there is little support from course instructors as presented in Table 9. Most of the students indicated a lack of real-time and individualized feedback at 22% and 20% respectively. From the results, 15 % of students indicated that they rarely receive guided learning while 12% said that there is little support in the provision of prompts that guide them on their study habits.

Table 9: Areas Students Perceive there is Little Support from Course Instructors

Area with little support	N	%
Real-time feedback	207	22.43
Individualized feedback	186	20.15
Guided learning	136	14.73
Prompts guiding you on your study habits	112	12.13
Instructional help	92	9.97
Study hints	92	9.97
Provision of learning materials	83	8.99
Other	15	1.63

The students' experiences in regard to the support they receive from course instructors

Students were asked about their experiences on the kind of support they received from instructors during online courses. A sample of the most frequently cited types of student responses on the open-ended question are shown in Table 10 below.

Table 10: *Students' Experiences on Support Received from Instructors*

Area of support	Sample Responses
Instructor feedback/interaction	<p data-bbox="586 516 1378 575">"Instructors are not usually available for support and offering individualized assistance"</p> <p data-bbox="586 611 1149 642">"most lectures do not respond to online queries"</p> <p data-bbox="586 674 1378 732">"online course is very difficult as there is no interaction with instructors like full-time"</p> <p data-bbox="586 764 1378 823">"instructors not active, most lecturers take too long before responding to student's chats"</p> <p data-bbox="586 854 1149 886">"I have not received any support from lecturers"</p> <p data-bbox="586 917 1133 949">"good but online interactions need more effort"</p> <p data-bbox="586 980 867 1012">"need more interaction"</p>
Online monitoring, guidance, and support	<p data-bbox="586 1012 808 1043">"lack engagement"</p> <p data-bbox="586 1075 1003 1106">"there is not much online guidance"</p> <p data-bbox="586 1138 1378 1197">"very minimal support making the course hard because of limited time"</p> <p data-bbox="586 1228 911 1260">"the support was negligible"</p> <p data-bbox="586 1291 922 1323">"the support is very minimal"</p> <p data-bbox="586 1354 1354 1386">"there is lack of follow-up and prompts feedback from instructors"</p> <p data-bbox="586 1417 1349 1449">"I have not received much support and they can improve on that"</p> <p data-bbox="586 1480 1349 1512">"online instructors need to be more involved in guiding students"</p>

Suggested additional features for supporting Self-Regulated Learning

Through an open-ended question, we sought to establish the additional features students would like to have included in the LMS. Table 11 below highlights some of the frequently mentioned items.

Table 11: Suggested Areas of Improvement in Terms of Additional Features for LMS

Suggested area of improvement	Sample Responses
Instructor Interaction	<p>“Instructor support needs to be boosted”</p> <p>“simple study hints”, “one on one communication links”</p> <p>“two-way communication with students and instructors”</p> <p>“real-time response to questions”</p> <p>“group chats”</p>
Mode of examination administration	<p>“Online exams to make it convenient”</p> <p>“final exams should be done online”</p> <p>“ability to sit for examination online”</p> <p>“administer exams online”</p>
Lack of adequate internet	<p>“Access to modules without the use of internet or mobile data”</p> <p>“SMS chatting for areas with no internet”</p>
Instructor Feedback	<p>“Real-time response to queries”</p> <p>“more individualized attention”</p> <p>“immediate feedback on assignment and quizzes”</p> <p>“features for prompt feedback”</p>
Integration of social media and other tools	<p>“WhatsApp”</p> <p>“integration with videos”</p> <p>“SMS integration”</p> <p>“Twitter”</p>
Monitoring learner progress	<p>“Progressive alerts as reminders on learner progress”</p> <p>“the University should provide progress bar for monitoring progress with online learners”</p> <p>“tracking device”</p> <p>“prompts on ongoing activities”</p> <p>“real-time notifications”</p> <p>“regular reminders”</p> <p>“well-managed progress bar”</p>

	“learning tracker to monitor how far one has reached”
Organisation and time management	“Time management features” “clear notifications on activities to be done”

DISCUSSION

This study was conducted to explore how students utilize LMS features in promoting SRL and to establish University students' perceived challenges in online learning. The SRL strategies that are critical in learning, such as time management, self-evaluation, help-seeking, effort management, and self-monitoring (Broadbent & Poon, 2015) were considered in the study.

First, the study investigated the utilization of LMS features in enhancing SRL. The findings indicate that chats, forums, quizzes, and messages are among the features that are commonly used by learners. The wikis, blogs, workshops are least used by learners. Likewise, in a related study carried by Back *et al.* (2016), it can be observed that LMS features such as wikis and blogs are least used and therefore required by the learners. Another related study showed that wikis acceptance levels by students is low (Yilmaz *et al.*, 2017). From the literature, all the features considered in the present study are significant in improving students' learning experience. (Janson *et al.*, 2017) investigated the factors that influence learning processes and success in the LMS. The study indicated that students perceive that learner support, interactivity with peer learners and instructors, and Task-Technology Fit (TTF), which refers to the LMS features (forums, quizzes, assignments) that enable learners to carry out learning activities such as communication and interaction with peers and instructors, positively influence the use of LMS. From this present study, it can also be noted that communications tools are underutilized as emails appear to be preferred amongst students. In a related study, Back *et al.* (2016) investigated how medical students utilized the LMS for their learning and the challenges they faced. The study revealed that the students mainly communicated via emails and Facebook. The most popular tools the students used in their learning were slides, video and digital texts. Interestingly, it was also observed that in using the LMS, there was lack of interaction. The students reported that there was lack of personalized contact amongst them and instructors and this required them to make much effort in learning. This study concurs with related studies where students suggested the incorporation of telephone messages and social media platforms as integrated channels of communication (Back *et al.*, 2016). The social platforms such as Facebook if integrated into online learning environments could be useful for group social collaborative learning by students which could potentially help students develop socially shared regulation skills (Yilmaz *et al.*, 2017).

Second, from the findings in this study, it can also be observed that the LMS inbuilt features such as discussion forums, chats, quizzes, emails, and wikis that are supposed to stimulate the growth of SRL skills are underutilized and therefore less likely to promote the development of SRL. The implication is that learners are not benefiting from the features due to lack of SRL skills and may require interventions to enable them to apply the skills. It is important to observe that the inbuilt LMS features if well utilized by learners and instructors could lead to satisfaction and success in online learning (Vovides *et al.*, 2007). According to (Oliveira *et al.*, 2016) technology should be an enabler that allows for high-level interaction, collaboration and communication among students and instructors especially when learning takes place through LMS. The findings in this study imply that for learners to develop and grow their SRL skills, they require a learning environment that supports them in planning and monitoring their own learning. As Palomino, Silveira and Nakayama (2014) asserts, there is need to integrate the benefits of intelligent tutoring systems into LMS to experience aggregated advantages of both. Additionally, to curb this problem of underutilization, there is also a need for University students and instructors, especially those who participate in online learning and teaching to be trained on the importance of Self-regulated

Learning (Núñez et al., 2017). Furthermore, providing SRL interventions benefits students to plan, monitor and reflect on the learning practices by providing relevant guidelines and hints to improve their self-regulatory skills especially in online learning environments (Viberg et al., 2020). According to (Kim & Moon, 2019) online learning environments need to be designed in a way that supports and deepens students' engagement levels through integration with intelligent tools. The intelligent tools can help infer learning behaviors from log data and then provide targeted interventions for each learner.

This study sought to determine students' perceived challenges encountered during online learning. The student responses indicate lack of real-time and individualized feedback especially to guide students in their learning habits and performance in various course assessments such as continuous assessment tests, and quizzes. The results also reveal that a lack of Internet connectivity is a hindrance to active and successful online learning. The qualitative findings concur with the findings in previous studies where students pursuing open and distance learning experience poor Internet connectivity (Muuro & Kihoro, 2017). From the literature it can be observed that only those LMS that have incorporated hypermedia and provide personalized feedback for learners can lead to increased self-regulated learning and improved motivation. The feedback helps the learner to be able to utilize LMS resources (Sáiz-Manzanares et al., 2019). Similarly, according to Fetzner (2013), when students are left alone without guidance and support, they feel left behind and are likely to drop or fail in online courses. The challenges experienced by learners can also be attributed to the underutilization of various SRL strategies in online courses. It will be interesting to consider the provision of real-time and frequent feedback on how students utilize LMS features to support various learning activities. Real-time feedback to students helps them to not only become aware of their learning habits but also know how to improve their learning speed so that they are not left behind. When students feel they are left behind they may feel dissatisfied and demotivated which has also been attributed to unsuccessful online learning (Fetzner, 2013). Hashemyolia *et al.* (2014) also argued that although most of the online learning environments offered a variety of tools and features that were intended to enhance engagement levels, the actual use by the students depended on their levels of motivation.

With the unavailability of analytical tools in the LMS and without incorporating other technological tools, the LMS may not be effective in supporting self-regulated learning. Incorporating analytical tools will facilitate the provision of individualized feedback that encourages self-paced learning for each student (Sáiz-Manzanares et al., 2019). Further, Sáiz-Manzanares *et al.* (2019), argue that individualized feedback and student monitoring will be made possible using educational data mining techniques that will enable real-time analysis and provision of information on learners' behavior. Still, Zarouk and Khaldi (2016) earlier argued that current LMS fails to facilitate promotion of SRL strategies and therefore require integration of tools that enable learners to engage on learning activities that can improve their self-regulatory skills. The literature indicates that external support is required to support learners to utilize SRL strategies (Karaoglan Yilmaz & Yilmaz, 2020). The use of SRL interventions provides the potential of supporting learners to engage in their learning through technological tools integrated into LMS. This can be achieved by using learning dashboards and real-time student feedback enabled by the integration of analytical tools into LMS (Janson et al., 2017; Sáiz-Manzanares et al., 2019). In other words, when students are supported externally by pedagogical agents, their SRL skills are improved (Karaoglan Yilmaz et al., 2018).

Since most institutions are adopting LMS for online learning, it is important that they ensure that students are supported by offering interventions to improve their self-regulatory skills. It is therefore expected that the findings of this research will guide educators and stakeholders in higher education to design LMS components that support learners in taking control of their own learning processes.

CONCLUSION AND FUTURE RESEARCH

From the findings in this study, it can be observed that the LMS features that are intended to enhance SRL are underutilized by online learners. The students' perceived challenges such as lack of individualized support from online instructors may be contributing to the underutilization of the LMS features. This individualized guidance and support is lacking in most institutions of higher learning due to large numbers of students enrolled in online courses (Muuro et al., 2014). It will therefore be interesting to investigate how the provision of SRL interventions through educational data mining techniques can enhance the measurement and promotion of self-regulatory skills especially in online learning. The results in this research reveal that there is need for urgent consideration of the design and integration of analytical tools into the current LMS to enhance the provision of SRL interventions for online learners. Although LMS provides suitable environments for enhancing students' SRL skills, the underutilization of its features and lack of individualized support to learners poses a challenge worthy of consideration by researchers and instructional designers (Alkhasawneh et al., 2019). This may also necessitate the provision of SRL interventions to reinforce them on utilizing the LMS features.

Given that a greater percentage of respondents in this study came from one University, it will be necessary to carry out a comparative study in other universities especially outside Kenya where challenges that online learners face could be divergent to those experienced by students in Kenyan universities. Additionally, since our study did not address the use of automated tools to measure and support SRL in online learning, an empirical study can be carried out to investigate the effectiveness of using Educational Data Mining tools in measuring and promoting SRL. For instance, mining log data for inferences of students learning behaviors is likely to help researchers and educators understand how learners behave online and can deliver scaffolds that can reinforce the development of SRL skills. Future studies should, therefore, address how SRL strategies such as time management and task activities can be promoted within LMS to promote adaptive learning and offer individualized support and guidance to ODEL students. Furthermore, the large number of students who enroll in online learning can be a hindrance for instructors to offer adequate support. Offering instructor support to e-learning students may not be adequately addressed as the number of learners has become large for tutors to guide them individually (Nussbaumer et al., 2015). According to Sáiz-Manzanares *et al.* (2019), there is need to incorporate analytical tools into LMS to provide insights about learners' interactions and behavior to teachers for easier interventions especially for weak students. Moreover, since there have also been calls for the development of tools that can not only measure SRL in online learning environments but also develop interventions to promote SRL in e-learning environments (Alario-Hoyos et al., 2017; Terras & Ramsay, 2015; Panadero et al., 2016). Researchers in this study recommend that future studies should focus on carrying out empirical research to explore the effectiveness of providing SRL interventions such as prompts, feedback and study hints on LMS to enhance the utilization of LMS features and how they can improve performance for online learning students.

Finally, understanding how students utilize LMS features in promoting SRL strategies provides valuable insights on the quality of teaching and learning in online learning environments. Our findings form an empirical foundation for educators, instructors, and instructional designers to improve the design of LMS to enhance its capability in promoting self-regulated learning for learners.

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