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EFFECTIVENESS OF MAKERERE UNIVERSITY E-LEARNING ENVIRONMENT (MUELE) IN THE LENS OF DELONE AND MCLEAN'S (2003) INFORMATION SYSTEMS SUCCESS MODEL: A QUALITATIVE STUDY

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ABSTRACT

The global trend of embracing electronic learning (e-learning) in higher education raises a crucial need to have evidence of achieving the investment goals. In other words, policy makers and managers are faced with a question as to whether their decisions to invest in ICT in teaching and learning have yielded the intended goals or not. Hence, the aim of this study was to explore how different stakeholders in Makerere University perceived *effectiveness of* Makerere University E-Learning Environment (MUELE). The study was guided by the DeLone and McLean's (2003) information systems success model which suggested six dimensions of effectiveness of MUELE. These dimensions were, namely, *net benefits of MUELE, use of MUELE, user satisfaction with MUELE, quality of information uploaded on MUELE, quality of performance of MUELE* and *quality of technical support received by MUELE.* We used a qualitative approach of research to collect data from participants using interviews and analysed them using the thematic framework method (Gale *et al*. 2013). Hence, we found out that on four of the dimensions (*net benefits of use of MUELE, use of MUELE, user satisfaction with MUELE,* and *quality of information generated by MUELE*),participants neither perceived MUELE as effective nor non effective. However, on the other two dimensions (*quality of performance of MUELE* and *quality of technical support received by the user of MUELE),* participants perceived MUELE as effective. We hence gave recommendations.

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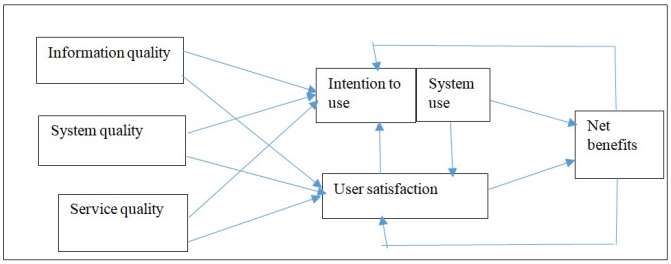
INTRODUCTION

The concept of effectiveness of ICT in teaching and learning has long been and still remains a contentious issue among practitioners and researchers. According to Noesgaard and Ørngreen (2015), previous researchers had defined and investigated effectiveness of ICT in teaching and learning in multiple ways. For example, Jenkinson (2009) defined effectiveness of ICT in teaching and learning as the extent to which students were able to interact with the various ICT tools in order to acquire knowledge which is required to solve their daily problems. Biagi and Loi (2013) defined effectiveness of ICT in terms of the extent to which ICT enhanced knowledge and skills of students. Noesgaard and Ørngreen noted that such broadness of the concept limited researchers and practitioners to target their efforts towards what was important when measuring the effectiveness of ICT in teaching and learning. Worth noting is that an investment in ICT in teaching and learning is such a huge capital with no guarantee of achieving the expected benefits. Hence having a clear understanding of its effectiveness is key for managers and policy makers to evaluate their investment decisions.Based on this, the aim of our study was to explore how different stakeholders perceived *effectiveness of*Makerere University E-Learning Environment (MUELE). This study was guided by the DeLone and McLean's (2003) information systems success model as per Figure 1.



Note. From DeLone and McLean (2003, p. 24, Figure 3)

Figure 1. DeLone and McLean's (2003) Information Systems Success Model

According to Delone and McLean (2003), the variable information systems success is operationalized in terms of six dimensions as indicated in the model (Figure 1). One of the dimensions is, namely, *net benefits,* the other two are namely, *intention to use/system use, user satisfaction* (usage constructs), and the remaining three are, namely, *information quality, system quality* and *service quality* (quality constructs). DeLone and McLean (2003) point out that these six dimensions need to be accounted for in the evaluation of an information system success, failure of which the results would be partial or inconsistent.

They (Delone & McLean) developed their model in the context of e-commerce and hence to keep it under a continuous growth and development, they made a call for its application in other contexts. Hence, basing on this model, we explored the *effectiveness of MUELE* in terms of six dimensions. Of these (six dimensions), one was, namely, *net benefits of MUELE,* other two were, namely,*use of MUELE and user satisfaction with MUELE*(usage constructs)and the remaining three were, namely, *quality of information uploaded on MUELE, quality of performance of MUELE* and *quality of technical support received by a user of MUELE* (quality constructs).

In Uganda researchers (e.g., Bakkabulindi, *et al*., 2016; Kabugo, Masagazi, *et al*., 2015; Kabugo, Muyinda *et al*., 2015; Muyinda *et al*., 2019) have made publications on effectiveness of ICT in teaching and learning. These, however, have looked at *use of ICT* which is only one of the six dimensions of *effectiveness of ICT*hence giving partial results. In other words, researchers in Uganda in this field have hardly been guided by the DeLone and McLean's (2003) model of information systems success. Implied in this situation is that managers and policy makers in Universities in Uganda stand a high risk of making partially informed decisions which might result into financial loses to institutions. In this study, our aim was to explore how different stakeholders perceive effectiveness of MUELE in terms of net benefits, usage constructs and quality constructs. To achieve our aim in this study, we focused on three research questions:

i. How do stakeholders in Makerere University make meaning of effectiveness of ICT in terms of*net benefits of MUELE*?
ii. What is the perception of stakeholders in Makerere University on the effectiveness of MUELE in terms of the usage constructs (*use of MUELE and user satisfaction with MUELE*)?
iii. What is the perception of stakeholders in Makerere University on the effectiveness of MUELE in terms of the quality constructs (*quality of information generated; quality of performance;* and *quality of technical support*).

Related Literature

Different studies have been conducetd on effectiveness of ICT in teaching and learning. In this study we reviewed empirical studies on net benefits of ICT, usage of ICT and quality of ICT in teching and learning.

Empirical Studies on Net Benefits of ICT in Teaching and Learning: Researchers have conducted different studies on the usefulness, impact or influence of ICT in teaching and learning. For purposes of this study, we chronologically reviewed studies conducted from 2020 to 2021. For example, Almusharraf *et al*. (2020) explored the effect of video lectures on the levels interaction in terms of collaboration and completeness of note taking by students. They used a survey method and collect data from a sample of, "113masters students and 36 doctoral students" (p. 645) at a university in South Korea. To measure the levels of interaction, Almusharraf *et al*. used values and scores which they had converted into what they termed as 'standardized values.' They did their analysis in three groups (high, middle and low). Hence by summing the means of the standardized values for the three groups, they obtained an overall mean of "0" for each of the of interaction levels (collaboration and completeness of notes). This meant that video lectures did not have any impact on the level of collaboration of students and the level of completeness of note taking.Almusharraf *et al*. did report limitations on their study but they recommended for a future research to obtain more objective measures of student interactions with video.

Hamed and Aljanazrah (2020) explored, "the effectiveness of using virtual experiments on the achievement and performance levels of students. They used a mixed method of research in their study. They used a quasi-experimental design explore the effect of using virtual experiments on level ofachievement by the student with a control group of 45 students and an experimental group with the same number and they used an observation to explore students the performance of student.Hamed and Aljanazrahused used descriptive statistics and an independent sample t-test to analyze the quantitative data while they used thematic analysis to analyze the qualitative data.According to their quantitative findings, the control and experimental groups respectively had means3.42 and 3.07 hence suggesting that there was no difference between the two groups in achievements meaning that the two groups had almost achieved equally. Thematic analysis revealed that the time spent to conduct the hands-on experiment and gatherdata was nearly the same for both students' groups meaning that performance was the same in the two groups. These results suggested that there was no effectiveness of using virtual experiments on the achievement and performance of students.

Huilcapi-Collantes *et al.* (2020) examined the effects of, "blended learning visual literacy course [when] applied to in-service teachers" (p. 133). They used a quasi-experimental pretest-posttest design with a sample of 51 participants who were teachers. Using descriptive statistics, they obtained a posttest mean of 21.8 which was high as compared to the pretest mean of 18.5. This meant that blended learning course slightly helped teachers to develop visual literacy abilities. As a limitation on their study, Huilcapi-Collantes *et al*. noted that their sample size was small and they hence suggested future studies to take this limitation into account.

Owen and Licorish (2020) researched on the effectiveness of Kahoot as a learning management system (LMS) in order to shade light, "on the conflicting evidence as to whether… Kahoot improves students' learning and knowledge retention beyond traditional teaching methods (p. 514). They used a qualitative research method and purposively obtained a sample of 27 students whom they interviewed about their perceptions on effectiveness of Kahoot. By using content analysis, they found out that Kahoot as an LMS stimulated the learning process of students and their knowledge retention. Owen and Licorish noted that their study sample was relatively small and they recommended future studies to have it increased.

Gonzalez *et al*. (2021) conducted a research on the effects of escritura científica multilingüe (ECM) on the learning and writing motivation of Spanish and in English as languages.They used a quasi-experimental design and they collected data from 100 students whom they selected from a university in Southern Spain. They used twogroups each of 50 students, one as a control group and another as an experimental group. Using descriptive measures, they found out thatthe means for all the variables were almost the same for the pretest and posttest in control group. However, for the experimental group, the means for all the variables in the posttest were higher than those for the pretest. These findings were suggestive that ECM enhanced the learning and writing motivation of Spanish and English as languages.

A review of studies on net benefits of ICT indicated that majority of the studies (Almusharraf *et al*., 2020; Gonzalez *et al*., 2021; Huilcap-Collantes *et al*., 2020) had employed quantitative research method while only one study (Owen & Licorish, 2020) had employed qualitative research method. This pointed to a methodological gap to the effect that the qualitative method had been ignored in previous studies for which we conducted this study to reduce such a gap. The review further indicated conflicting results with some studies (e.g. Almusharraf *et al*., 2020; Hamed and Aljanazrah, 2020) showing no effectiveness of ICT in terms of net benefits while others (e.g. Gonzalez *et al*., 2021; Huilcap-Collantes *et al*., 2020;Owen & Licorish, 2020) indicated effectiveness of ICT in terms of net benefits. Such conflicting results gave us a basis for this study to be conducted in order to make a contribution on the existing literature.

Empirical Studies on Usage of ICT in Teaching and Learning: Different studies have investigated the manner and extent to which students and lecturers are able to utilize ICT and their perceived enjoyment or pleasure in using ICT in teaching and learning. We chronologically reviewedsuch studies conducted in the years 2020

and 2021. For example, Al Qunayeer (2020) explored how learners of English as a foreign language (EFL) viewed the role of Facebook-facilitated activities in promoting their online participation. Her study was qualitative in nature and she conducted it among nine undergraduate students of English language in Saudi Arabia. Al Qunayeer analyzed her data basing on themes that emerged from the comments from learners on online interactions in group writing. Hence she reported that learners had a perception that online participation had made them feel active or autonomous learners hence promoting their commitment to group work. Al Qunayeer identified the small number of participants as a limitation on her study. Xiu and Thompson (2020) conducted a study to determine the extent to which motivational characteristics of students relate to their use of course materials in a flipped class. Xiu and Thompson used a self-reported survey which they conducted among 59 students from a Midwestern public university.The students were from two courses, namely, hospitality management (HM) and leisure services (LS). Using descriptive statistics, Xiu and Thompson found that students from the group of HM had visited the content topic provided by the instructors at an average rate of 65.2% and these had on an average spent about 355.84 seconds on each topic. Their results also indicated that students from the LS group had on average visited the content provided by the instructors at a rate of 85.8%. These results are suggestive that on average, students frequently or regularly used the course materials in a flipped class.

Alajaji and Alshwiah (2021) investigated the perception of students of the specific e-tool, namely, Quizizz which is used in gamification. In persuit of their aim, they formulated three questions of which on was: 1.What are the perceptions of students of effectiveness of Quizizz? Alajaji and Alshwiahused a mixed method of research and had a sample of 41 studentsfrom Abdulrahman University (IAU) whom they selected using convenient sampling. They used weighted averages and thematic analysis respectively for quantitative and qualitative data analyses. Hence from the quantitative side, they obtained an overall weighted average of 4.64 suggesting that students highly appreciated Quizizz as very useful tool in gamification. From the qualitative findings, students revealed that Quizizz had increased their willingness and enthusiasm to accomplish more of their work. They however, noted that students had experienced some difficulties in usingQuizizz and they as well complained about the network. From the review of previous studies on the usage of ICT in teaching and learning we noted that of these studies, none had been conducted in the context of Africa and in particular Uganda which pointed to a contextual gap and hence a need for this study.

Empirical Studies on Quality Constructs of Effectiveness of ICT in Teaching and Learning: Studies on quality constructs (quality of information generated, quality of system performance and quality of technical support) of effectiveness of ICT have been conducted. For example, Esmael (2017) examined whether there was a difference between manual feedback and online feedback with regard to feedback quality. Esmael used a quantitative method of research with a total of 4678 students as participants. Using paired t-tests, he found out that, "the response to the manual feedback was significantly higher than the response to the online feedback. As a limitation on his study, Esmael noted that the gender aspect had not been taken into consideration and hence recommended future research to include the aspect of gender differences into the topic. Kintu *et al*. (2017) investigated the effectiveness of a blended learning environment through analyzing the design features of an online learning system. They applied a quantitative research method in which they used a cluster sampling technique to select a total of 238 students from which they collected data on the design features. From their descriptive results, they revealed that technology quality during blended learning was rated at 69%, and the quality of resources was rated at 68%. Kintu *et al*. noted that students experienced network problems during the learning process although they were able to finish up their work during the connection. These results indicated that overall, respondents agreed to the effectiveness of blended learning on the quality deign of an online learning system.They however did not give limitations on their study as well as recommendations for researchers.

Methodology

Research Approach and Design: In this study, we used a qualitative approach of research. In particular, we employed an exploratory design in order to capture the perception or understanding of *effectiveness of use of MUELE* by participants of different categories.

Sampling: We had a total of seven participant whom we purposively selected to provide information on the *effectiveness of MUELE* in terms its six dimensions. The sample was comprised of one staff from the Directorate of ICT support (DICTS), two members of staff from the Institute of Open, Distance and e-Learning (IODeL), one lecturer from the College of Computing and Information Sciences (CoCIS) and three students, one from the College of Humanities and Social Sciences (CHUSS) and the other two from the College of Education and External Studies (CEES). The staff from DICTS was a male and at the level of an administrator. In this study, we referred to him using an abbreviation of ADM 1. The two staff members from IODeL were administrators of whom one was a female and the other a male. In this study, we respectively referred to them using abbreviations ADM 2 and ADM 3. The lecturer was a female and we did not use any abbreviation in referring to her since she was the only one we interviewed. The student were three, one from CHUSS and a female and the other two were from CESS and both males. In this study, we respectively referred to these (students) as STD 1, STD 2 and STD 3.

Data Collection Instruments: We collected data from participants on their understanding of effectiveness of use of MUELE using interview guides. We used one of the interview guides to draw information from students and lecturers on the net benefits of use of MUELE to students, use of MUELE by students, satisfaction of students with use MUELE and quality of information received from MUELE by students. We used the other interview guide to collect data from participants in the Directorate of ICT Support (DICTS) and the Institute of Open, Distance and e-Learning (IODeL). It focused on the net benefits of use of MUELE to students, use of MUELE by students, satisfaction of students with use of MUELE, quality of performance of MUELE as judged by students and technical support received by students when using MUELE.

Data Analysis: We used the thematicframework method (Gale *et al*., 2013) in which we followed six stages in order to analyze the data. Stage 1 was a process of transcribing which involved writing down responses from participants where we made efforts to quote them verbatim. Stage 2 was a process of gaining a firm base of interpreting these responses and as well become conversant with them. At this stage, we iteratively read through the transcriptions and replayed and carefully re-listened to the audio recordings. Stage 3 was a process of coding in which, having carefully read through the transcriptions, we developed phrases (code) that we used to interpret the responses from the participants. We developed these phrases (codes) basing the measures of the six dimensions of effectiveness of use of MUELE as suggested by the DeLone and McLean's (2003) information systems success model which guided this study. Hence, in this study, the dimensions were the predefined themes while the measures of each of the dimensions were the predefined sub-themes. Stage 4 was a process of developing a working analytical frame work.

At this stage, we organized the codes into categories hence forming a new structure of data rather than the original ideas as given by participants. Stage 5 was a process of charting data into a framework matrix. At this stage, we summarized the data by category from each of the transcripts and in so doing, we remained keen not to lose the original meaning and feel of the interviewees (Gale *et al*., 2013). Stage 6 was the process of interpreting the data. For each code in the analytical frame, we included an analytical note which was a summarized interpretation of each response. We used these analytical notes for analysing and reporting our findings.

Results

The aim of this study was to to explore how different stakeholders perceive effectiveness of MUELE in terms of net benefits, usage constructs (*use of MUELE, user satisfaction with MUELE)* and quality constructs (*quality of information Uploaded on MUELE, quality of performance of MUELE* and *quality of technical support received by MUELE).*Hence we based our findings on these dimension.

Net Benefits of MUELE: The first dimension of *effectiveness of MUELE* was *net benefits of MUELE* which we operationalized using five sub-themes that guided our interviews. The five sub-themes were, namely, improvement of academic performance when using MUELE, ability to solve problems when using MUELE, reception of better education services due to use of MUELE, cost saving as a result of using MUELE and usefulness of MUELE (Al-Azawei, 2019).

Improvement of Academic Performance: On this sub-theme, two of the administrators (ADM 1 and ADM 2) were of the view that MUELE could help students to improve on their academic performance since they (students) were able to read at their pace without the presence of the lecturer. For example, ADM 1 mentioned that:

> *"MUELE allows students to organize their private reading at any time they may wish which may help them to improve on their academic performance."*

Two of the students (STD 1 and STD 2) confirmed the submissions of the administrators to the effect that MUELE had improved their academic performance. For, example, STD 1 revealed that:

> *"MUELE helps in research. It helps to get new knowledge whereby improving on the academic performance."*

In the same line, STD 2 reported that:

> *"MUELE helps me to retrieve my work when preparing for exams and other revision"*

However, one of the administrators (ADM 3), expressed the view that much as MUELE could improve the academic performance of students, there were some negative effects worth taking note of. To this effect, ADM 3 pointed out that:

> "*With MUELE, students are empowered to build discussion groups… and skills of research. However, MUELE breeds laziness among students. Sometimes they [students] deliberately miss the live real time lectures and opt for the recorded. They are even reluctant to attend physical lectures which require hands on learning."*

The lecturer on other side had a different opinion on the ability of MUELE to improve on the academic performance of students with a submission that:

> *"I don't think MUELE improves on the academic…. MUELE is just a software which cannot talk. It is the student himself or herself."*

Still, one of the students (STD 3) shared a negative experience with using MUELE in terms of academic improvement revealing that:

> *"Online learning has not been good for my academic performance. It made me to decline terribly. In using MUELE, my grade lowered from A+ to B in all subjects."*

Ability to Solve Problems in Studies: On this sub-theme, we only got responses from students who reported that MUELE provided them with an opportunity to share views in group discussions which were on the platform. These views according to them were useful in solving their problems in studies. In this regard SDT 2 gave the view that:

> *"Group discussion on the platform have helped me to solve academic problems."*

Reception of Better Education Services: About this sub-theme, two of the administrators (ADM 1 and ADM 3) were of the view that lecturers upload a lot of information on MUELE including videos and audios which could improve the teaching and learning process. For example, ADM 3 reported that:

> *"MUELE has compelled lecturers to make more research about the content they upload for students. They have included multimedia components in the teaching and learning preparation process. Both the lecturers and student do prepare ahead of the lecture. This makes good teaching services."*

According to ADM 2, MUELE could offer additional services to students such as access to educational services without necessarily coming to the university which was of a great advantage especially to people with disabilities. To this effect, ADM 2 pointed out that:

> *"MUELE is inclusive in that it caters for students with disabilities since they can access services from any place to their convenience."*

Like administrators, students also reported that MUELE had offered them with an opportunity to receive better education services especially in terms of easy access to the teaching and learning facilities. For, example, STD 2 reported that:

> *"MUELE helps to have timely learning. Issues of delay due to traffic jam or rain are not there. I can access all the course content at once and use it to read a head of the lecturer."*

However, while the lecturer admitted that MUELE minimized time wastage on the account that students could get reading materials posted on MUELE in advance, she expressed concern that;

> *"…the system [sometimes] tend s to slow down when it is over loaded which affects service delivery."*

In line with the submission from the lecturer on reception of better services when using MUELE, one of the students SDT 3 gave a response that;

> *"MUELE is a system which can jam any time and without a computer or the required gadget it means no learning will take place. It would be better if lecturers give handouts."*

Cost Saving: In terms of cost saving, administrators reported that students hand a chance of saving in terms of transport, rent and other costs associated to the teaching and learning process. For instance, ADM 2 gave a response that:

> *"When students use MUELE, there is a tendency of saving on the costs of learning in terms of transport or accommodation."*

In regard to this, students equally reported that MUELE had helped them to reduce on the costs involved in the teaching and learning process. Taking a case of STD 3, the response on cost saving was that:

> *"At campus, I can access MUELE at a free cost using Mak air and eudrom wifi services. Even off campus the cost of uses MUELE is low. I am able to study without great expenses such as rent and transport."*

However, the lecturer was at variance with the views from the administrators and students about the cost saving due to use of MUELE for which the response in this regard was that:

"Much as MUELE saves in terms of printing, it dilutes the traditional way of learning which requires one to read the physical copy so as to understand well…."

In balance of the views from administrators and experiences of students, there was a substantial variation in the perceiption of stakeholders as to the effectiveness of MUELE in terms of *net benefits of use of MUELE.* For example, while two of the administrators and two of the students had a perception that MUELE could improve the academic performance, one of the administrators was not in total agreement with such a view, while the lecturer and one of the students were totally variance of the same view (by administrators and two of the students).

***Use of MUELE**:* The second dimension of *effectiveness of MUELE* was *use of MUELE.* We operationalized this dimension with three sub-themes, namely, frequency of use of MUELE, level of dependency of MUELE (Al-Azawei, 2019) and ability of students to utilize the functions of MUELE (Yakubu and Dasuki). Hence we present findings on this dimension basing on these sub-themes.

Frequency of Use of MUELE*:* On this sub-theme, one of the three administrators (ADM 2) reported that students used MUELE regularly and further mentioned that it would soon be a policy for all lecturers to use MUELE. In this regard, ADM 2 reported that:

"To a large, extent student do use MUELE. It is now compulsory and they have to use it. It is also going to become a policy for lecturers to upload the core course units."

In the same line, two of the students (STD 1 & STD 2) confirmed that they frequently used MUELE just as ADM 2 had reported. For example, STD 2 reported that:

"I frequently use MUELE since much of the work is always uploaded for the course units I offer. Almost 80% is provided by MUELE. I always use it to the maximum."

However, two of the administrators reported that it was usually the role of lecturers to ensure that students do use MUELE regularly. Their argument was that lecturer could only force students to use MUELE by uploading reading materials on the platform. In accordance to this, ADM 1 gave a response that:

"Where a lecturer subjects the student to use MUELE, they tend to use it. But not all lecturers do this."

The indication here is that students most likely do not use MUELE frequently since the lecturers do not subjected them to do so. From the lecturer, the response on the use of MUELE was that:

"Students do use MUELE frequently but for me I last uploaded information some good time back. But since we share the course unit, I believe my colleagues do engage the students on MUELE."

This response was an indication that not all lecturers are committed to task of uploading reading materials on the MUELE platform and this signifies the response from ADM 1 to the effect that not all lecturers do subject students to use MUELE. In line with this finding one of the students (STD 3) reported that:

"… we do not use it [MUELE] frequently since lecturers dodge it due to limited knowledge of use using it."

Level of Dependency on MUELE: In our findings on this sub-theme, ADM 2 and the lecturer reported that students did not entirely depending on MUELE in their studies. For example. ADM 2 reported that:

"Much as students use MUELE, they do not entirely depend on it. It is still a blended approach with both online and physical."

In the same line, the lecture pointed that:

"Students do not entirely depend on MUELE. The content needs to be subsidized by other sources."

The responses from students regarding this theme did not differ from those by ADM 1 and the Lecturer. Students in this case expressed the view that they did not depended on MUELE entirely. For example, STD 3 reported that:

"We as learners cannot truly depend on MUELE. It is like an online library. We mostly depend on other sources of information such as textbooks or google information."

Ability of Students to Utilize the Functions of MUELE: On this sub-theme, one of the administrators and the lecturer had the opinion that students were in position of utilizing MUELE with limited challenges. For example, the lecturer reported that:

"Students may have complaints of access. Otherwise, they are okay with most of the functions of MUELE. Once they login they can communicate and use MUELE."

Related to such a response were the reports from two of the students. For example, STD 1 reported that:

"It being a new forum, I may not give it 100%. But I have the ability to make use of the functions of MUELE for my learning."

However, two of the administrators gave responses that the university management had programs of training to students on how to utilize the functions of MUELE. ADM 1 admitted the need for such training stating that:

"Some training is need for students to fully be well versed with the functions of MUELE if they are to utilize them fully. An orientation is very essential for the student to utilize the features of MUELE. This role is usually played by IODEL."

In line with this submission, ADM 2 revealed that:

"Learners are usually given orientation on how to use the functions of MUELE. They are further given continuous training which makes them able to use the functions."

However, despite the actions undertaken to train and give orientation on how to utilize the functions of MUELE, one of the students mentioned that they were still faced with challenges of utilizing MUELE. For example, STD 3 pointed out that:

"It [MUELE] is a very complex system with many functions. DICTS keeps on upgrading the system which makes it hard for us learners (sic) to get used it. But we keep trying."

In getting a summary on the *use of MUELE*, we noted that on the three sub-themes, the views from administrators, the lecturer and students were largely at variant with more of the submissions being negative or partially positive on most of the subthemes. For example, while one of the administrators mentioned that students frequently used MUELE as policy, another administrator mentioned that lecturers did not subject student to the task of using MUELE. In the same line. The response from the lecturer to the effect that she had spent a good time without uploading content was a sign that indeed lecturers were reluctant to use MUELE and hence the students.

User Satisfaction with MUELE: The third dimension of effectiveness of MUELE was *user satisfaction with MUELE.* We conceptualised this dimension in terms of seven sub-themes, namely, efficiency, dependability, accuracy of the system, usefulness of output format, adequacy of system to meet academic needs of students, attitude towards the functions of MUELE and perceived utility (Tella, 2011). Hence, our findings are based on these seven sub-themes.

Efficiency of MUELE: On this sub-themes, students acknowledged thatMUELE. For example STD 2 mentioned that:

"MUELE is efficient and effective. I am able to get all the course content that I may need for my studies."

Dependability of MUELE.On this sub-theme, two of the students expressed feelings that MUELE was dependable and that they were happy using it. For example, STD 2 said this:

"I had online examinations and all was okay and I was happy. There were some cases when power would go off. But I would have my computer fully charged when I am to have an examination."

Two of the administrators revealed that MUELE could be dependable although there were some few challenges that students were experiencing while using it. To this effect, ADM 3 mentioned that:

"Not that all is well. But generally, MUELE is dependable. Students and lecturers can never lose their work which they upload to MUELE."

However, ADM 2 pointed out that there were issues worth noting which were affecting the dependability of MUELE hence revealing that:

"I feel that MUELE may not fully be dependable. There are network issues, students may not have appropriate gadget to smoothly run the MUELE programs and at times power may go off."

In line with the submission by ADM 2, STD 3 revealed that their gadgets were indeed not good enough to accommodate the requirements of MUELE. To this regard, STD 3 mentioned that:

"Our gadgets would not accommodate the requirements of MUELE in order to run smoothly."

Output Format: Concerning the responses on this sub-theme,one of the students (STD 1) had a feeling that the output of information from MUELE was good and that as students they were satisfied. According to STD 1:

"The information is well organized and from a wide scope of people."

However, one of the administrators (ADM 2) expressed a view that students may be having problems with the output format due to inconsistencies in the way the content is uploaded. To this effect, ADM 2stated that:

"At the moment, there are different ways in which content is uploaded. This may somehow be problematic to students. But there are plans to have content uploaded in a uniform manner."

Along this line of submission, STD 3 expressed a dissatisfaction with the output format of information from MUELE who mentioned that:

"There are frequent changes in the format of the system by DICTS [directorate of ICT support]. There is also no consistency in the format of setting exams."

Adequacy of the System to Meet the Academic Needs: The responses we obtained on this sub-theme were only from students. According to one of the students (STD 1) MUELE was very useful and made great contributions to their academic needs. However, another student (STD 2) was in partially agreement with this submission and according said that:

"MUELE caters for my academic needs. But in some cases, I feel the need for the physical hand out…. For example, in literature I need to touch the physical books rather than the electronic…."

Unlike STD 1 and STD 2 who had a feel that MUELE catered for their needs, STD 3 had a different position to that regard hence saying that:

"MUELE cannot meet my academic needs. I suggest that it should complement the physical where 70% is physical and 30% MUELE."

Attitude Towards the Functions: On this sub-theme, two of the students (STD 1 & STD 2) reported that they had no challenges and hence they were okay with the functions. For example, STD 2 mentioned that:

"I have no problem with the functions of MUELE. I can upload my coursework, download the course content, and edit my profile and others."

However, a response from ADM 2 on this sub-theme pointed to the fact that for students to have a good attitude towards the functions of MUELE, they needed some prior knowledge of using a computer. According to ADM 2, the opinion was that:

"For those with computer skills, the attitude towards MUELE is good. The background really matters a lot."

A response that reflected the submission by ADM 2 was given by ADM 3 who revealed that some students were still uncomfortable with the functions of MUELE which forced them to hire other people to do for them the work posted on MUELE. ADM 3 pointed out that:

"Some students are still resistant and others have a phobia for technology. Some students have hired individual to do the work from MUELE on their behalf because they are not comfortable with using it."

In line with this submission by ADM 3, STD 3 revealed that neither the students nor the lecturers were happy about using MUELE. Accordingly, STD 3 revealed that:

"Honestly no one feels good using MUELE, whether students or lecturers. The worst situation is that even some of the lecturers do not want to use MUELE."

In summary, we found slightly more positiveviews and experiences from participants on this dimension *(user satisfaction with MUELE).* For example, while two of the students reported that that MUELE was dependable, the administrator too had the same view but with reservation since there were network and power issues. However, one of the students raised concern that their gadgets could not fully accommodate the requirements of MUELE. This suggested that participants had divergent perceptions on the *effectiveness of use of MUELE* on this dimension.

Quality of Information Generated by MUELE: The fourth dimension of *effectiveness of MUELE* was quality of *information generated by MUELE.* We operationalized this dimension using sub-themes. These were, namely, accuracy of information relevance of information timeliness, regularity of update of information ability to improve learning, sufficiency and comprehensiveness of information received from MUELE (Shagari *et al*., 2017). Hence we give findings basing on these sub-themes.

Accuracy of Information: Only students gave responses on this sub-theme. These revealed that the information generated by MUELE was good in terms of content and assessment. For example, STD 2 gave a response that:

"MUELE is good enough for purposes of learning. The information is consistent with the objectives set in the course outline."

Relevance of Information Uploaded on MUELE: According to the lecturer the information was relevant and it was in accordance with the curriculum. The lecturer reported that:

> *"The information is relevant since course content is based on the curriculum as provided by the respective departments."*

Two of the students (STD 1 & STD 2) were in agreement with the lecturer to the effect that information generated by MUELE was relevant. For example, STD 1gave the view that:

> "*In terms of use for learning, the information is always relevant. The information posted for each course unit is a consistent with the learning objectives set."*

In the same spirit, STD 2 also reported that:

> *"The information uploaded on MUELE is relevant since I am able to use it to pass tests and examinations… The lecturers who upload the information take the trouble to ensure this."*

Timeliness*:* On this sub-theme, two of the students revealed that the reading materials were always posted on MUELE platform in time and assessment feedback was on time. Accordingly, STD 1 mentioned that:

> *"Usually, a week before the semester begins, the work is uploaded. We get assessment feedbacks as fast as possible unlike when the lecturer marks physically."*

However, as opposed to the submission from STD 1, student STD 3 reported that there was a delay in uploading the content on MUELE platform.

Regularity of Update of Information: On this sub-theme, one of the three students (STD 2) reported that both the students and lecturers were able to edit and update their work or content when using MUELE. As mentioned by STD 2:

> *"Lecturers have the right to upgrade or update the course content. Even students edit their submission. Both students and lecturers edit their work on MUELE as need arises."*

However, as opposed to the submission from STD 2, the lecturer reported that there was usually a delay in updating the information andthat to some extent old content was reused. In this regard, the lecturerreported that:

> *"Updating of information is usually delayed. Some lecturers have a tendency of bringing back old content."*

Sufficiency of Information Generated by MUELE: On this sub-theme**,** one of the three students (STD 1) revealed that the information on MUELE was sufficient for their learning since they were sharing a lot of information on the platform. Student STD 2, however was of the view that much as lecturers posted on MUELE information which was sufficient, there was need to supplement on it for one to excel. In this regard, STD 2 pointed out that:

> *"What the lecturers post on MUELE is enough. However, for one to excel, there is need to supplement it from other sources.*

Comprehensiveness of Information Generated by MUELE*:* One of the students (STD 1) reported that the information which they received from MUELE was comprehensive. However, the lecturer was of the view that the information could never be comprehensive since it regularly needed to be added and adjusted. The lecturer reported that:

> *"MUELE information can never be comprehensive. Ideas keep coming up which may require to adjust the information for the sake of improving."*

According to STD 3, the information which MUELE generated was not comprehensive and according to him, it only contributed 30% or less to the required content.

Overall, the positive, negative and partial views and experiences from participants on thisdimension (*Quality of information generated by MUELE)* indicated that participants had divergent perception as per the*effectiveness of MUELE* on this dimension.

Quality of Performance of MUELE: The fifth dimension of effectiveness of MUELE which we used was *quality of performance of MUELE.* We operationalized this dimension in terms of five sub-themes, namely, availability of MUELE, user friendliness of MUELE, interactivity of MUELE interface, attractiveness of MUELE features and speed of access of MUELE (Kurt, 2019). Hence we give our findings basing on these sub-themes.

***Availability of MUELE*:** As per this sub-theme, ADM 2 revealed that MUELE was good in terms of performance and was available whenever needed by students. In this regard, ADM 2 reported that:

> *"MUELE is now doing well. There new servers that support the system so as to make it available all the time."*

Other administrators reported that there were few compliant about the availability of MUELE although there were some few availability issues that could be handled by the technical team. For example, ADM 3 reported that:

> *"There are less complaints from students. However, the system goes off sometimes. It even once went off when an examination was going on. However, the technical team is always available to restore the system in the shortest time possible."*

User Friendliness: Regarding this theme**,** administrators reported that the interface was okay for students although they needed some orientation in order to overcome some few challenges. For example, ADM 2 reported that:

> *"MUELE is user friendly to students because of the orientation they get. However, there could be some few challenges."*

While ADM 1 admitted that MUELE was user friendly, he made an observation that the interface had multiple functions that required students to have adequate information in order to have a good interaction.

Attractiveness of the Features of MUELE: According to some of the administrators, students usually had challenges the first they used MUELE but later they would get used it. For example, ADM 3 reported that:

> *"For the first time to use MUELE, students do not have that attractiveness with the interface. However, as they continue, they get used to the interface."*

Speed of Access to MUELE: According to the administrators, the speed of access was good. One of them (ADM 1) reported that the speed was good and they (administrators) were having more servers installed so that the system is able to accommodate multiple requests at the same time. Two of the administrators however noted that sometimes the speed may depend on the gadgets which students use and their location. For example, ADM 3made a note that:

> *There are dedicated servers to ensure that the speed of access to MUELE is good enough. The speed may however depend on the gadgets which students use and to some extent the location.*

Overall, the views from administrators on this dimension were almost positive on all the subthemes. For example, most of the administrators agreed that the speed of access to MUELE was good but sometimes it was dependent on the gadgets which students used. These findings

suggested that participants perceived MUELE effectiveness MUELE on this dimension. We noted however, that all responses to this dimension were from only administrators who were not the users of MUELE. This had a possibility of giving biased results.

Quality of Technical Support Received by a User of MUELE: The sixth dimension was quality of technical support received by a user of MUELE. We operationalized this in terms of: assurance of availability of MUELE, assurance of usability of MUELE, promptness of response to requests, knowledge possessed by the technical team and empathy with which the technical team attends to requests from the users of MUELE (Yakubu & Dasuki, 2018).

Assurance of Availability of MUELE: On this sub-themes, administrators reported that there were various mechanisms and contacts which students could use for assistance in case the system went off when they are using it. For example, ADM 1 reported that:

> *"We have help desks which respond to queries from students. We also provide online videos which guide students in they face challenges…."*

In the same line ADM 2 reported that:

> *"There is a function of help which prompts the user to contact the e-learning support team/desk. In case of online jam, the technical team usually intervenes physically."*

Promptness of Response to Requests: According to ADM 2, the technical team was always quick responses to requests from students in case they had challenges when using MUELE. Other administrators revealed that although there were efforts to promptly respond to requests, there were challenges which the technical team faces. To this effect, ADM 3 mentioned that:

> *"The technical team tries. But the students are many that their requests may not be responded to immediately. The staff is not big enough to manage the requests. Sometimes the students are not even patient."*

Knowledge to Support Requests From Students*:* Administrators revealed that there were online solutions that would give the technical support and at the same time the technical team was well knowledgeable to the handle requests from students. For example, ADM 1 gave a response that:

> *"We have provided an online knowledge base on You Tube and Twitter which can give the required technical."*

In the same line, ADM 3 gave a response that:

> *"The technical staff is very knowledgeable and technical. They have tested the system and they know the solution to most of the challenges within the system."*

Empathy With the User: Administrators revealed that efforts were made by the technical team to respond to students with care. Administrators also revealed that the technical team was professional and handled students with care. To this effect, ADM 3 gave a response that:

> *"Honestly speaking, our staff is empathetic. They always ensure that the system is okay whenever we need to use it."*

ADM 1 also gave a response that:

> *"We try to respond to queries from students though we are not 100% perfect. We do face so many challenges."*

In summary, the views from the administrators we noted that participants perceived MUELE as effectiveness on this dimension (*quality of technical support received by a user of MUELE*). However, we noted that responses to this dimension were from administrators only who were not the actual users of MUELE which could have caused the results to be biased.

Discussion

In this study we explored how different stakeholders in Makerere University perceived effectiveness of MUELE in terms of *net benefits of use of MUELE*, usage constructs (*use of MUELE* and *user satisfaction with* MUELE) and the quality constructs (*quality of information uploaded on MUELE, quality of performance of MUELE* and *quality of technical support received by a user of MUELE*). On the dimension *net benefits of use of MUELE,* we found out that overall, stakeholders had substantial variation as to the effectiveness of MUELE. Our findings were in line with results from previous studies (e.g. Almusharraf *et al*., 2020; Hamed and Aljanazrah, 2020) which showed no effectiveness of ICT in terms of net benefits. Our results however, were not in agreement with those from other studies (e.g. Gonzalez *et al*., 2021; Huilcap-Collantes *et al*., 2020;Owen and Licorish, 2020) which indicated *effectiveness of ICT* in terms of *net benefits*.Our overall results indicated that participants did perceive MUELE as effectiveness in terms of the two usage constructs (*use of MUELE* and *user satisfaction with MUELE*). In other words, according to these participants there was no *effectiveness of MUELE* in terms of *use of MUELE* and *user satisfaction with MUELE.* According to our literature review, our results did not agree with findings from previous studies. For example, related to the dimension of *use of MUELE,* Xiu and Thompson (2020) conducted a study to determine the extent to which students used their course materials in a flipped class. These reported that on average, students had frequently or regularly used the course materials in a flipped class which gave an indication of effectiveness *ofICT*.

Related to the dimension of *user satisfaction with MUELE,* Al Qunayeer (2020) explored how learners of English as a foreign language (EFL) viewed the role of Facebook-facilitated activities in promoting their online participation. Hence she reported that learners had a perception that online participation had made them feel active or autonomous learners hence promoting their commitment to group work. Alajaji *et al*. (2021) investigated the perception of students of the specific e-tool, namely, Quizizz which is used in gamification. Their results indicated that students highly appreciated the use of Quizizz in their learning. These findings indicated *effectiveness of ICT* on *user satisfaction.*Our findings also indicated that stakeholders did not perceive MUELE as*effectiveness* on one of the quality dimensions (*quality of information generated by MUELE*) while they (stakeholders) perceived MUELE as *effectiveness*on the other two quality dimensions (*quality of performance of MUELE and quality of technical support received by a user of MUELE).*

Conclusion and Recommendations

From the findings we concluded that participants had varied perception as the perception of *effectiveness of MUELE* on four of its dimensions, namely, *net benefits of use of MUELE, use of MUELE, user satisfaction with MUELE* and *quality of information generated by MUELE.* However, they (participants) did perceive MUELE as effective on the other two dimensions, namely, *quality of performance of MUELE* and *quality of technical support received by the user of MUELE.* We hence recommended that concerned authorities give adequate attention to dimensions (*net benefits of use of MUELE, use of MUELE, user satisfaction with MUELE* and *quality of information generated by MUELE*) on which the participants did not perceive MUELE as *effectiveness.*

Limitations of the Study and Suggestions for Further Research

This study had limitations against which we proposed further research to be conducted. For example, this study was on Makerere University

alone. Hence future researchers may consider conducting a similar study including more than one university in the context of Uganda. Our study was limited to only four colleges of Makerere University for which the results could not necessarily apply to all the colleges. Future studies may therefore be conducted to include all the colleges within Makerere University. In terms of sample, the study focused on a narrow sample of only seven participants which could have affected the finding. Hence future researchers may consider having a number which is larger than that used in this study. We further suggest studies which use quantitative or mixed methodstudies to be conducted since in this study we used a qualitative method.

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