Assessing the readiness of students to use mobile applications in collaborative learning: A case of Copperbelt University.

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Abstract - **To improve student performance and retention rates, higher institutions of learning are constantly researching on the approaches, tools and techniques to use. In recent times, concepts such as mobile learning, electronic learning, collaborative learning, flipped classroom and deep learning have emerged. These describe the different approaches that institutions are using to improve student performance and retention rates. However, the successful implementation of an approach largely depends on the willingness of the users (learners and educators) to use. Even the best approaches or techniques cannot yield fruitful results if the users are not willing to use them. This paper assesses the willing of students at Copperbelt University to use mobile application-aided collaborative learning in their studies. In this paper, we have identified that students are very confident in collaborative activities. Higher learning institution should incorporate learning activities requiring collaboration among students. This will help the students learn how to work with their peers and to encourage them to take charge of the learning process.**

Key Words: Collaborative Learning, Collaboration, Cooperative Learning, mobile learning (m-learning), Computer –aided learning, electronic learning (e-learning)

I.   INTRODUCTION

Educators have researched on various tools and approaches that can be used to improve student performance and retention rates in tertiary education. These approaches and technologies have different emphasis, some of them emphasise on active learning, improvement of collaboration among learners and educators, mobile learning and adaptive learning, among many others [1, 2].

The New Media Consortium publishes the approaches and technologies that are likely to affect education in tertiary institution over a period of five years. In their 2017 report, they suggest that computer-aided collaborative learning is one of the education technologies that will be adopted in tertiary education in the next one to two years [1]. Collaborative learning or cooperative learning refers to a learning approach in which learners work in groups in a coordinated fashion to achieve a learning goal or complete a learning task [1, 3]. Collaborative

learning aims to encourage student engagement and critical thinking in learning [4].

Computer-aided collaborative learning occurs when technology is introduced in collaborative learning environments [5, 6]. Odiakaosa, et al, [7] and Ledlow [8] identifies that the successful implementation of technology in education requires the involvement of learners and educators. Failure to involve these key stakeholders results in underutilisation of the technology or failure to achieve the intended goals for introducing the technology [9].

The authors of this article believe that it is important to assess the readiness of students to use mobile applications in collaborative learning to ensure that institutions can successfully incorporate this learning model in their institutions. The rest of the paper is structured as follows: Section II reviews literature on similar work, section III describes the methodology used in the research, Section IV gives the findings and analysis of the findings and section V gives the key implications of the research findings and section VI concludes the paper.

II.   LITERATURE REVIEW

As already defined, collaborative learning is a group-based learning approach in which learners work together to accomplish a specific goal [1]. Becker et al. [1] identifies placing the students at the centre of learning process, interaction and working in groups to develop solutions as the key principles on which collaborative learning is based. Chen and Denoyelles [10], identifies that collaborative learning activities typically occur outside the classroom where there is very little guidance from the educator or instructor. This means that, instead of looking at students only as recipients of knowledge, they are considered as the originator of the knowledge. We will now consider several issues relating to mobile application-aided collaborative learning.

A.   Mobile applications in education

Researches done on the use of mobile applications in education have identified that mobile applications provide opportunities for

educators to promote learning [10, 4]. The key characteristics that have made mobile applications very popular in education and other fields include ubiquity, privacy, interactivity, portability, immediacy and collaboration [11]. Ubiquity means the application can be accessed from anywhere. For this reason, mobile applications have been identified as key in collaboration [11]. The typical uses of mobile applications in education include collaboration, engagement and interactivity. Students are able to share lecture materials, discuss class activities and comment on class programs [12, 13]. Al-Hunaiyyan, et al. [14], identifies that mobile application and mobile learning offers us an opportunity to change the current learning strategies to those that are more flexible. Because the benefits offered by mobile application aided learning, many academic institutions are now incorporating mobile learning in their learning strategies.

Despite the many benefits that mobile application aided learning promises to offer, other researchers have cautioned against rushing to introduce mobile applications in education. Sung, et al. [15], argues that, for education software (mobile applications included) to be used most effectively, the educators should design the learning experience that matches the software with the learning objectives of the educational experience. In Sung. Et al's view, only those applications that are aligned with the leaning objectives of the educational experience will succeed. Al-Hunaiyyan, et al. [14] argues that there are five categories of mobile learning challenges. These are social and cultural challenges, management challenges, technology challenges, design challenges and evaluation challenges. Social and cultural challenges refer to how students in a particular social and cultural setup views the use of mobile learning. Management challenges refer challenges to deal with how mobile learning will be administered. Design challenges refer to how the education content for mobile learning should be designed. Mobile devices have limited resources, therefore one should pay attention to how the academic materials for mobile learning are designed to avoid depleting the resources of the device. Evaluation challenges are those challenges that arise when determining whether mobile learning was successfully carried out or not. Technology challenges refer to the challenges in the technologies to be used in mobile learning.

B. Benefits of collaborative learning

A number of researches have been carried out to investigate the benefits of using collaborative learning in higher education. University of Arizona [16] argues that students' performance improves when active learning strategies as collaborative learning are used. University of Tennessee [17] argues that collaborative learning motivates the students to learn the material. This argument is substantiated by the fact that in collaborative learning students play the roles of being the educators to their peers [3].

Research also identifies offering of formative feedback, developing of social and group skills, better self-esteem, increased leadership and developing of analytical skills as other benefits of collaborative learning [1, 3, 17]. Collaborative learning also promotes positive interaction between members

from different cultural and social backgrounds [17]. Konak and Bartolacci [18], concludes that, students that participate in collaborative learning tend to perform better than students who work in isolation.

C. Issues affecting collaborative learning

To successfully implement computer-aided collaborative learning, there are some key issues that need to be resolved. Some of these issues include communication challenges and individual accountability [9, 19]. This is especially true in developing countries where there are still challenges with internet connectivity. To successfully conduct collaborative learning using computing devices, the participants should be able to have in-depth discussion and participate as openly as possible [20]. This would be hampered if the communication channels are limited, ineffective or very expensive to acquire.

The issue of individual accountability is very important to build trust in online collaborative learning [19]. Accountability entails that each participant in the collaboration must play their role in the group work. However, if, some participants are not faithful in their roles, the other participants tend to pull out of the collaboration.

Other researchers have pointed out that mobile application aided collaborative learning have several negative effects. For example, Heflin et al. [4], argues the use mobile application does not always encourage critical thinking. In some cases, the tools used may distract the student and their colleagues. This is true since mobile devices users are able to multitask. The user will therefore be switching between different applications.

D. Why mobile application-aided collaborative learning

With the proliferation of mobile devices among learners in higher institutions of learning, educators are researching on how they can be used to support collaborative learning activities. Cheong [3] argues that, "there is little room for collaborative learning in the short time frame of a lecture." This makes it imperative that mobile devices-based collaborative learning a necessity in education. Ku et al [21] also argues that students favour collaboration in online or electronic learning environments.

There is a number of existing application software that can be used for aiding collaborative learning. These applications include wikis, google docs, social media and messaging apps [1]. These applications have been used in learning with varying degrees of success [22, 23, 24]. Deal [25] argues that educators can benefit from a more detailed and disaggregated study of available collaboration tools, and how to effectively use them. Morrison [26] outlines five steps that should be considered when introducing online collaboration tools. The first step is to determine whether a particular tool will motivate learners. The second step is to review the learning objective of the activity to be supported by the tool. The third step is to identify the contents that students need to learn. The fourth step is assess whether the tool will encourage learners to apply the content and learning the

material, construct knowledge and promote critical thinking. The final step is to select and implement the best application.

III. METHODOLOGY

This research aims at investigating the learners' willingness to use mobile applications (commonly referred to as apps) in collaborative learning. This section covers the research design, population sample, data collection instrument and method of data analysis.

A. Design of the study

A research design is a plan used by a scholar to obtain research participants and to collect information. The research design of this study is exploratory in nature. An exploratory research is carried out when earlier studies to refer to are limited [7]. This design is useful for this study because it explores students' readiness to incorporate mobile apps in collaborative learning at Copperbelt University.

B. Participants

Copperbelt University has over 10,000 students. Carrying out a study of the whole population was not realistic; a sample of the population was therefore taken. 709 students drawn from seven (7) schools and one (1) directorate were studied. These students' years of study ranged from first year to final year (that is, fourth or fifth year) of their undergraduate studies. Table 1 give a summary of the participants.

Table 1 Cross tabulation of the respondents year of study and their gender

		Gender of the respondent		Total
		Female	Male	
Respondent's year of Study	First Year	112	167	279
	Second Year	59	197	256
	Third Year	24	73	97
	4th or 5th Year	29	48	77
	TOTAL	224	485	709

C. Data collection instrument and analysis

A survey questionnaire was used in collecting the data for the research. There were different questions related to the research being conducted. Using the questionnaire, we were able to collect students' opinion of collaborative learning, their confidence in it and their willingness to use a collaborative learning mobile app, if it was developed.

The data that was obtained in the research was analysed using frequency analysis to get the general consensus of CBU students' views of mobile application-aided collaborative learning.

IV. RESULTS

900 questionnaires were distributed and 709 Students from seven (7) schools and from the Directorate of Distance Education and Open Learning responded. The results below show the responses from the respondents.

A. Amount of time spent online

Figure 1 shows the amount of time students spend online. About 44% of students spend up to one hour of their day online while 56% of the students spent one or more hours online.
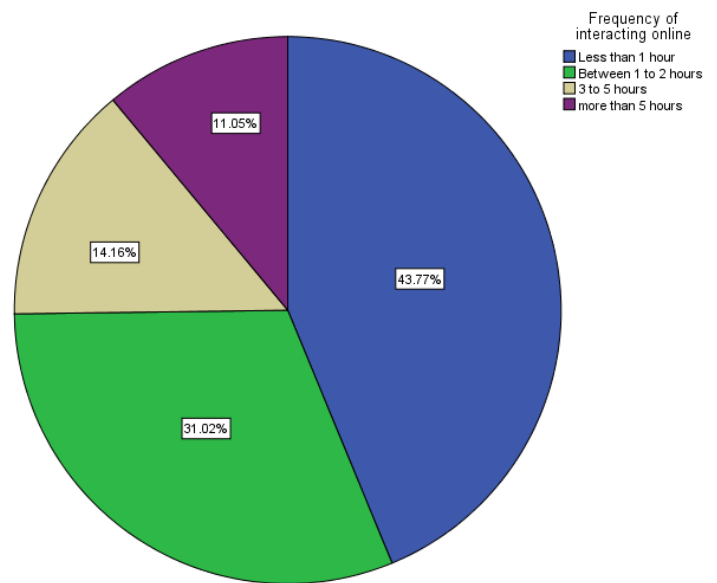

Figure 1 amount of time spent online

B. User confidence in collaborative learning

Table 2 and figure 2 show the confidence that students in different years of studies have in collaborative learning activities. As it can be seen from the table and figure, most undergraduate students have confidence in collaborative learning. In addition, we can also observe that the confidence in collaborative learning activities increases as students progress in their studies.

Table 2Confidence in collaborative learning activities

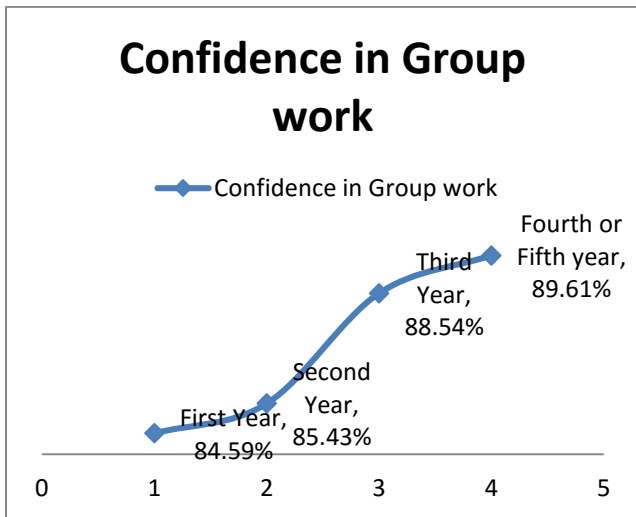|		Confidence in group academic activities		Total
		Yes	No	
Respondent's year of Study	First Year	236	43	279
	Second Year	217	37	254
	Third Year	85	11	96
	4th or 5th Year	69	8	77
Total		607	99	706

Figure 2 Confidence in collaborative learning activities

C. Ways of conducting collaborative learning activities

It is very clear that much of collaborative learning done face to face. That is, all the participants are in the same location (see figure 3). The reason why this is the most preferred way of collaboration is that the participants in the collaboration respond immediately a concern is raised.

Figure 3 Ways in which collaborative learning is currently being done

D. Uses of mobile applications in education

Figure 4 shows the academic activities that are currently being done using mobile application. The figure shows that most students (about 60%) are using mobile applications to conduct group discussions, share study materials and share announcements. Other students are using mobile applications to share class announcements, study materials or engage in class discussions.
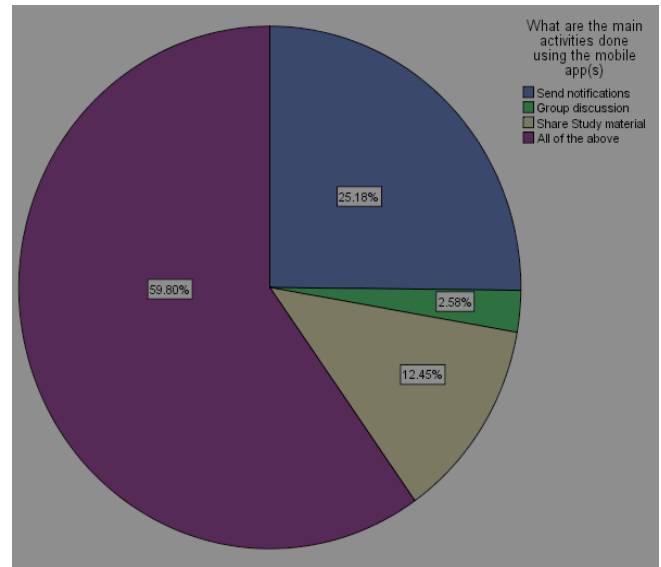

Figure 4 Activities done using mobile applications

E. Effectiveness of existing mobile application used in classes

Figure 5 shows effectiveness of existing mobile apps being used in classes. Most respondents either feel the current applications

are very effective (31.9%) or slightly effective (50.3%). The main weakness that was pointed out by students was that most applications (especially social interaction applications) were not designed to be used for educational purposes. Applications designed for educational purposes should allow students to share study material, allow them to research and engage in academic discussions. The students pointed out that they are unable to share study materials on most of the applications.
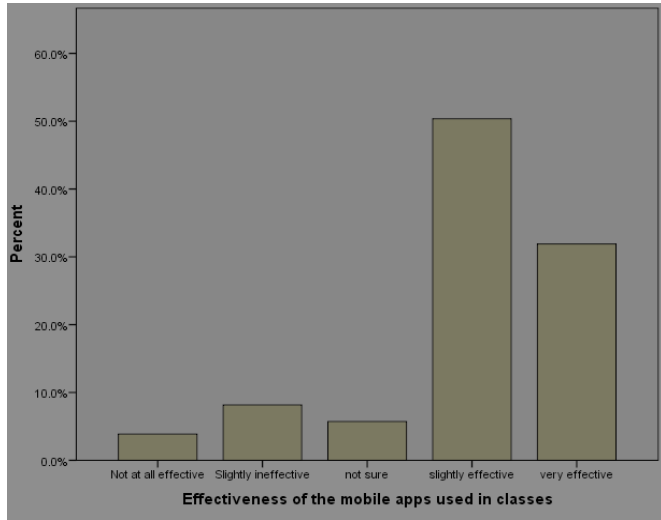

Figure 5 Effectiveness of mobile applications used in classes

F. Willingness to use collaborative learning app if developed

Figure 6 shows that almost all the students would be willing to use a collaborative learning mobile app if it was to be developed. It can be observed that almost all the responded are willing to use a new collaboration app if developed. This is true even for those students who feel the apps currently being used are very effective as can be observed from table 3.
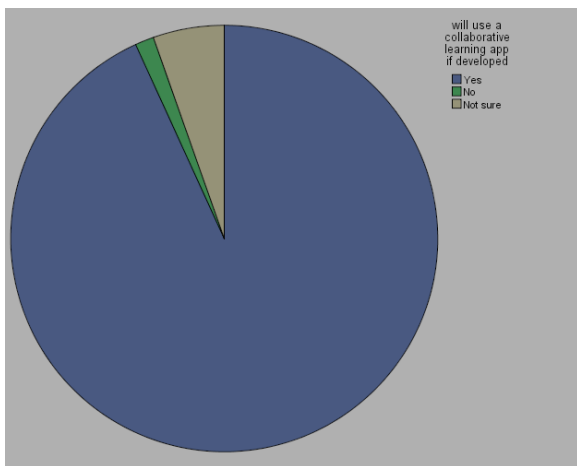

Figure 6 willingness to use new collaboration apps if developed

Table 3 cross tabulation of the Effectiveness of apps currently being used in schools and willingness to use new app if developed

| | | should a collaborative learning app be developed | | | Total |
		Yes	No	Not sure	
Effectiveness of the mobile apps used in classes	Not at all effective	22	1	4	27
	Slightly ineffective	51	2	4	57
	not sure	36	0	3	39
	slightly effective	324	6	21	351
	very effective	217	1	4	222
Total		650	10	36	696

G. Desired features in collaborative learning applications

The respondents identified the following features that should be included in applications developed to assist in collaborative learning.

1. The application should allow the students to share study material.
2. The application should ensure that the discussions conducted and materials shared are strictly academic.
3. Allow students to view the study material offline.
4. The application should allow the students to chat with a tutor if they fail to grasp a concept.
5. The application should allow students to have voice conversations.
6. The cost of communication using the application should be affordable.

V. STUDY IMPLICATIONS

The results indicate that most undergraduate students (around 87%) prefer to collaborate in their academic activities as opposed to working in isolation. Institutions should consider structure their education programs in a way that encourages student collaboration.

To successfully implement mobile applications assisted collaborative learning, institution should ensure that they have adequate technological infrastructure to efficiently support mobile learning.

Most social networking application have enable students to interact. However, they lack features to effectively function as mobile learning applications. To effectively function as a mobile learning tool, an application should ensure that students are not distracted with non-academic matters at the time they are studying. In addition, the application should allow students to study note and take assessments. The application should also

analyse the student performance and offer remedial suggestions [27, 28, 29].

There is need to design collaborative learning applications that overcome the challenges of social networking applications identified in the previous point.

Although collaborative learning is done in informal settings with no supervision from the educators, students would like the intervention of the educators in case they fail to grasp a concept.

VI.   CONCLUSION

As it has been observed from the data collected in this research, there is growing interest in collaborative learning activities among students. Educators need to consider increasing the use of collaborative learning in higher education as it encourages students to improve their understanding of the material and to develop social skills that would help them excel in their education and their chosen careers. Developers of mobile learning applications should ensure that the tools they design contain all the features required for effective collaboration in learning.

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