

Leveraging Google Classroom to Promote E-Learning Initiative: Students' Experience

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The rapid growth of modern technology in the global space has changed almost all aspect of our lives and the way we work. In education sector, the use of internet and other web-based technology have given educators and students opportunity to explore various learning environment to deliver remote education. Most of these technologies are often right on the fingertips and have the ability to assist students' career as well as the teacher vocation by keeping them updated everywhere and anytime using various mobile devices such as smart phone, Tablet, PDAs and Laptop. The most interesting aspect of these technologies in educational systems is their ability to enable e-learning environment over traditional face-to-face to allow educators deliver content and sharing of teaching and learning resources. In this paper, we optimize various e-learning techniques using google classroom to leverage e-learning. Furthermore, the paper assesses students' perceptions in the use of google classroom, its effectiveness in delivery of teaching and learning resources and several other relevant issues. We report on the overall view of Google Classroom in the Department of Information Technology Systems in one of rural Universities in South Africa by linking Roger's theory of diffusion of innovation. The findings of this study show an overwhelming response from students in the use of google classroom compared to other technology that are used for teaching and learning in their context as well as the need to incorporate this technology in the classroom.

Key words: *Technology, E- Learning, Google Classroom, Teaching and Learning*



Introduction

The fast evolution of modern technology in the global space has change almost all aspect of lives and the way we work. In education sector, the use of internet and other web-based technology have given educators and students opportunity to explore various learning environment to deliver remote education. The benefits of traditional way of teaching in the classroom cannot match the intensity of various opportunities offered in the use of modern technology-enable classrooms. For the past decade most universities in the world and South Africa in particular, migrated to the use of different technologies for teaching and learning as a solution to respond to the demand of the 21st century education.

According to (Dasym, 2019), modern technology has transformed education in terms of efficiency, affordability, accessibility, and effectiveness. E-learning is known as the use of various modern technology such as web-based, mobile based and computer-based technology to deliver education via internet. Over a decade, e-learning has given a novel shape to the traditional classroom by bringing in techniques wherein educators and learners can collaborate virtually or remotely from anywhere and at any time to deliver learning contents in a creative way using various computer-based devices and technology. The rapid growth of innovation in Information and Communication technology (ICT) and the rising of computer knowledge has laid to the development of several e-learning tools and one of the prominent among them is the Google Classroom (Herrick, 2009).

Google classroom is one of the applications (Apps) of google suite with web-based features that enable schools, universities, and educators to deliver education remotely. Google classrooms work together with other google suite services of communication and productivity tools such as Gmail (e-mail), Drive, forms, slides, sites, Calendar, Docs and additional products like chrome, YouTube and many other. Since all Google Apps are web-based; any computing platform that is compatible with modern web browser will inherently function across without any additional software or device required. Looking at all the above features that Google Classroom offers, it is easy for an educator to create a classroom that will contain different subjects and learners can also be added to those subjects that they are enrolled to (Bhat, Raju, Bikramjit, & D'Souza, 2018). Google classroom with other google suite services of communication and productivity tools provide a massive diversity of knowledge and information for learners and educators to use for teaching and learning purposes. In addition to this, since most educational institutions and universities are using e-learning, Google Classroom fits perfectly into the classification of flipped classrooms which becomes more and more widespread in this modern world (Ferreira, 20`4). This paper mainly focuses on leveraging Google Classroom to promote e-learning initiative opposed to the traditional face-to-face approaches of teaching and learning.



Literature Review

This section reviews different literatures in the use of e-learning by defining it as well as a detailed discussion of its effectiveness for teaching and learning to enhance education. Furthermore, it describes Google Classroom, benefits, and various opportunities that it offers in facilitation e-learning process.

E-Learning

E-learning has been defined as the use of computer-based technology to deliver education via the internet. According to (S.S & Tiwari, 2016), e-learning is referred to as the use of electronic applications and process to deliver education using web-based and computer-based learning technology. As the revolution in the field of e-learning evolves, some authors describe it as the usage of network technology to deliver training, education, and information via technologies such as internet, Television, CD-ROM, tape recorder satellite and other related technology (ALGAHTANI, 2011; Mkabile Mbodila & Ndebele, 2019; Welsh, 2003). To create student experience and make learning more effective, e-learning apply various methods that result in higher knowledge retention (Mbodila, Mkabile & Ndebele, 2019).

Researchers such as (Mbodila, Mkabile & Ndebele, 2019; SELIM, 2007) argued that e-learning is not just a concept of using technology for teaching and learning, but it also encompasses a range of teaching pedagogy, learning methods and some processes that emphasis on student- centeredness. According to (Zhang, 2004), e-learning has the possibilities of replacing classroom learning by assimilating suitable pedagogical approaches to augment system interaction and personalization for learners' engagement. In (Govindasamy, 2001), pedagogical approaches were considered as key factors for the failure or the successful implementation of e-learning. From the literature above, it is significant for the teacher to have diverse pedagogical knowledge approaches to build effective course content when using e-learning. In line with this, (Tavangarian, 2004) point out the importance of teachers in early e-learning design model to ensure flexibility as well as focus on learner's center.

Google Classroom

Google classroom (Google Suite App) offers several opportunities that can embed e-learning techniques and can be used as a teaching and learning tool to simplify creativity, collaboration, sharing of resources as well as grading of assessments. A study by (Bhat et al., 2018), used Google Classroom as an e-learning facility for students to submit assignments as compared to face-to-face. The results of this study showed positive success when tasks were carried out in this platform. Another similar study by (Brown, Elizabeth, & Hocutt, 2015) assessed Google Classroom Apps to examine the students' community perceptions for its usage for education. The study reveals that students found Google Apps relatively easy to use widely appreciating

its collaborative affordance. Research by (Blau, Ina, & AvnerCaspi, 2009) describes Google Apps usage as a collaboration tool in education by affirming the successful story of Colorado State University in (Bhat et al., 2018). Based on these points of views, it is evident that by applying good pedagogical approaches and e-learning techniques, Google Classroom can be adopted as an effective teaching and learning tool to leverage e-learning in education.

Features and Benefits of Google Classroom

Google classroom is considered in the literature as one of the best e-learning platforms for augmenting educators' workflow, saving time, keeping classes organized and improving communication with learners (Blau et al., 2009; Brown et al., 2015; Iftakhar, 2016). The App (Google classroom) provides educators with several great features that make it an ideal tool to use for teaching and learning in education. Google Classroom and other suit of productivity are available free of charge for any user that has a Gmail account. Figure 1 shows different types of Google Apps Edition.

	G Suite Business / Standard Edition	G Suite Basic / Premier Edition	Free (LEGACY)	Free Education Edition
Cost	Free	Account / Year		Free
Storage and collaboration: Drives, Docs and more	X Same storage space as regular gmail.com accounts (over 7G)	25 G space for e-mail	X Same storage space as regular gmail.com accounts (over 7G)	X Same storage space as regular gmail.com accounts (over 7G)
Support	No	X 24/7 phone support	X 24/7 phone support	X 24/7 phone support
Users	Limit to 50	X	No limit	No limit
Other Google services: Blogger, YouTube and More	X	X	X	X
Access Option: Web-base, smart phone, Tablets, voice and Video	X	X	X	X

Figure 1: Different types of Google Apps Edition

All Google Classroom features are integrated and allow easy creation and simplicity of usage for the teacher. When creating a new course, the teacher can be able to see the course label, stream (labelled as 1) which is used to share information or display communiqué, classwork (labelled as 2) is used to create task (quiz, assignment, text etc.), people (labelled as 3) display the details of the students (name and email) and grade (labelled as 4) is used for grading. There are two other icons on the right corner, settings (Labelled as 5) that can be used when setting tests or Assignments and (label as 6) that allows the user to access more Google suite Apps. See Figure 2 below is an example of a class in Google Classroom.

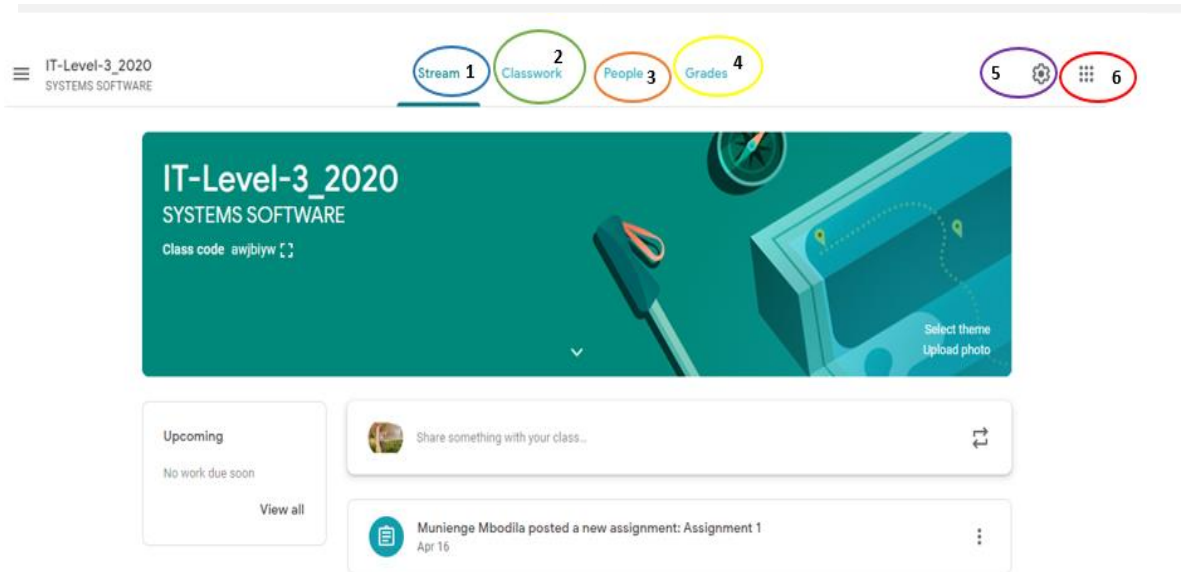


Figure 2: Example of a Class in Google classroom

With the use of Google Classroom, a teacher can keep all files saved in the Google Drive, upload teaching material and other resources, attach YouTube link for any instructional purposes, send emails directly as well as giving feedback to students. On their side, Students can share documents and collaborate with each other. Several authors pointed out the benefits of Google Classroom ranging from easy to use, saving time, flexibility, cloud-based technology, mobile friendly as well as free (Chehayeb, 2015; Iftakhar, 2016; Janzen, 2014). Authors in (Railean & Elena, 2012) and (Keeler, 2014) mentioned additional benefits in the use of Google Classroom such as streaming line, posting of announcement and enabling collaborative learning between students.

Diffusion Of Innovation Theory and Decision Process

The Rogers' diffusion of innovation theory has been seen by some researchers as the most suitable theory to investigate technology adoption in educational environment particularly in higher education (HE) (Parisot, 1995; Rogers, 2003). According to (Rogers, 2003), "a technology is a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome". In his publication innovation is described as an idea, practice, or object that is perceived to be new by the individual and diffusion as the process through which an innovation is transferred using specific communication channels over a time between a group of people of a social system. (Rogers, 2003). This theory deals with the how, why as well as the degree in which a technology spreads and offers a theoretical framework for analyzing technology adoption patterns (Iftakhar, 2016; Medlin, 2001). In the view of the above, it is evident that theory of diffusion is made up of four components: innovation, communication channels, time frame, and social system (Iftakhar, 2016). On the other hand, innovation-decision process is described as an approach to find out where an individual is motivated from the first knowledge of an innovation to reduce

uncertainty attitude toward acceptance or rejection of an innovation. In (Rogers, 2003), knowledge, persuasion, decision, implementation, and confirmation are presented as the five steps of decision process, See Figure 3.

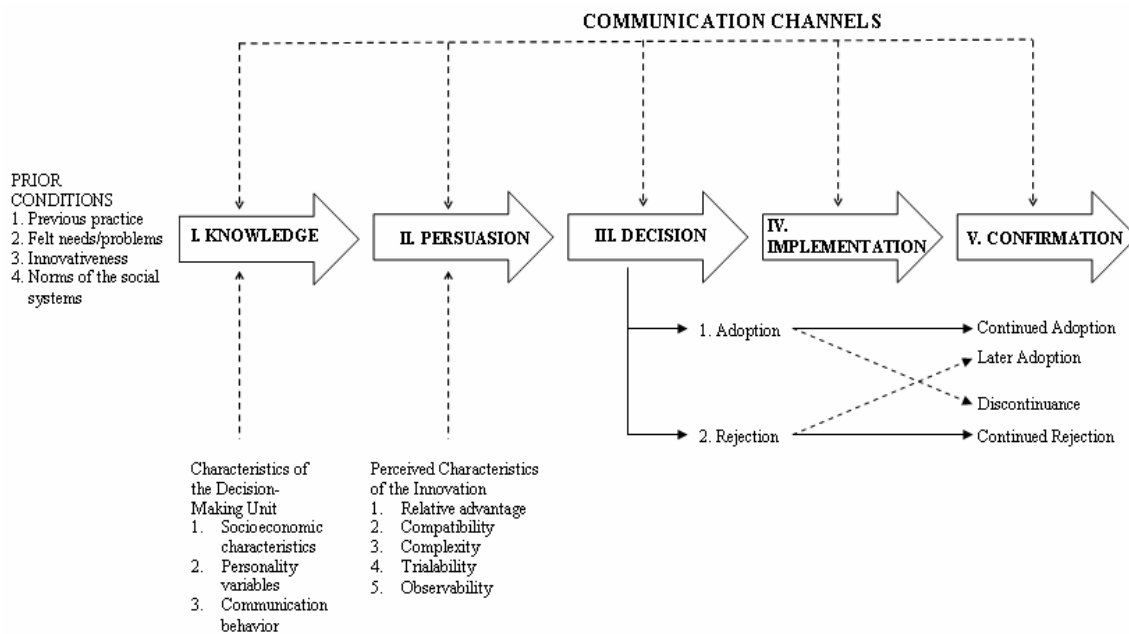


Figure 3: Innovation Decision Process

In (Rogers, 2003), the author argued that the adaptation of an innovation in a social system is not done at the same time but gradually depending on their attitudes, some early and some later. The degree of individuals' adoption in new idea or innovation is quite earlier compared to other members of a social system. The distribution of numerous adoptions according to the innovativeness criterion vary in percentage, for innovator (2.5%), early adopter (13.5%), early majority (34%), late majority (34%), and Laggards (16%) (Iftakhar, 2016; Rogers, 2003). The factors that influence an individual's decision to adopt or reject an innovation or an idea according to a publication by (Rogers, 1995) are:

- *Relative advantage*: defines how improved an innovation is over the prior generation.
- *Compatibility*: is the degree by which the innovation has to be integrated into an individual's life
- *Complexity*: defines the level of difficulty that had to be for an individual to adopt the innovation, if difficult it is likely to be rejected
- *Trialability*: it has to do with how easy an innovation may be experimented with during the adoption.
- *Observability*: is the visible part of the innovation. The innovation that is visible and accepted will be share around by different users and can be positive or negative.

MODEL DESIGN

According to the literature, a key component of the design and implementation of the e-learning platform is student's retention and engagement in the teaching and learning materials [8]. For successful and effective e-learning implementation, there is a need to plan a design that fits into every aspect of the curriculum and puts the students in center of every activity. In the literature, a student-centered approach has been shown as one of the techniques that is effective for use to retain students engaged thus, ensuring effective e-learning experience (Govindasamy, 2001). Therefore, the model used for Google classroom in this study is embedded in e-learning component that guarantee student's centered approach. See Figure 4.

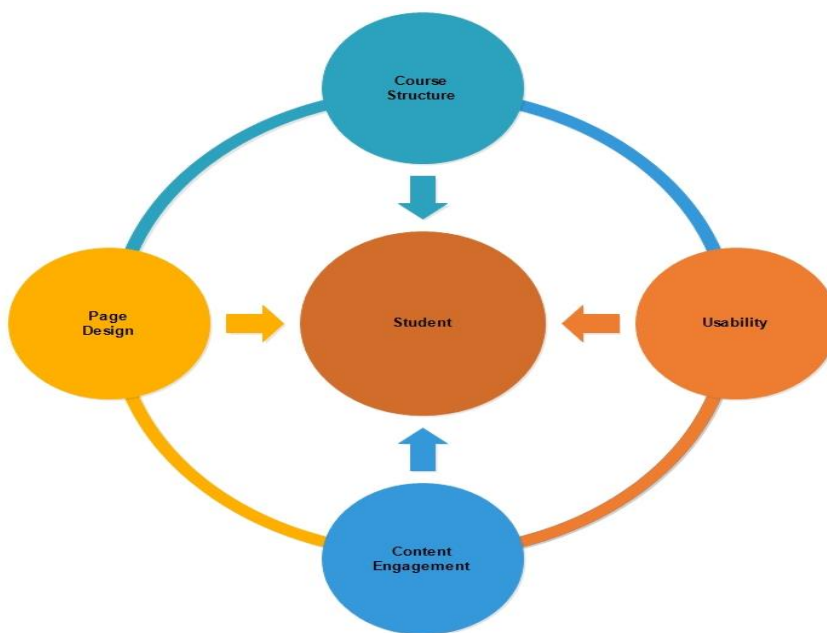


Figure 4: E-learning Component Model

From the diagram above, student is a critical factor in the design process of the online course from the concept to the implementation. Course Structure plays an important role in how students learn the content, and this refers to how a course is structured in e-learning platform. Page Design displays different features in the page, and this has an impact on students 'online learning experience. Content Engagement refers to how the student interacts with the online module content. Usability shows how user friendly is the online platform for the student. The five e-learning components are essential tools for a successful online module, and they are connected. Each component plays an importance role in the design of any online course.

Based on the above e-learning components, we designed an online Google Classroom model that makes use of various Google Suite Apps to assist students access the teaching and learning materials, to allow them submit assignments, write quiz, deliver teaching, share online content as well as interact with lecturers and their peers. We make use of Google classroom to create

classes for IT students from first, second- and third-year level. Google Drive is used to store and share common various materials (e-book, articles, and some extra learning materials), Google site was developed as a website whereby students can access more resources; and Google Doc as well as other productivity Google suite for students to submit assessments, write quizzes, presentations, and any other related activities. See Figure 5.

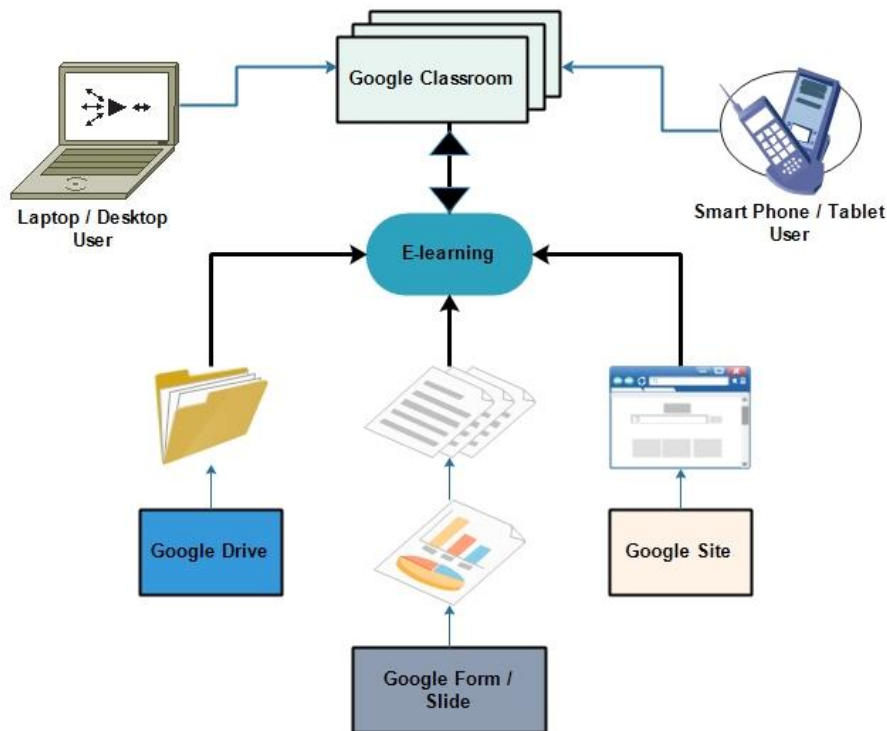


Figure 5: The Proposed Google Classroom Design

Basically, students have the Apps installed on their mobile devices or laptops to allow them access class materials in their respective modules according to their level. Whenever a task is created/uploaded by the instructor in Google Classroom, such as an announcement, quiz, assignment, or any other related task, students get notification on their emails or devices in sort of a text or SMS making them aware of the post. Each time, a student of a particular class posts something or ask a question related to the subject or when starting a new discussion, all students in that class can see the post and comment on it. This provides students with a kind of discussion forum similar in most LMS.

Methodology

E-learning offers various way to deliver teaching and learning compared to face-to-face approach. During the outbreak of COVID-19 pandemic and subsequence lockdown, there was a need for the Department of Information Technology Systems to continue with teaching and

learning activities while the University was working on the strategies to deliver teaching. This study is based on applying e-learning approach as opposed to the traditional classroom setup to deliver teaching and learning. An online platform using Google Classroom was created to allow students interact with teaching and learning materials, submit assignments, write quizzes, and share online content with their peers.

Population and Sampling

The participant of this study were 64 students comprised of first, second- and third-year level from the Department of Information Technology Systems and their lecturers. In total, the number of females were 32.8% and male 67.2% as shown in Figure 6.

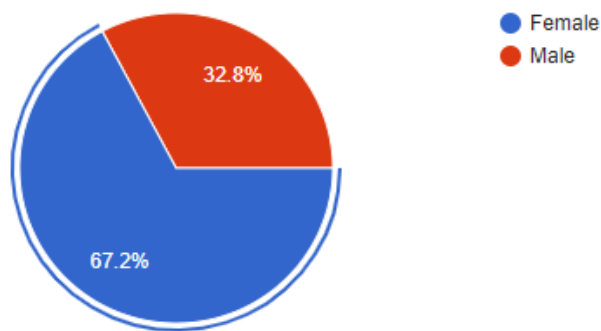


Figure 6: Participants Demography

According to the data, about 96.9% of the students come from disadvantaged backgrounds, whereby 75% of them come from rural areas, 21.9% come from townships, and only 3.1% come from city. This is because the Institution is in the rural area, and this attracts mostly students from the villages and townships around. See Figure 7.

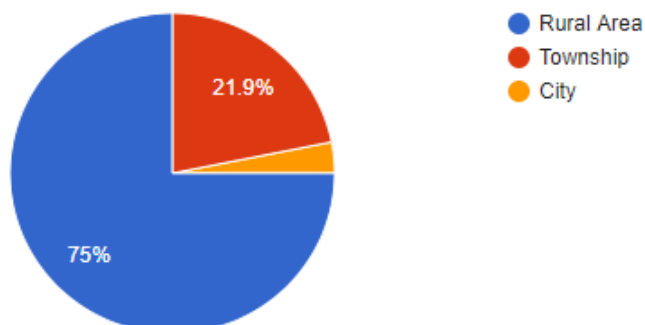


Figure 7: Participants Demography



Data Collection and Analysis

An initial online questionnaire was designed using google form and was sent to all students from the three classes from their WhatsApp group before initiating the study to find out if all students had a Gmail account and if they owned a smart phone or any other device to access their Gmail account. The total number of students' respondents was 64. In phase one, as a group of lecturers, we decided to find out if all students had a Gmail e-mail account and surprisingly, we find out that they all had it. Phase two, we decided to leverage Google Classroom as an online platform to promote e-learning and keep students learning and engaged with their school activities. In phase three, we uploaded learning materials and created topics for discussion in their respective classes to allow them to interact. Lastly, in phase five, we designed assignments and quizzes that students had to write online using google form on their devices and we gave them feedback. The drive of this study was to allow students to continue having classes during the COVID-19 outbreaks, interact with their learning materials and be assessed by their Lecturers. Many students were faced with challenges of accessing the institution's LMS due to some reasons such as logging credentials, not finalizing their registration, not making their student card on time, and the LMS being down or offline most of the time when the students want to access it. An online evaluation questionnaire using Google form was used to collect data from students to get information such as the type of devices they used to access the platform, if they had a Gmail account, the online platform they preferred to use, their perception in the use of Google Classroom, the level of technology usage in the department for teaching and their level of technology usage for learning. For Data analysis and representation, closed questions and option statements were presented into frequency table and charts.

Results

This section presents the results of the study based on the data collected from the participants. These results are analyzed and presented in several sections below.

Do you have a Gmail Account?

The results show that the average number of participants had a Gmail account and the Apps for google Suite installed on their phones. The data in the graph below shows that 98% of the participants had a Gmail account and 2% did not have it.

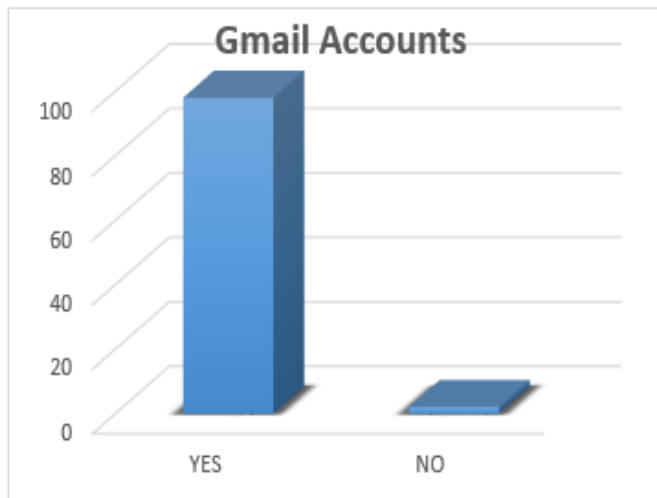


Figure 8: Participants Gmail Accounts

What type of Device are you Using to Access Online Material?

Here the participants were required to indicate which type of device they were using to access learning materials using Google Classroom. The results demonstrated that 100% of them had mobile devices and 93% of those devices were smart phone with capabilities of accessing Google Classroom. See Figure 9.

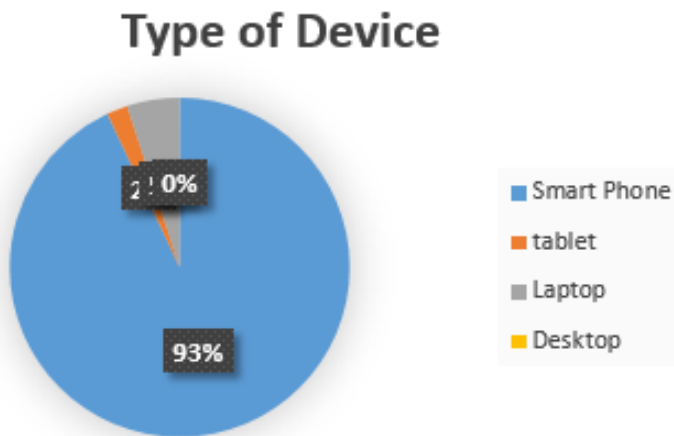


Figure 9: Participants Type of Device Ownership

What do you prefer between the Institution LMS and Google Classroom to access your study materials?

This question was asked to find out if students were aware of the institutional learning management system (WiSeUp) and their preference between WiSeUp and Google Classroom. About 73.4% of students said that they were not aware and 26.6% said that they were aware of Institutional LMS (WiSeUp). Amongst these numbers, 60.9% confirmed that they preferred to

use Google Classroom and 39.1% preferred to use WiSeUp. See Figure 10 and Figure 11 respectively.

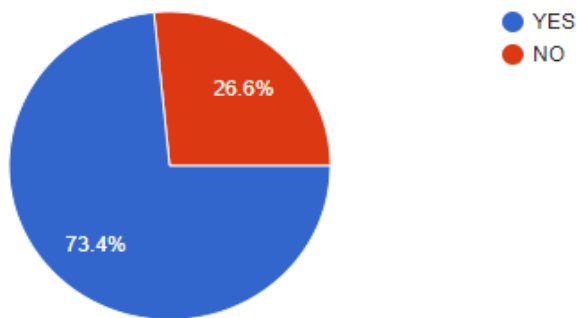


Figure 10: Participant's knowledge of WiSeUp

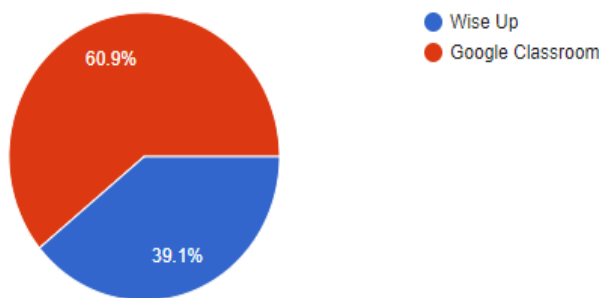


Figure 11: Participants Online Platform Preference

Rate your ability and the Department ability in the use of online platforms for teaching and learning

To determine students' satisfaction in the use of this online platform, and the level to which the Department is using technology for teaching and learning, there was a need to ask students to rate their own usage of online platform and the Department usage of these platforms for teaching learning. Hence, this section was used to find out students' ability to use online platforms and to rate Lecturers in the department. The level of rating was between 1 to 5, whereby 1 = *poor* and 5 = *excellent*. The findings showed an average of 78.2% of students were comfortable using the online platform for teaching and learning and 21.8% were not comfortable in the use of this platform. This may be due to various challenges that students have identified such as network connection due to their location as most of them are from the rural areas, data cost and the level of technology usage by the lecturers in the department. Students have indicated that the Department average usage of online platforms is about 76.6%, which is slightly close to the student's average. See Figure 12 and Figure 13 below.

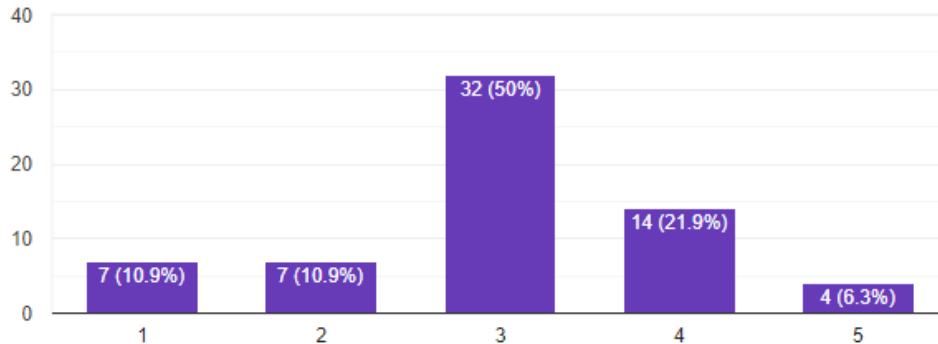


Figure 12: Participants Online Usage Rate

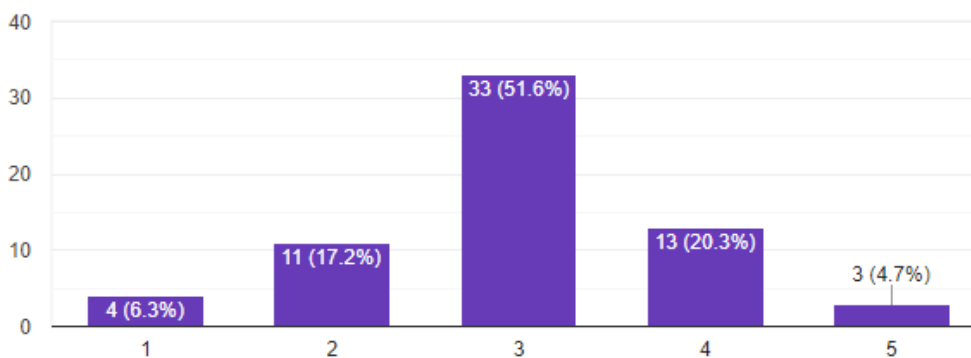


Figure 13: Department of ITS Online Usage Rate by Students

Students' Perceptions on the Use of Google Classroom

In this question, students were asked to indicate their perception on the use of Google Classroom to leverage e-learning for teaching and learning in the Department in general. The results showed that 78.1% find the use of Google Classroom helpful and 21.9% find it not helpful.

Similarly, 65% of students finds the submission of assignment using Google Classroom easy but 35% say that it was difficulty for them to submit. The same apply with quizzes, 60% agreed that it was easy but 40% of the students say that it was difficult. The main reason for this, is that students have difficulty to access internet because of their location and data for internet access. Most of them stay in rural areas or villages where there is less or no network coverage which made it difficult for them to have a smooth submission of the tasks. On the question of being notified about a post on Google Classroom, using their phone 93% said that it was easy and only 7% responded that it was not easy.

Many the respondents about 95% agreed that Google classroom should be used as one of the e-learning platforms in the Department and only 5% of the students disagreed on the use of the google classroom platform. Table 1 shows the distribution of the above results.

Table 1: Students ‘Perception on the Use of Google Classroom

	YES	NO
<i>Is the use of additional platforms such as Google Classroom helpful?</i>	78.1%	21.9%
<i>Were the submission of assignment in using Google form easy?</i>	65%	35%
<i>Were the quizzes on Google Classroom easy?</i>	60%	40%
<i>It was easy for me having notification on Google Classroom using my phone</i>	93%	7%
<i>It will be good for the Department to use Google Classroom as e-learning platform</i>	95%	5%

How much data do you use when using online platforms on daily basis?

With the data collected we asked participants to know how much data it costed them when using online platform on the daily basis. As shown below in Fig.13, 75% of the participants mentioned that it costed them more than 1 GB, 12.5 mentioned that it costed them 2 GB and another 12.5 said that it costed them more than 2 GB for them to connect and use the online platform. Students mentioned other challenges such as poor network connection when wanting to connect on the online platform. As we mentioned, earlier that most of these students live in the townships or in the rural areas where the network coverage can be very poor sometimes or most of the times. With poor network connection, it makes it difficult for students to use the online platform for learning.

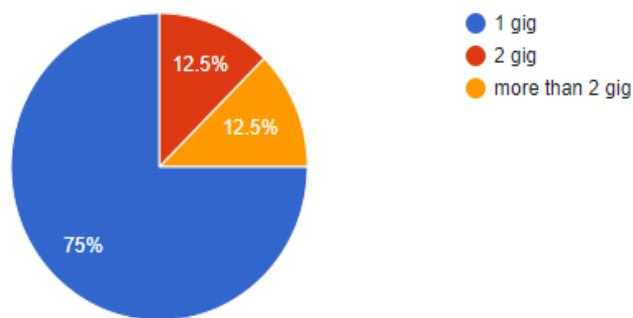


Figure 13: Data Usage by Students

Discussion

According to the results, Figure 6 showed the type of students that were involved in this study; most of them in the institution are from the rural areas around as this institution is in the rural area. Most of these students come from disadvantages schools and have various challenges ranging from their education background, schools’ infrastructures, socio economics as well as computer-based courses at the University (Munienge Mbodila, Bassey, Kikunga, & Masehele, 2016). Figure 7 and Figure 8, present the statistics of the students who had Gmail accounts and



the type of devices that they were using to access Google Classroom. The results showed that most of the participants in this research had Gmail accounts and they used their mobile devices to access study materials, submit assignments, quizzes, and any related class activities. Most of these students are digital native. According to (O & A, 2011) digital natives understand the language of computers and cultures of the web into which they were born. Figure 9 and Figure 10 showed data derived from the data collected after the students were asked which platforms, they were comfortable to use for the purpose of teaching and learning. However, student knew about the institution's LMS which is blackboard (WiSeUp) but most of them preferred using Google Classroom as an e-learning platform. According to [21], the adaptation of an innovation in a social system is not done at the same time but gradually depending on their attitudes. In Figure 11 and Figure 12 students were asked to rate their ability and the Department ability in the use of online platforms for teaching and learning. The results demonstrated that technology usage ability of the students is relative like the Department. This showed that the level of Lecturers adoption in the use of new technology for teaching can be a key factor for students' usability of the technology (Mbodila, Ndebele, & Muhandji, 2019). A survey was conducted to understand student's perceptions on the use of Google Classroom. The results shown in Table 1, expressed participants' needs to leverage Google Classroom as an e-learning tool in the Department. This adoption does not resolve some issues raised by the students in this study such as network coverage, slow internet, and socio economics.

Conclusion

This study and the results presented show clearly that Google Classroom is an effective tool to use for online teaching, assessment as well as for communication between students and instructors to leverage e-learning. The analysis showed that participants were extremely motivated in the use of Google Classroom for teaching and learning purposes over the institutional LMS (Blackboard). The investigational indication of this study shows that Google suits Apps can be used as synchronized tools to leverage e-learning for purpose of sharing materials, submission of assignment, quizzes and other related teaching and learning activities. The study therefore concludes that; Google Classroom could be adopted as an effective tool to students' experience in leveraging e-Learning initiative.



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