



Towards Provision of Online Peer Assisted Learning: Understanding the Contemporary Participation Trends

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Abstract. Although learning materials for eLearning platforms are keenly developed, learner support has remained unreliable. Mainly, the focus has been on managing and easily delivering learning resources to learners. The aim of this study was to thoroughly analyze the participation trends of both teachers and students from one of the deployed learning management systems (LMS). To accomplish this objective, activities logfile from Halostudy LMS implemented for secondary schools in Tanzania for the period of 11 months were extracted and analyzed. The study found that learning support is not always evident as it is entirely reliant on subject teachers who were found to be not actively using the system. Drawing on reflection of this finding, this study provides analytical commentary on the consequences of relying on subject teachers for the provision of learning support. With this understanding, future work will look at the use of machine learning techniques to facilitate automatic recommendation and pairing of potential peers to students facing challenges in their learning.

Keywords: eLearning · Machine learning · Learning support · Education · Learning Management System (LMS) · Educational data mining · Autonomous learning support

1 Background

Previously, the teachings were predominantly bound by traditionally face-to-face delivery of instructions. However, for more than a decade, the setting has been changing. Education sectors have shown interest in delivering instructions using eLearning systems. Although some studies show that eLearning systems were predominant in higher learning institutions (Estacio and Raga Jr. 2017), using eLearning platform has globally become a common interest of all levels of education including pre-tertiary education level (Mtebe et al. 2015). In Tanzania for instance, some examples of eLearning systems that have reportedly been implemented for secondary schools (Kalinga et al. 2007; Mtebe et al. 2015; Mtebe and Kissaka 2015; Mwakisole et al. 2018). These systems have made educational resources easily accessible and have been cited as effective platforms

that can facilitate course administration roles, improve collaboration and significantly enhance self-directed learning (Estacio and Raga Jr. 2017). Although learning materials have keenly been developed, an aspect of learning support in these platforms has received little attention.

2 Literature Review

2.1 ICT in Education

Information and Communication Technology has shaped various sectors during this 21st Century. Through ICT, many sectors have been positively transformed. To cite some include education sectors, mining, agriculture, and transportation, tourism, and health sectors.

In education sector, apart from enhancing motivation, collaboration and engaging students, the development of ICT technologies for education, to a great deal, improve quality of teaching and learning (The Swedish National Agency for School Improvement 2008). Not only that, but also if used in sensibly and well-planned manner, ICT is capable of offering individualized learning (The Swedish National Agency for School Improvement 2008). Among other tools, eLearning platform is reported to be a common tool with which learners and teachers are provided with tools to access and deliver learning materials.

2.2 eLearning Platforms

eLearning platforms can be considered as a tool with which students use to access learning materials whereas teachers or educators use to provide learning materials and manage student learning activities. There are varieties of eLearning platform in place, such as moodle, chamilo, openEdx, and canvas. Nevertheless, their positive impact is gotten when they are suitably used (The Swedish National Agency for School Improvement 2008). One of aspect, among other, to be considered is having proper learner support strategies in place.

2.3 Learner Support

Beyond formal delivery of learning resources, effectiveness of learning environment is attributed by its capability to provide learner support. Learner support is what makes students in being more successful in their studies. An aspect of learner support is often provided by teachers to their students along the entire learning spectrum (Dousay 2015).

Learner support is an important without which students' learning curiosity can be disrupted. It has been noted that, decline of both performance and completion rate is often a result of absence of instructors who are to provide learner support (Dousay 2015). This means that, instructors need to be available to respond to queries that will be paused by their students. Following its vitality, learner support need to be timely provided whether in face-to-face setting or online learning environments.

2.4 Learning Support in Traditional Classroom

In traditional classroom, place and time is often commonly defined for both teachers and students. Thus, teachers and students are often have opportunity to interact each other. In this setting, teachers can modify mode of teaching to assist those that seem not to understand the concept using prior planned teaching method. In this way, traditional classroom is in a position of offering a guaranteed timely learning support (Ochukut and Oboko 2019). The learner support is often centred into subject instructors' mandate. The effectiveness of subject teacher is attributed by the fact that distance between student and teachers is often minimal because they all in same class at the same time.

2.5 Learner Support in eLearning Platform

An aspect of learner support in the eLearning platforms is no exception. Online learning has made learning more flexible and has brought learning resources closer to learners (Estacio and Raga Jr. 2017). However, the distance between instructors and learners has increased relatively to traditional face to face setting where a learner and teachers are often in same location. That is to say, relatively online learner does not a guaranteed learning support as in traditional face to face classroom settings (Ochukut and Oboko 2019). This unguaranteed learner support can be traced back from a work by (Dousay 2015) which reported that provision of learner support in online environments is more intense.

3 Problem

As previously stated, although learner support in online environment is intense, learning supports in eLearning platforms have remained solely reliant to instructors of the course. Relatively, eLearning systems have increased the distance between a teacher and a learner. This increased distance minimizes essential learning support which is often timely available in traditional face to face classroom settings (Ochukut and Oboko 2019). However, little research exist on reflection of learner support available in the eLearning platform.

4 Objective Statement

The study aims to increase understanding of the current learning support in the learning management system (LMS). The findings will provide inspiration on the future research within the area of learner support.

5 Methodology

5.1 Study Area

This study was conducted using data that were extracted from Halostudy LMS. The system was implemented for secondary schools in Tanzania under Retooling project. The project was under Ministry of Education and Vocational Training (MoEVT) of the government of Tanzania in collaboration with the College of Information and Communication Technologies of the University of Dar es Salaam.

5.2 Data Extraction

Data for this study were extracted from Halostudy LMS. The data that were extracted were log data on system interaction of both instructors and students. The extracted log data were for the period 11 months. Table 1 and Table 2 show variables for student and teachers respectively whose log data were extracted for the study.

Table 1. Log data variables for students

	Variable	Description
1	Enrolled students	Number of student enrolled into Halostudy eLearning platform
2	Active students	Number of students who used the system in a particular month
3	Inactive students	Number of students who did not use the system for a particular month

Table 2. Log data variables for instructors

	Variable	Description
1	Instructor login	The last date the instructor logged into system
2	Subject	The subject that instructors is assigned
3	Inactive period	Number of days that instructor was not active since last login

Using variables specified in Table 1 and Table 2, we were able to correlate the availability of instructors and participation trends of students. As shown by the two tables, participation trends of students and availability of teachers, revealed through login trends, were extracted from the Halostudy LMS implemented for secondary schools in Tanzania.

5.3 Data Analysis Tools

The examination process of the data that were extracted from Halostudy LMS used Analysis ToolPak. The Analysis ToolPak is a multifunctional data analytical tool with which complex statistical or engineering analyses can be developed. It makes use of appropriate statistical or engineering macro functions to calculate and display the results in an output table, and to generate charts.

5.4 Ethical Consideration

This study used data that were extracted from personal activities in Halostudy LMS. Thus, we were certain that using some of the variables values the way they are would be revealing personal details. We had to rename some of the variable values to maintain the required personal confidentiality. For example, by writing the name of the subject, the instructor is easily revealed. Therefore, subject names were purposely decode to Subject A, Subject B, Subject C, and Subject D.

6 Findings and Discussion

6.1 Number of Enrolled Student

The data pertaining enrolment of student into the Halostudy LMS for the period of 11 months were extracted (see Fig. 1).

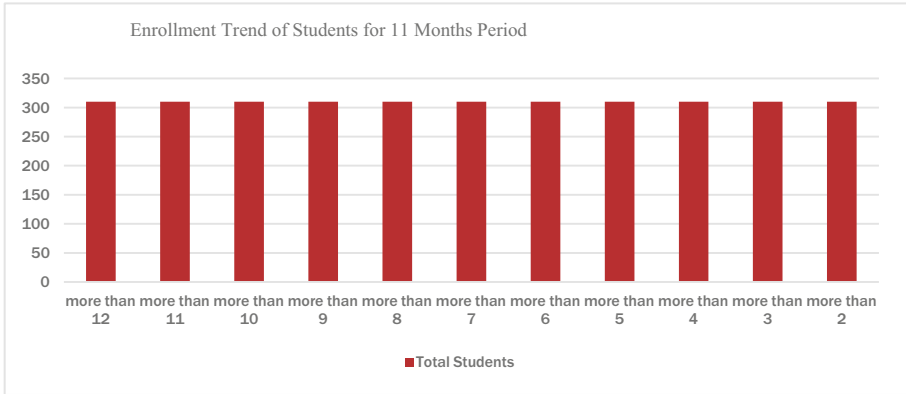


Fig. 1. Enrolment trend for 11 months period

As can be seen in Fig. 1, the number of registered students in the system has remained constant for the entire period of 11 months. Although the system is open to all schools in Tanzania and accessible almost all the time, there was no new students registered for the entire period of 11 months.

6.2 Participation Trends

Although there was no new registered students for the period of 11 months, it is not the case for participation trend of students for whole period of 11 months (see Fig. 2).

As can be seen from Fig. 2, despite the benefits that online learning platforms promise to offer, the participation trend throughout the period of 11 months has been shown linearly declining. While tracing what might be causing the trend, we managed acquiring two groups of informing indicators. Figure 3 shows a trend of internet usage has recorded a linear growing trend.

6.3 Inactive Trends

Although it was expected that with the linear growth of internet penetration trend shown in Fig. 3 would proportionally motivate a linear growth of participation trend in online systems, the data in Fig. 2 and in Fig. 3 show the opposing trend.

As can be seen from Fig. 4, the dropout from system has also recorded a steady linear increase for the period of 11 months. These data provide useful hints that there exist factor(s) beyond globally linear growth of internet usage (see Fig. 3). Nevertheless,

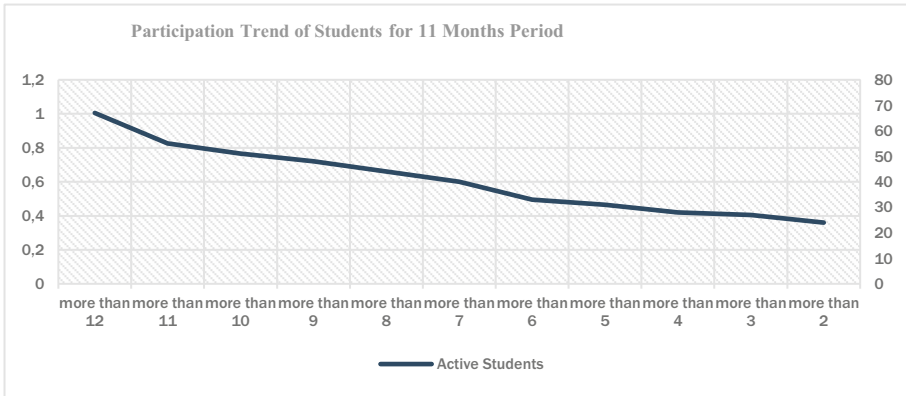


Fig. 2. Participation trends for 11 months period

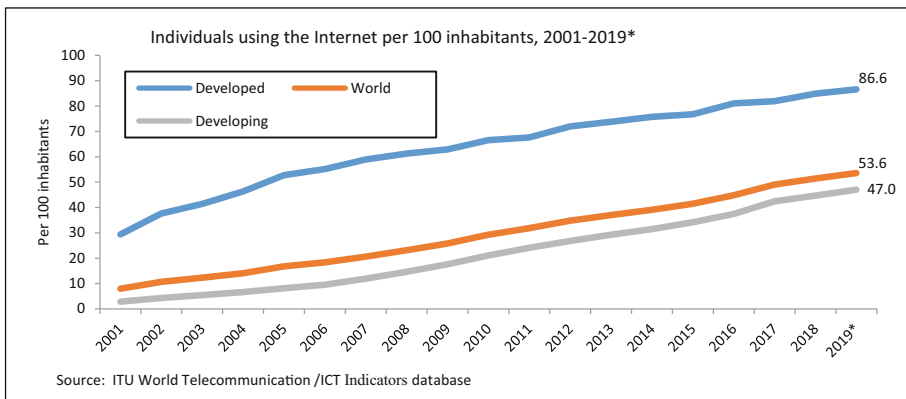


Fig. 3. Internet usage penetration trend

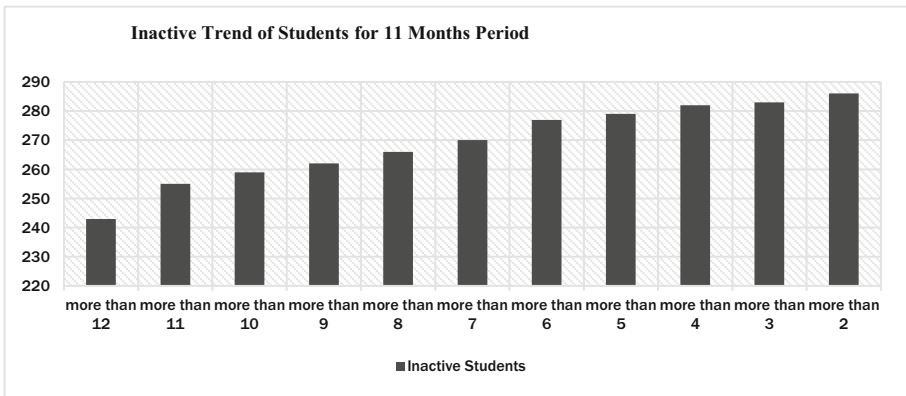


Fig. 4. Inactive trends for 11 months period

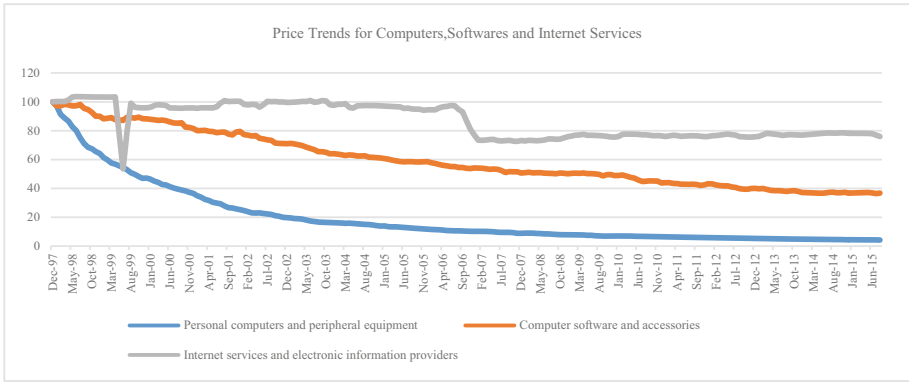


Fig. 5. Price trends for computers, Software and Internet Services (source (U.S. Bureau of Labor Statistics 2015))

even the linear price decrease of computing devices seems not to be the only factor that motivates students in using the system (see Fig. 5).

As can be seen from Fig. 5, although the price of personal computers and peripheral equipment, computer software and accessories, and internet services have declined from December 1997 to August 2015, the participation trend has been declining whereas the dropout trend has been increasing for the studied eLearning platform and no new registered student (see Fig. 6).

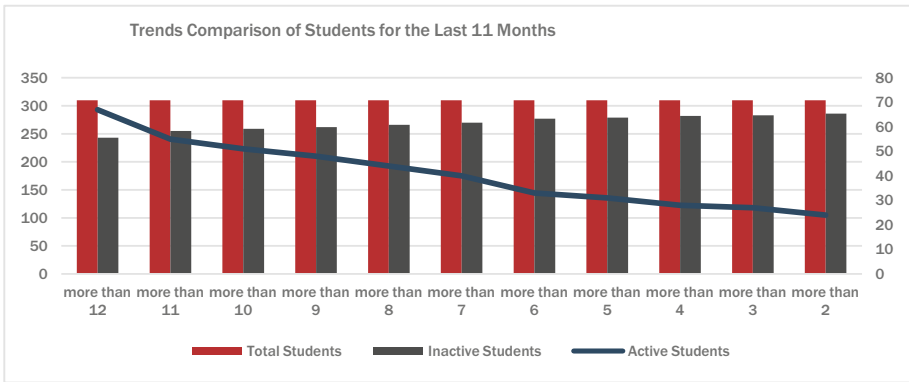


Fig. 6. Trends comparisons for 11 months period

6.4 Instructors Online Presence

Again, with the data presented in Fig. 5, it can be presumed that price decrease seems to insignificantly motivate registration, learner’s retention to the system. This presumption motivated authors to explore for other factors likely to be demotivating learner from using the system. In Table 3 extracted data about login traces of subject instructors.

Table 3. Last login date per subject

	Subject	Last login	Total offline days
1	Subject A	5 th April 2018	1 year 316 days
2	Subject B	5 th April 2018	1 year 316 days
3	Subject C	17 th February 2019	362 days 23 h
4	Subject D	17 th February 2019	362 days 23 h

As can be seen from Table 3, Halostudy LMS has 4 subjects. For the purpose of this study, values for three variables were extracted. These are subject, last login date, and the total offline days since last login. To adhere with the confidentiality, the names of the subjects were decoded as shown in Table 3. As can be seen from Table 3, instructors in all subjects were not available for any activity in the system for an average of the whole year. Following the fact that learner support in online platform is often defaulted to subject instructor, the data in Table 3 evidently suggest prolonged absence of learner support. At least with these data in Table 3, it can be presumably concluded that the shown decline of participation trends is caused by prolonged absence of instructors who are hereby the centre of required learner support. Furthermore, data in Table 3 provides evidence that entirely relying on instructors for the provision of learner support might not be reliable decision.

As has been analysed regarding data shown in Table 3, learner support from instructors are not reliable, and thus it worth exploring for strategies for enhancing the provision of learner support.

7 Conclusion and Future Work

Although learning materials for eLearning platforms are keenly developed, learning support has remained unreliable. Trends shown in previous section of this study suggest that authority are often keen in implementing eLearning platforms. However, plans for sustainable learner support is often defaulted to instructors. Nevertheless, as shown from the analysis of extracted data, the monthly declining trend of system usage suggest evidently due to absence of learner support. It has been shown that instructors cannot reliably provide learner support in online environments as evidently shown in Table 3. Thus strategies that minimizes reliant on instructors need to be explored and implemented to truly and sustainably realize the benefits that online platforms are capable to provide to both learners and instructors. This conclusive statement calls for the further studies with the focus of exploring complimenting approaches that will minimize reliant on instructors. In our future work, we will conduct a survey on the contextual factors, both physical and social contexts to understand the position of students from secondary schools regarding peer assisted learning in online learning environments. The understanding will further be used as an input in the attempt to future work which will be looking on use of machine learning techniques to facilitate automatic recommendation and pairing of potential peers to students facing challenges in their learning.

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