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Adopting Course Completion Tracking and Conditional Activities to Enhance Engagement in eLearning for University Students

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Abstract: Student engagement is an overarching problem in the learning context that instructors continue to grapple with. Several attempts that utilize features within the Learning Management Systems (LMSs) have been made to increase student engagement and motivation for online courses. This paper presents the findings of the adoption of completion tracking and conditional activities to enhance engagement in Moodle, a leading LMS. To investigate the effectiveness and the potential of completion tracking and conditional activities in enhancing engagement, data was collected from 90 students across four courses, further Moodle logs were examined. The research findings indicate completion tracking and conditional activities significantly increase learner engagement in online classes. These findings have significant implications on instructors conducting online classes and the development of student engagement for online courses. The present research fulfills the need to study how completion tracking and conditional activities features can be used to enhance learner engagement in Moodle LMS.

Keywords: student engagement; completion tracking; conditional activities; educational data mining; eLearning; moodle.

1. Introduction

Information Communication Technology (ICT) continues to disrupt how learning is undertaken over the Internet. Over the last few years, eLearning has become prevalent partly because of its perceived benefits such as self-paced learning, reaching learners beyond the confines of time and location. Institutions of Higher Learning have adopted eLearning as a strategic goal to ensure business continuity and to reach beyond their physical campuses.

Technology assisted learning has been packaged in different ways such as blended learning which involves the use of technology and the traditional (face to face) learning [1]. The other rendering is pure online learning commonly known as eLearning. eLearning is where learners and the instructor do not have physical meetings, but all learning is mediated through technological tools. Learners can remain connected to Virtual Learning Environments (VLEs) [2, 3]

Even though eLearning has been adopted with moderate and varying success, many institutions are yet to realize full benefits of the same owing to low student engagement resulting to attrition and eventual dropout. Attrition for eLearning stands at 10-20% higher than that of traditional classes [4]. Several attempts have been made to encourage

engagement, lack of which threatens to annul the gains of eLearning. Engaging and motivating students studying in virtual environments increases the learner's satisfaction and retention.

For nearly two decades [5], student engagement has enjoyed increased amount of attention from researchers. [6] observes that the discourse has evolved from a concept of being attentive in class, as observed in face-to-face learning to a construct comprising behavioural cognitive and emotional components impact on student motivation to learn. Researchers have adopted different definitions for student engagement, [7] suggest that student engagement has to do with the degree to which a student appears interested and involved.

In the context of eLearning, learner isolation can lead to low engagement, attrition and subsequent dropping out from a course. [8] puts forward several metrics such as active learning, collaboration amongst learners, communication, completion of tasks as indicators of learner engagement.

A Learning Management System (LMS) is a web-based platform that is designed to deliver and manage training content and resources for learning purposes [9]. It does that by facilitating the delivery of content through online learning, face-to-face and blended learning [10]. These LMSs can be utilized by a variety of stakeholders such as business firms (small or large), federal or state agencies and more importantly, traditional educational institutions like colleges, universities [11]. The major reason for utilizing LMS is faster distribution of content. Content is centralized in an online environment where learners can access and download information from any location, at any time, as long as the internet and computer technologies are available [12]. Cutting down on costs for organizations and continuity of service delivery under adverse conditions like the Covid-19 pandemic witnessed in the world in the 21st century. Other reasons include fostering of global inclusion in business organizations, creation of learner centered instruction, offering 24/7 access to content for learners, flexibility for on-demand learning, integrated assessment of learning etc [13].

Learning Management Systems (LMSs) have been adopted to help with the management of information and interaction between instructors and students [14]. LMSs are bundled with many features that enhance the learning and teaching experience. Many of these features are used for content authoring, assessment, collaboration, video conferencing and reporting [15]. Several LMSs are available, both commercial and open source including Docebo, Moodle and Canvas [12]. Moodle is one of the popular [16] LMS being used by currently over 247 million users with more than 204,000 sites worldwide. It hosts 33 million courses with more than 1.3 billion users [17].

Myriad of researchers have carried out studies around the acceptance and adoption of Moodle [18-20], its features [21], and their direct connection to performance. There is paucity of research on the impact of specific activities and resources within Moodle on student engagement.

[12] identified a few features on the Moodle LMS that were heavily used. They included assignment, feedback, quiz, and workshop. He further observed that Moodle had several features that most research focused on evaluating while features that were important in making the course effective had not received much attention from researchers. This provides the gap for our research. This research focuses on two main features in Moodle LMS: Course Completion Tracking and Conditional Activities.

The fields of study concerned with collecting, analysing, measuring and reporting of data about learners and their contexts for the purpose of understanding and optimising the learning environment are known as learning analytics and educational data mining [22]. Several learning analytics and education data mining studies have been conducted to investigate the level of student retention when using virtual learning systems. Machine

learning algorithms and artificial intelligence [23] on the other hand have been utilized to predict student success, understand success of completing or passing a course, and these early predictions helped teachers and automated systems to intervene before it got to late [22].

This paper is structured as follows: section 1 introduces the topic, section 2 states the objective of this study, section 3 discusses the methodology used, section 4 outlines the technological implementation of the study while Section 5 presents the results and finally section 6 is the conclusion of the paper.

2. Objectives

This research focuses on investigating the potential of completion tracking and conditional activities to enhance engagement. The specific research questions are:

1. Does completion tracking enhance course engagement in online environments?
2. Does the use of conditional resources and activities enhance course engagement in online environments?

3. Methodology

The experimental study was carried out between August to December 2020 at Daystar University in Kenya. During this period, the government had directed that learning be conducted online to curb the spread of the novel corona virus. Online classes for students pursuing different courses were prepared in advance with the features under study namely completion tracking, and conditional activities enabled. The research involved all students who were in the four classes taught by the researcher. Although most students were pursuing Computer Science related courses, some were pursuing a general course in Computer Science for non-Computer Science majors. The participants were also in different years of their study. This sample can thus be generalised for the University population.

Students enrolled in these classes on Moodle LMS were taken through an orientation. Students could monitor their progress in covering modules and could only be allowed to access some parts of the course after fully covering requisite portions of the course. Halfway into the semester (in the month of October), Completion Tracking and Conditional features were disabled and thus students could not monitor their progress in covering course modules. They henceforth also could unconditionally access any part of the course.

Disabling of the features was done to enable the researchers to monitor the students' engagement with and without the two features.

3.1 Data Collection

At the end of the semester, primary data was collected using an online survey tool namely monkey survey. Questions included participants' gender, year of study and 5-point Linkert Scale questions on whether the students thought completion tracking, and conditional activities made them engage with the course more.

90 validly filled responses of the possible 120 were received. The collected data was analysed using SPSS software and MS Excel. The results are presented in the section that follows.

3.2 Moodle Logs Data

In addition to the data collected from the participants through the survey, Moodle log data was used to better understand student engagement with the two features enabled.

Moodle logs are reports that are automatically logged by the LMS at the site or course level. These reports contain user data such as IP address of the device used and the name of the activity accessed [24]. These reports we analysed to show how learners engaged with

the course with and without Completion Tracking and Conditional Activities. Studies such as [25, 26] have utilised Moodle logs to carry out educational data mining in attempts to understand learner engagement.

4. Technology Description

4.1 Completion Tracking

Completion Tracking is a feature in Moodle LMS that allows both the learner and the instructor to see a progress bar indicating the extent to which certain topics have been covered. In this research, the feature was enabled for each course and each activity within the course. This allowed Moodle LMS to track the completion status of any activity the learner was supposed to undertake. Specific conditions were configured which once met would mean that the activity was completed. These conditions included minimum time to be taken in performing an activity, whether an activity was accessed and whether a learner has been graded in quizzes etc. When all the activities marked as completed, the progress bar would move to 100%. If some conditions were unmet, the progress bar would never move to 100% but to a level indicative of the completion status.

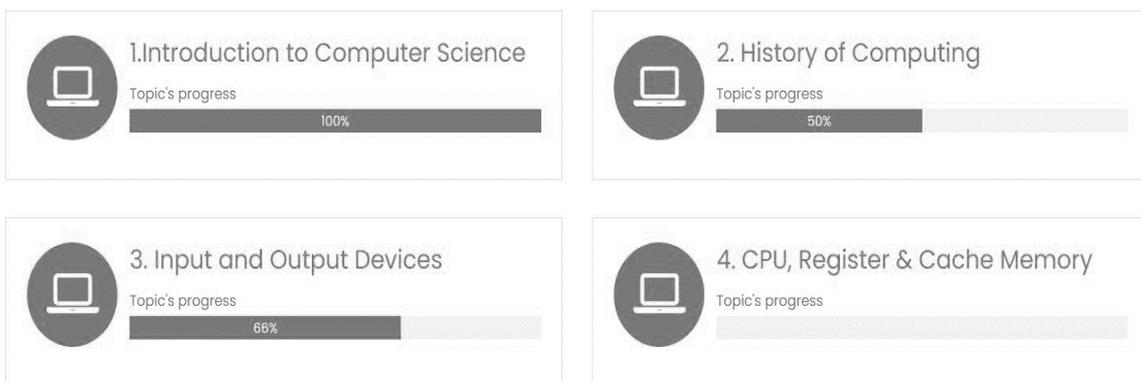


Figure 1: Student's Course Home Page

4.2 Conditional Activities

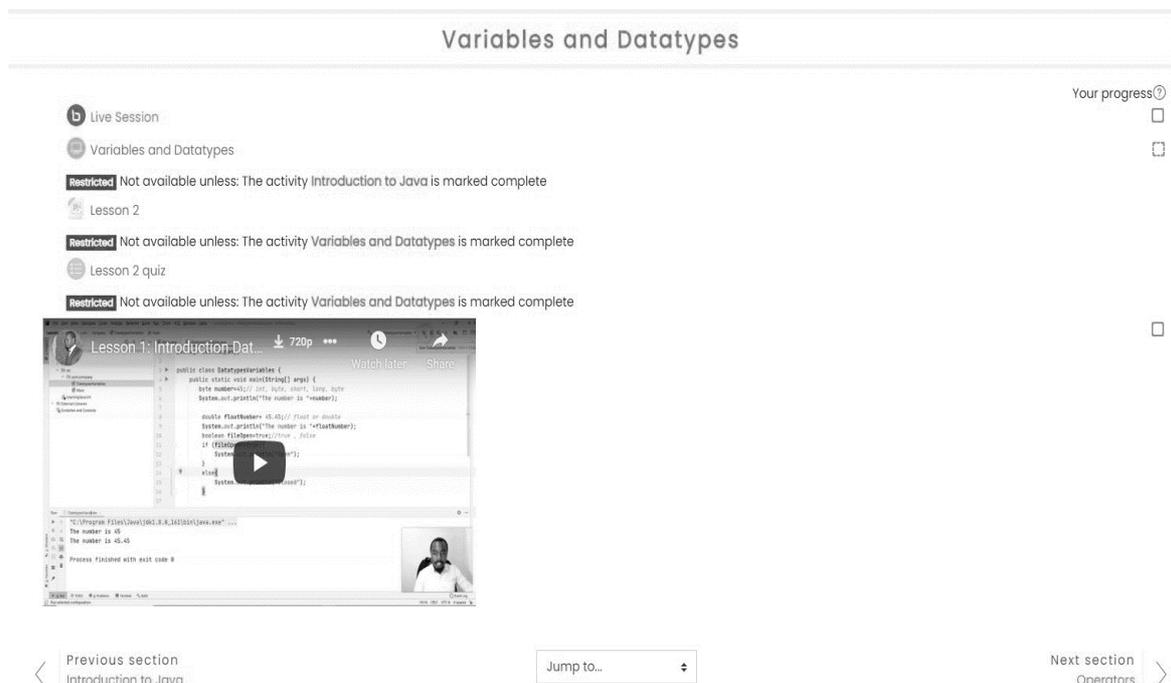


Figure 2 Conditional Activities

The Conditional Activities feature allows the course instructor to restrict access to some activities or resources until some conditions have been met [26]. The course instructor can specify the conditions. These conditions could include viewing some files or spending a certain period engaging with some resource. In this study, Conditional Activities were activated, restricting access of activities and resources based on the completion status of previous activities. This meant a student could not access some activities unless some activities were completed. For example, as illustrated in Figure 1, for Lesson 2 to be visible, a student had to complete Lesson 1 and have the progress bar for Lesson 1 indicate 100% completion. Other resources such as files and quizzes also utilized the restriction feature so that they could only be visible after a given activity had been marked completed

As shown in Figure 2, a student could not access the lesson “Variables and Data types” if they had not completed the previous lesson “Introduction to Java”. Likewise, without completing the topic “Variables and Data types” one could access notes and the quiz associated with that topic.

5. Results

5.1 Survey Findings

The findings of the survey were analysed by use of IBM’s SPSS the report is as shown below. Responses on the gender and year of study were not analysed as their impact on engagement was not the focus of this research.

Figures 3 and 4 present the analysis of the data collected from users on whether Completion Tracking and Conditional Activities increased learner’s engagement. A 5-point Likert Scale questions had been presented to the user in an online survey. The 5-point Likert had the values “Strongly Agree”, “Agree”, “Neither Agree nor Disagree”, “Disagree” and “Strongly Disagree”.

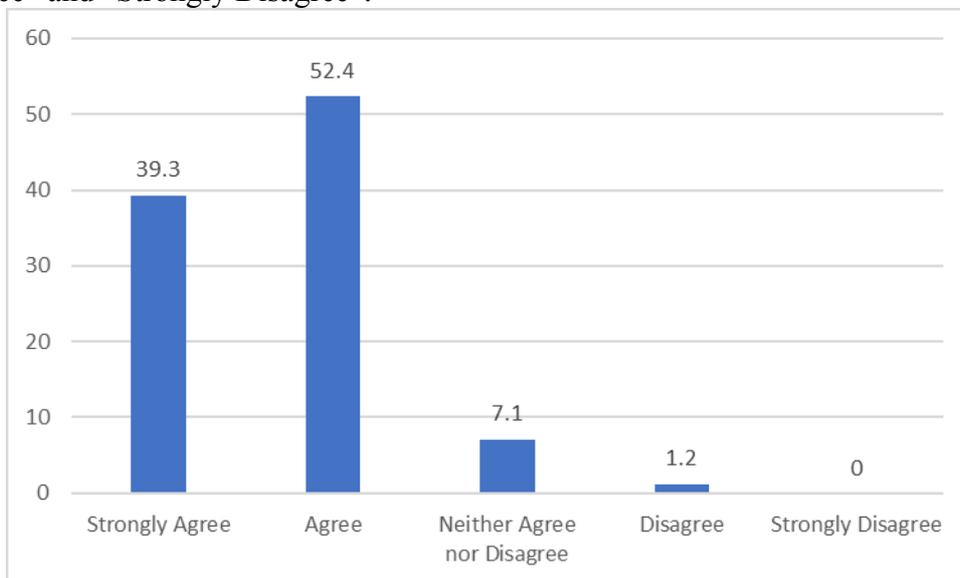


Figure 3. Does Completion Tracking Increase Engagement

On the question of whether Completion Tracking feature in Moodle helped increase study participants’ engagement, a Likert 5-point scale was used to receive respondents’ views. 39.3% of the study participants Strongly Agreed that their engagement had increased, 52.4% of the participants Agreed while 7.1% neither Agreed nor Disagreed. 1.2% Disagreed. There was no respondents who Strongly Disagreed as illustrated in Figure 3.

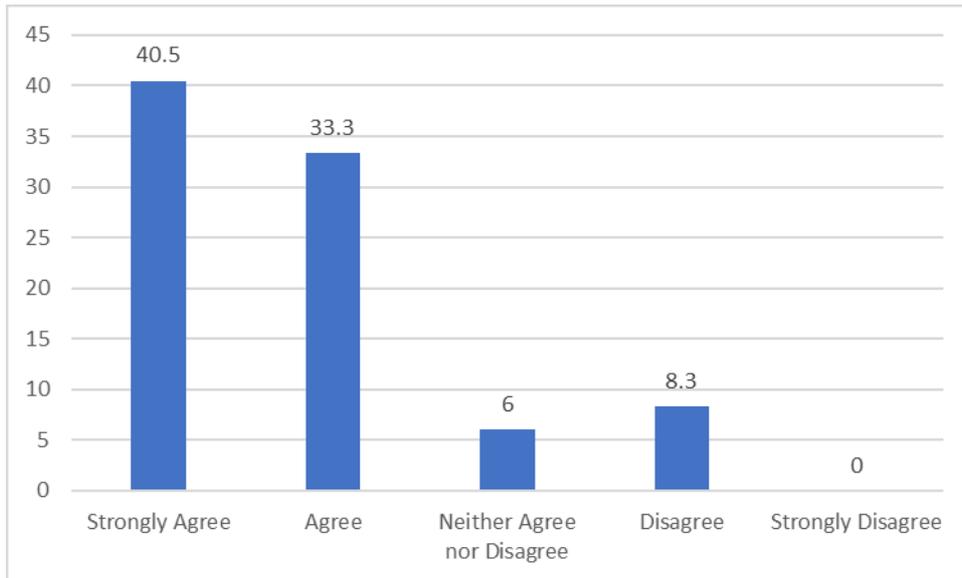


Figure 4. Does Conditional Activities/Resource Increase Engagement

On whether Conditional Activities feature helped the respondents to engage more with the course, 40.5% Strongly Agreed, 33.3% Agreed, 6% Neither Agree nor Disagree, while 8.3% Disagree. None of the participants Strongly Disagree as illustrated in Figure 4.

5.2 Moodle Logs Findings

Moodle Logs for the same classes used in this survey were analyzed as shown below:

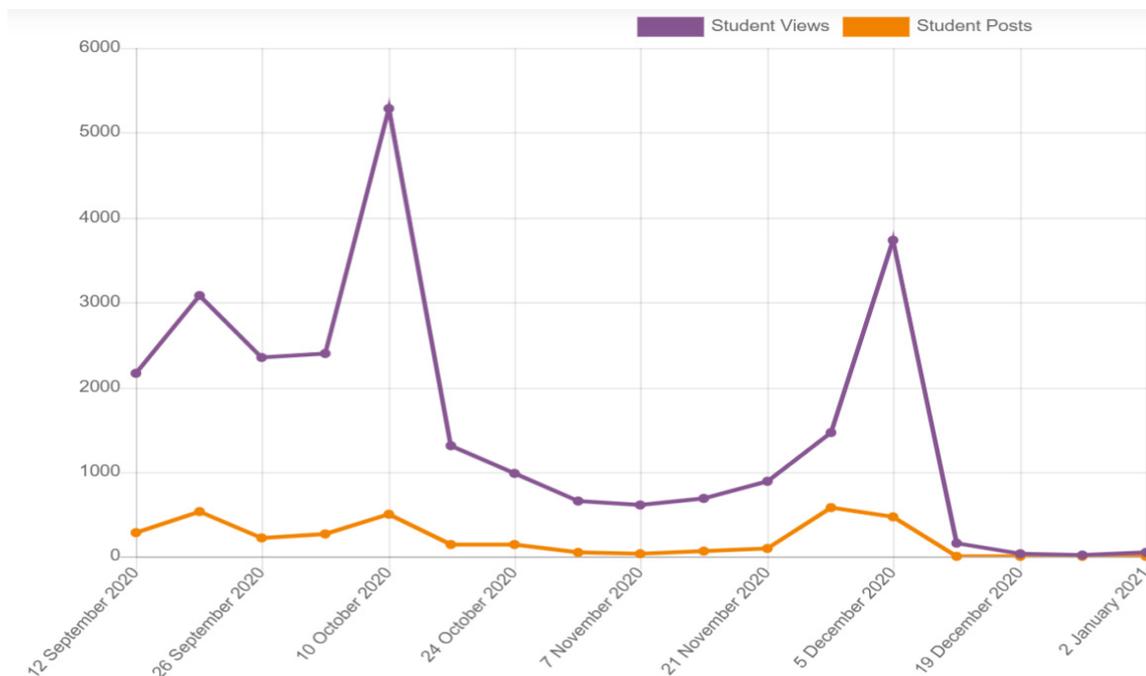


Figure 5: Moodle Data for ACS101 Course

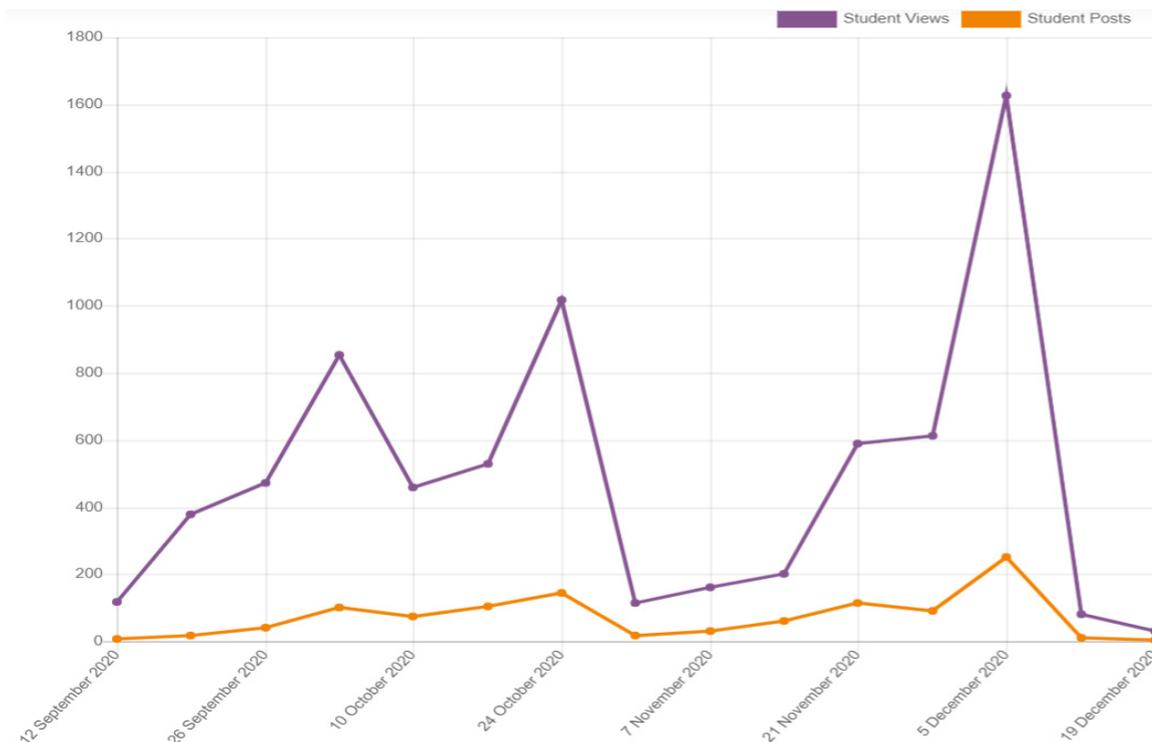


Figure 6: Moodle Logs Data for DICT213 Course

As shown in Figure 5 and 6, in September and October when Completion Tracking and Conditional Activities features were enabled, learners engaged more with the course. In the month of November when the two features are disabled, a steep decline in engagement was noted. The peak in December is a result of many students accessing the course in preparation for their final exams. [26] observed similar spikes around the time deadlines for some activities were approaching or towards summative assessments like the final examination.

The study sought to find out if Completion Tracking and Conditional Activities features found in Moodle LMS had the potential to increase learner engagement. From the results, it is established that use of the Completion tracking feature increased course engagement. A total 91.7% participants reported that this feature encouraged them to engage more with the course content. A study carried out in Cyprus found out that elements of gamification such badges, leader board and levels embedded in Moodle course had a positive impact on student engagement [27].

Additionally, this research found out that use of Conditional Activities and recourses increased student engagement. 73.8% of the research participants reported that they engaged more with the course because of this feature.

6. Conclusions and Recommendations

This study focused on whether the use of completion tracking and conditional resources and activities enhances course engagement in an online environment. Completion Tracking Conditional Activities were found to increase student engagement in a course. In this study data collected from the study participants and corroborated by data mined from Moodle logs revealed increased engagement when both Completion Tracking and Conditional Activities are used.

Beneficiaries of this study include instructors conducting online classes and the discourse on development of student engagement for online courses. Instructors can enable the two features to increase learner engagement in their courses and therefore reduce

attrition and eventual student dropout. Researchers can further associate specific competencies and badges with completed conditional activities within a course, this could yield higher engagement levels. In addition, more research is needed to explore effect of other prevalent features on Moodle (all LMSs) such Forums, Chats, Discussion Groups on student engagement. This will better inform course instructors as they make decision on what and how to use the features.

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