

Exploring the Learning Analytics of Teachers in Online Learning

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The expansion of online learning has brought about a paradigm shift in language learning as it provides numerous opportunities to engage in language learning across time and space which is in tandem with the wave of technological innovations practiced widely across the globe. However, limited studies have been conducted to investigate teachers' participation in this field. Thus, this study investigates the engagement and learning analytics exhibited by teachers in online learning. Participants were teachers taking an online language course. The study was conducted in a four-month period. Data was collected from LMS's course analytical content. The data was analysed using descriptive analysis. Data was analysed based on activity indulged, submission, and grades. As such, the study is to look into the patterns of online learning from studying analytics view and discover the relationships among factors such as activity by date, frequency of viewing times, and scores obtained. The study concerns investigating studying analytics of an online studying for teachers enhancing their proficiency with an enrolment of 29 teachers. The findings of the study display that high engagement of the teachers does not necessarily require a slower tempo of learning, while a decrease in engagement does not require a higher rate of learning. In a nutshell, the findings stated that the teachers' engagement in an online learning and learning analytics can't be made the sole measure of learning, as it could be associated to pace of learning considering the learner's autonomy.

Key words: *Learning analytics, online learning, pace of learning, LMS, teacher training.*

Introduction

Blitz (2013) expressed that the digital world has significantly emerged as possibilities for learning. It is elevated throughout time and era indicating that online learning can gain the dreams of PLCs. In fact, teachers may want to additionally enhance their information of problem and pedagogical content material and modify their academic practices. Flexibility is stated as the dominant benefit of online learning over the traditional face-to-face environment in facilitating teachers' learning. The online environment enables teachers to learn and share expertise besides any hindrance at any space and time. It is the fastest growing trait in educational technology according to Means and team in their article, *The Effectiveness of Online and Blended Learning: A Meta-Analysis of the Empirical Literature 2013*. Christensen, Horn and Johnson (2008) anticipated that by 2019, one 1/2 of all U.S excessive faculty enrollments will be online. It is popular as it provides flexible access to content material and education at any time from any place. Eshtehardi (2014) cited that online courses are developing rapidly in almost all fields, giving a flexible alternative to those who are interested in education however are now not able to allocate specific time to study regularly. Online teacher training packages have been growing hastily along with other discipline of studies. Thus, this paper studies the learning analytics that are entailed in an online course designed for teachers.

The paper is organised as follows. First, the concepts applied in this study such as 'online learning', 'online learning through LMS', and 'learning analytics' are introduced. These concepts are then linked with recent literature to illustrate the research gap identified. It is followed by a discussion on the research approach and methods used to capture and analyse the data via descriptive analysis. The paper is ended by a discussion on the findings as well as the future directions in the area of online learning.

Online Learning

Ubell (2017) referred to the fact that nearly a century earlier than the Internet university and university with online learning, the American truth seeker and progressive education champion John Dewey identified that typical school rooms can regularly stand in the way of creative learning. What we were once thinking as the future is now the past. Vivolo (2017) highlights that the capacity to join research from the luxurious home comfortability which used to be seen as long in the future, is now our day-to-day experience. As a result, online learning has been built-in as a section of training and continues to evolve drastically. The growth of online studying is viewed due to the introduction of broadband Internet. According to Boettcher and Conrad (2016), the demand for online programmes has expanded over the previous a number of decades. As Lee and Lee (2008) remarked, online learning is an active procedure of facts because knowledge is performed through experience, maturity and

interaction with one another. This is exactly what is prescribed in this study as it permits the teachers to be actively engaged in the studying process.

Online gaining of knowledge by what is referred to as a fiery marriage of training by Shea-Schultz and Fogarty (2002), has altered the style of our work and allows for greater learning. According to Major (2015), with the creation of such a mode, we have developed a meaningful lifestyle considering the time factor. Mayadas (2017) has explicitly indicated that when most human beings think of online learning, the image that appears is a learner sitting in the front of a PC screen completely alone. It may additionally now not be as daunting as one thinks. Shea-Schultz says that 'online gaining of knowledge isn't that tough'. In fact, she adds that even the Learning Management Systems (LMS) are now not that hard to grasp, as soon as any individual is there to guide. After all, a lot of what we do today involves technology. Everything is digital. We do virtually nothing barring the aid of technology (Said et. al, 2013). Everything we do entails bytes, bits, jpeg, chips, ram and information storage. Therefore, her question, why should studying be distinctive then? Like any different forms of communication, online learning virtually avails itself of the modern applied sciences. Layering to this rapid enlargement of technology, many institutes and higher educations have embraced the way ahead for studying methodology.

Pramela and Hussin (2015) noted that online learning has been employed in many greater training establishments to provide deep and significant gaining of knowledge for rookies learning about technology. They also indicated that on-line mastering looks to be a desired mode for many students and instructors, as it permits lessons to be performed without hindrance of time and space. As technological know-how evolves, the modes of delivery have to evolve simultaneously. Sreenivasan (2017) in his foreword, cited that online mastering has moved well to the stage where interactions with rookies is absent, and it has evolved as a mode of delivery. Mayadas (2017) again stresses that the greatest and complete learning of online technology and that virtual newcomers fared better than conventional learners. According to Shea-Schultz and Fogarty, online technology learning ideally fits into the equation everywhere, every day, and in each and every manner. The science should now not get away. It should be accomplished with the job process: a fluid, seamless symbiosis of learning, doing and knowing. They highlighted that the technological know-how is very intuitive, subtle, powerful, varied and meaningful. Furthermore, gaining online knowledge can be done anywhere. Unlike the time constraint imposed via the physical classroom, online knowledge opens the possibility of non-stop mastering (Kasson, 2003). Major (2015) adds that when we research online, we discover ourselves removed from naturally grounded notions of time. Our work is altered by the new electronic day. No longer does teaching and studying need to show up synchronously, at a fixed time and location. Rather, it can be done frequently at the place learner completes the duties in their own time and rate. Additionally, the mastering comes with a new language and distinct expectations, which include any-time

and any-where learning. Thus, online gaining knowledge has demonstrated to be a useful mode of learning.

Online Learning through LMS

Educational institutions want tremendous and efficient mastering techniques to make sure that college students and teachers are suitably outfitted with the modern facts and the most advanced skills (Nordin et al., 2016; Adnan & Ritzhaupt, 2018; Andersen et al., 2018; Hashim et al., 2018). The following factor should be observed: the nice use of science in the organisational placing of the educational group is immediately associated with the intertwining of technical and social factors (Senteni, 2006). The significance of creating time for, and encouraging, self-reflection with regard to the gaining knowledge process, is nicely documented by means of constructivists (Gunstone, 1994; Hewson, 1996; Posner, Strike, Hewson, & Gertzog, 1982). Constructive learning is primarily based on the notion that human beings analyse via developing new thoughts based totally on their current and previous information (Cavus & Ibrahim, 2009). A learning management machine (LMS) provides the platform for this type of studying environment, by means of enabling management, delivery, tracking of learning, testing, communication, the registration process, and scheduling (Cavus, Uzunboylu, & Ibrahim, 2007). The ordinary LMS presents instructors with a suite of flexible tools (Grabe & Christopherson, 2008). With the help of such software, instructors and learners no longer have to be physically present at the identical vicinity (Cavus, 2009a). Additionally, Budhai and Skipwith (2017) expressed that it provides learners with flexible learning opportunities that suit their busy lifestyles as well as accessibility to connect with mates even across the country.

Pedagogy is the art of how to layout and train so that novices can enjoy meaningful learning. According to Boettcher and Conrad (2016), monitoring a learner's engagement and things to do within LMS, is effortless and useful. LMS offers a state-of-the-art set of equipment for monitoring inexperienced persons' engagement in route activities. The teachers' growth offers the e-moderator a good deal needed information in split seconds. LMS can provide at-a-glance facts about learner access, grades and discussion board participation, as well vivid learning analytics.

Learning Analytics affecting the learning behaviour

Learning analytics emerges as a fast-growing and multi-disciplinary region of TEL (Ferguson, 2012), which forms its very own domain (Strang, 2016). It records information about learners and learning environments and is used to "access, elicit, and analyse them for modelling, prediction, and optimisation of learning processes" (Mah, 2016, p. 288). As such, it acts as a potential to help educators examine, understand, and aid learners' study

behaviours and exchange their learning environments (Drachsler & Kalz, 2012; Rubel & Jones, 2016). Many refer to it as “the measurement, collection, evaluation and reporting of records about learners and their contexts, for purposes of understanding and optimising gaining knowledge and the environments in which it occurs” (Long & Siemens, 2011, p. 34).

Learning processes exist when a learner is involved in an interaction with members of the community and participates in a shared activity in a community. The community of practice can further promote engagement of learners with other learners in the learning community, and reach a sufficient level of understanding to participate in learning practices (Norman et al., 2015; Andersen et al., 2018). Most of the proof primarily based on the analysis of the previous studies relates to the proposition that learning analytics improve learning and teaching, though comprising retention but also with completion and progression, which has been categorised as a proof that it will certainly improve teaching (Viberg et.al, 2018).

Learning analytics in an LMS can aid educators and researchers to apprehend mastering patterns in online learning. As gaining knowledge of these types of environments are nevertheless distinctly understudied, learning analytics can help in visualising patterns of mastering, which consist of engagement of learning. Previous research has indicated that a greater degree of participation of gaining knowledge might also point out that a learner is actively taking part in online learning. Thus, this study hopes to explore how such learning is being exhibited throughout the stipulated span.

Methodology

Data Collection Method

The data collection method is explained in four sections, which are: (i) participants; (ii) instruction; (iii) learning platform; and (iv) additional learning materials.

Participants

The participants of the study consisted of 29 teachers taking an online course. The course was a four-month course for in-service teachers to enhance their proficiency of English Language for professional development purposes.

Instruction

The teachers were given a structured learning task. The structured tasks are tasks that are systematically organised according to modules being classified according to skills; namely Grammar, Vocabulary, Listening, Speaking, Reading and Writing. It has been designed to



cater to the progression of each level in leading to the culmination of each skills' lesson being imbibed. Profoundly, Norman, Nordin, Din, Ally, & Dogan (2015) has quoted that the instructional design has been geared in terms of learner autonomy over formulation and execution of the learning problem, work process, and solution (Ryberg et al., 2010; Park, 2011). Significantly, the tasks were designed to provide extra autonomy closer to teachers and shift gaining knowledge from teacher-centered modulated to learner-directed learning in that they are being the learner in this scenario.

As such, each teacher was assigned to complete the modules comprising of a discussion chat forum, quizzes and assignments. Teachers were required to complete the learning task within a 16-week period from March 2018 until June 2018.

Learning platform

The Canvas Instructure was used as the Learning Management System (LMS) learning platform. The platform consisted of all the teachers and instructor taking the educational course in that semester. The group was set as a “closed group” in which posts could only be seen by the teachers and instructor that were in the course. Data was collected based on their leaning analytics and portrayed through their engagement, and the scores were auto-generated by the LMS for the quizzes.

Additional learning materials

External resources for further reading and engagement of activities were also given such as the usage of padlet, online language games and other reading pages.

Data Analysis Method

The data obtained was analysed through descriptive analysis (Loeb et al., 2017). The purpose was to perceive and describe developments and variants in populations, explain the measures of key phenomena, and definitely describe samples in studies aimed at causal effects. Descriptive research can be mainly treasured in today's age of massive datasets whereby countless portions of data are accrued every day—attendance, grades, and personnel characteristics. Descriptive research can be used to distill these datasets into meaningful dimensions, to find patterns being informed to improve decision-making.

As such, the following patterns were analysed descriptively namely: (i) activity by date, (ii) submission and (iii) grades.



Activity by date

This type of graph allowed for visualisation of relational data that exist in online learning. It explains the frequency of teachers being engaged, shown through the volume of participation. The regularity of viewing the pages is also evident in the graph. Hence, the conceptualisation of the phenomenon will determine how to best organise the data for analysis and the data for description (Loeb et al., 2017).

Submission

This measured the involvement expressed by the teachers in completing all the tasks assigned in the modules. In the study, this describes their sustainability indicated throughout the completion of the tasks. Therefore, the descriptive research becomes relevant when it identifies patterns in data that convey meaningful information (Loeb et al., 2017).

Grades

In this statistical data, the information obtained conveys the high score attained by the teachers in the quizzes designed for them, as well as tabulates the median score. This descriptive finding can then be integrated subsequently to the planning of the future study's design, interventions, and methods best employed for better outcome (Loeb et al., 2017).

Results

Activity

The participation illustrates the engagement of the teachers kicked off from March to June 2018.

Figure 1 shows a reasonable start for the course to commence but drastically dropped to the lowest peak of participation, which is 15 times only compared to the 189 number of times being engaged when the course was initiated. The decline rate is quite significant in the very next month itself.

However, the participation has accelerated to 737 in the final month before the completion from 180 in the previous month.

Fig. 1. Participation in March-June 2018



Submission

Figure 2 displays the percentage of submissions according to 34 tasks designed for the teachers in the module. From the chart, the result revealed that most of the tasks had been completed on time. It is very evident that the highest submission is 100 percent and lowest being 89.7 percent marked on time. In other words, all the assigned tasks were completed on time.

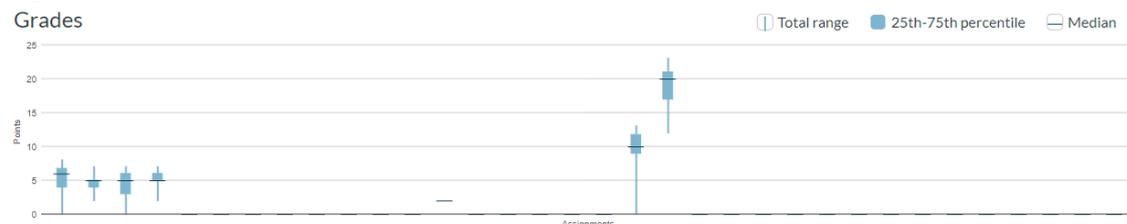
Fig. 2. Submission of Tasks in March-June 2018



Grades

In total, the module has 6 quizzes namely 4 reading quizzes and 2 grammar quizzes. The highest score is 8 out of 10 with the average median of 5 for the four reading quizzes. As with the two grammar quizzes, the highest score is marked as 23 out of 25 with a median of 20.

Fig. 3. Grades for the Quizzes



Overall Findings

Analysis of learners' interaction, engagement and active participation were also analysed with regards to the total score obtained in the course by all the 29 teachers. Table 1 shows the tabulated score received by individual teachers. The comparison of learners with high and low score of learning analytics, with 88.73 percent and 17.78 percent completion rates by total submission of tasks. From the table, results revealed that the teacher with highest score was only viewed 627 times while the teacher with the lowest score had only viewed 70 times. Here, the page view and submissions affect the score of the teachers.

Table 1: Total Individual Scores

Teachers	Submissions	Score
T1	34	69.01%
T2	34	71.83%
T3	34	63.38%
T4	34	69.01%
T5	34	80.28%
T6	26	36.62%
T7	34	78.87%
T8	34	81.69%
T9	34	80.28%
T10	34	69.01%
T11	34	87.32%



Teachers	Submissions	Score
T12	34	49.3%
T13	34	73.24%
T14	34	77.46%
T15	34	81.69%
T16	34	73.24%
T17	12	66.2%
T18	34	56.34%
T19	34	61.97%
T20	33	64.79%
T21	34	64.79%
T22	34	77.46%
T23	34	74.65%
T24	3	17.78%
T25	34	66.2%
T26	34	77.46%
T27	34	64.79%

Teachers	Submissions	Score
T28	34	88.73%
T29	34	67.61%

Discussion and Conclusion

The findings of these studies also show that the overall learning analytics does not constantly refer to higher active learning times. With regards to T28 with 100% completion status and highest score obtained, the teacher had only viewed the page 627 times in the spread over four months, yet the one with highest page viewed with 825 times, managed to score only 49.3 percent (T12). Nevertheless, the results also showed that the lowest achiever, T24 could only manage 17.78 percent with 70 times viewing the page. In summary, we can conclude that having a higher participation and engagement of learning does not constantly refer to having a higher peak of learning. This can be related to the fact that each teacher has styles of learning with regards to time and pace of learning. In the online learning, the teachers with a high score and moderate participation (with 100% completion status) preferred to concentrate and focus on learning in one particular period of time – hence producing the highest score. Yet, other teachers could prefer a slower pace of learning over a longer period of time. This can be related to the work of Durkensen et al. (2016) where they found that learning autonomy (i.e. to freely decide on the pace of learning) may have an effect on proficiency. In other words, allowing learning to cater for different paces of learning is important to increase teachers' understanding or increase level of proficiency.

And interestingly, findings also indicated that the teacher with the highest score was the one who was the first to complete all the tasks in March 2018 itself with 100% completion. This shows that course completion does not refer to active contribution throughout the duration of the course that emerged in learning communities. This can be related to the findings of Koller et al. (2013), where they discovered that active participation does not necessarily refer to the fact that learners are community contributors. In other words, teachers can be active learners, but they could prefer a more individualised and unsocial approach to learning, where they interact with learning materials and environment rather than with learning communities. On the contrary, teachers who prefer a more social approach to learning would contribute more to the community but may or may not have a high participation of learning time. From the findings, we can conclude that learning analytics is related to teachers' overall engagement in the lesson. Yet, findings revealed that the levels of learning engagement are also related to



active learning time in both direct and inverse manners which may indicate that a teacher may prefer a faster pace of learning or vice versa.

Despite the interesting findings discovered, it is worthwhile to note several limitations of this study in terms of teachers' background, learning content and duration of course conducted. Teachers who were involved in this study are from one district in a sub-urban city. Although the samples were randomly selected, the background of the samples was not varied, as all of the teachers mentioned in this study are from one state. Further analysis of teachers from different geographical backgrounds in terms of preferred learning styles and engagement will shed different findings in the future. Next, the learning content provided in this module was restricted to educational technology contexts. Lastly, analysis was done after the completion of one semester. Therefore, longer duration of course completion should be considered to obtain deeper insights and better findings in the future.

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