Unboxing Learner Engagement in an Online SEL for Teachers Course on FramerSpace

Hritik GUPTA, Nandini Chatterjee SINGH & Shitanshu MISHRA*
UNESCO Mahatma Gandhi Institute of Education for Peace and Sustainable Development, India
*s.mishra@unesco.org

Abstract: Understanding learning patterns in online learning platforms is an important aspect of digital learning. Our study aimed to present preliminary findings of learners' interactions (*N=29,826*) with course content (on an online interactive learning platform) for the course "social emotional learning for teachers", using course engagement time and quiz attempts as two parameters of learner engagement. Our findings suggest that question difficulty and learner characteristics (motivation to engage) both influence attempt patterns. The results of such analysis can provide data-driven strategies to improve content engagement, teaching methods, and platform features, enhancing online learning experiences.

Keywords: Social Emotional Learning, MOOC, Learner Engagement, Online Course Analytics, Framerspace.

1. Introduction

In the domain of online education, understanding learner behaviour and learning patterns is crucial for enhancing the effectiveness of digital learning platforms. Thus far, measurement of success of learning platforms has been limited primarily to completion rates and perceived benefits (Poellhuber et al., 2019), and the subsequent research in learner analytics has focused on categorising learners using aspects of their platform behaviour such as user clicks (Ho et al., 2015; Khalil & Ebner, 2017) in the context of tangible skills such as programming. The current study seeks to extend this body of research work by using two (number of attempts and course engagement time) parameters of online learners to understand learner behaviour in a massive online open course (available on framerspace.com) (UNESCO MGIEP, 2024) on social emotional learning, a greatly valued intra and inter-individual domain of life skills (Elbertson et al., 2009, Duriappah and Singh, 2019).

2. Research Methodology

2.1 Sample and Data

The data analyzed in this exploratory study were derived from 36,000 learners (35% females from the 49% reported demographics, $Mean_{age}$=40.19 (+/- 9.82)) enrolled in the "SEL for Teachers" (SEL-T) course on FramerSpace. We filtered our dataset (N=36000) further to only retain those who have successfully finished the course (N=29829). Data from 3 participants was excluded due to missing values, hence, our final dataset consisted of 29826 learners.

The online SEL-T course has a set of compulsory and non-compulsory questions with question types ranging from multiple choice questions (MCQs) to reflection-based (open-ended) questions. In the current work, we only consider the data from the 19 compulsory MCQs in the course, where the enrolment time, course engagement time (difference between first and last attempt), time of first attempt (first activity in the course), time of last attempt (last activity in the course), attempt frequency across questions, were extracted for all learners.

2.2 Data Analysis

We computed the difficulty of the questions in terms of the number of attempts made by learners across the 19 compulsory MCQ questions. We define it as the *perceived difficulty of the question as measured by the effort* (number of attempts) demanded to get it correct. We calculated this index **(θ)** for each of the 19 compulsory MCQ questions by subtracting the ratio of the number of learners who finish the question in the first attempt to the total number of learners from 1.

$$\theta = 1 - (no.of\ learners\ getting\ to\ the\ correct\ answer\ in\ 1st\ attempt\ /\ total\ number\ of\ learners)$$

The index can range from 0 (not complex at all or *easy*) to 1 (highly complex or *difficult*). In our dataset, the difficulty index across the question set ranged from 0.06 – 0.42.

3. Results and Discussion

RQ1: What is the association between number of attempts and the question difficulty? Pearson correlation analysis (see fig. 1) revealed a strong linear relationship between the (r=0.94, p <0.001) question difficulty and the average number of attempts across each question.

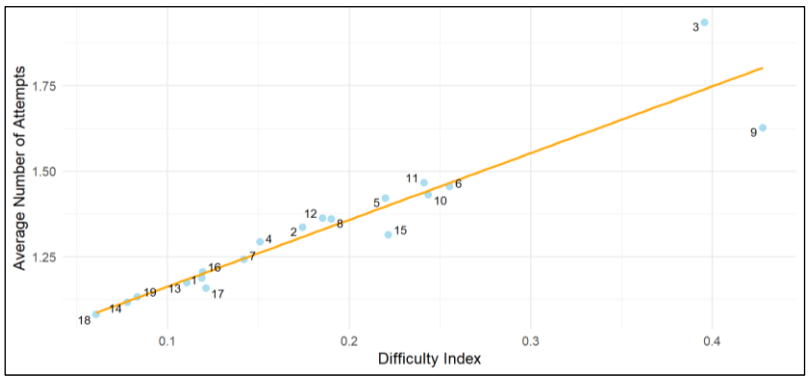

Figure 1. Relationship between the average number of attempts and difficulty index for 19 compulsory questions. Orange line: regression. MCQ #1-4: Module 1; MCQ #5-12: Module 2; MCQ #13-15: Module 3; MCQ #16-19: Module 4.

RQ2: Are there any relationships between the number of attempts for the 19 questions in the course? The number of attempts for questions within a module (intra-module level) have a stronger correlation magnitude (r = 0.41 – 0.76) as compared to the pairs of questions from different modules (inter-module level). This implies that learner behaviour (attempts) across the questions within the same module is similar.

RQ3: What are the associations between the number of attempts across the questions for different cohorts of learners? Upon examining the course engagement time, we found that 60% of the learners engaged with the course for less than 1 day, i.e., n(<1)=17816; and 40% learners engaged for more than a day, i.e., n(>1)=12010.

To study this “gaming the system effect” (Baker et al., 2008), we studied correlations between the number of attempts across the 19 MCQs for different cohorts of learners (with their engagement time with the course as the variable).

The strength of inter-question correlations within a module became weaker with decreasing engagement time (<1 day to <1 hour to <½ hour). This indicates that for learners who game the system, it doesn't matter whether any two questions are in the same or different modules; their learning (attempt) behavior is not influenced by the proximity or nature of the content. This might reflect a varying level of motivation to finish the course on the SEL life skill by teachers. This is in line with social cognitive theory of learning and motivation where personal factors, environmental and behavioural factors are at play in a successful online course attempt by teachers (Watted, 2023).

Our study uses two parameters of number of attempts and engagement information to understand learner behaviour and reports emerging trends for an online course focused at an important life skill of social emotional learning. Traditionally, such features have been studied in hard skill-based courses. Study limitations include diverse implementation sources, such as self-paced and guided cohorts. Russell et al. (2009) report the influence of self-directed vs. cohort based administration of online courses. Finally, we recommend that future studies examine the role of such factors in more life skill-based online courses and investigate the effects of nature of implementation on the subject matter gains of such courses.

References

Baker, R., Walonoski, J., Heffernan, N., Roll, I., Corbett, A., & Koedinger, K. (2008). Why students engage in “gaming the system” behavior in interactive learning environments. *Journal of Interactive Learning Research*, *19*(2), 185-224.

Duraiappah, A. and N. C. Singh (2019). The Science of Social and Emotional Learning. Teacher 13(4): 4-6.

Elbertson, N. A., Brackett, M. A., & Weissberg, R. P. (2009). School-based social and emotional learning (SEL) programming: Current perspectives. *Second international handbook of educational change*, 1017-1032.

Ho, A., Chuang, I., Reich, J., Coleman, C., Whitehill, J., Northcutt, C., ... & Petersen, R. (2015). HarvardX and MITx: Two years of open online courses fall 2012-summer 2014. *Available at SSRN 2586847*.

Khalil, M., & Ebner, M. (2017). Clustering patterns of engagement in Massive Open Online Courses (MOOCs): the use of learning analytics to reveal student categories. *Journal of computing in higher education*, *29*, 114-132.

Poellhuber, B., Roy, N., & Bouchoucha, I. (2019). Understanding participant’s behaviour in massively open online courses. *International Review of Research in Open and Distributed Learning*, *20*(1).

Russell, M., Kleiman, G., Carey, R., & Douglas, J. (2009). Comparing self-paced and cohort-based online courses for teachers. *Journal of research on technology in education*, *41*(4), 443-466.

UNESCO MGIEP. (2024). FramerSpace: Empowering Learners. FramerSpace. Retrieved May 20, 2024, from https://www.framerspace.com/

Watted, A. (2023). Examining motivation to learn and 21st century skills in a massive open online course. *International Journal of Instruction*, *16*(3), 797-822.