Designing an Online Course on Learning Analytics for Educators: Preliminary Insights from a Scoping Review

***Nurbiha A SHUKOR[a], Norah MD NOOR[a], Aini Marina MA'ROF[b], Noor Dayana ABD HALIM[a], Matthew MCLAIN[c], Phillip ROTHWELL[c], Graham DOWNES[c], Frances TRACY[c]**

[a]*Universiti Teknologi Malaysia, Malaysia*
[b]*Universiti Putra Malaysia, Malaysia*
[c]*Liverpool John Moores University, UK*

Abstract: This paper presents a project to develop graduate digital future work skills in data analytics. We describe a review activity carried out to guide the collaborative development of content for an online Data Analytics Course for Educators in Malaysia and the United Kingdom. Our methodology for systematically searching online learning platforms for current courses is described. We also give an overview of our preliminary findings in relation to the duration of learning, the types of online materials used and the range of topics included. Finally we describe our future plans to review the quality of the courses in relation to the depth, scope and complexity of the learning they promote.

Keywords: Data analytics,Learning Analytics, Content development, Online learning, Micro credential

1. Introduction

A new partnership called "i-Digitics" has been formed between Universiti Teknologi Malaysia (UTM), Universiti Putra Malaysia (UPM) and Liverpool John Moores University (LJMU) to develop future employability skills for a workplace driven by technological change. We are developing a new international curriculum on data analytics and offering it to education students online. Data analytics increasingly impact on educators at all levels and understanding the structure, uses and manipulation of data will help to empower those professionals to use them for enhancement of teaching and student support (Ndukwe and Daniel, 2020). We describe our initial review of currently available online courses on Data Analytics in Education. The content review represents a key task for our research group to identify the strengths and gaps in current provision to guide our own development of curriculum content to meet the needs of our target audience. The methodology describes the approach we have taken, future plans for analysis and our preliminary findings and progress. This will be of interest to other researchers and course developers in this field.

2. Methodology

There are many learning platforms that offer online courses on learning analytics and related content coverage such as data science, big data, and data analytics. This study applies a three-stage scoping review methodology to carry out the needs analysis for an educators' learning analytics course. The three stages include reviewing the learning platforms, selection criteria and online courses selection.

In the first stage, the available online learning platforms were analyzed and it was found that there are eighty-three 83 online learning platforms offering thousands of online courses as reported by Class Central (Shah, Pickard, Ma, 2023). From these online learning platforms, the top online learning platforms hosting the largest number of courses are: Udemy (28,216 courses), Coursera (14,638 courses), Linkedin Learning (11,802 courses), Skillshare (9455

courses) and edX (5888 courses). From this selection, the following research question is formulated for scoping review:

1. What is the extent and range of the current courses offered online related to learning analytics?
2. What is the characteristic of the online courses related to learning analytics in terms of quality (depth of learning topics) and core content (duration of learning, range of learning topics, learning materials)?

The next stage is to identify the selection criteria for reviewing the online courses in the respective learning platforms based on English Language as the language of learning, duration of learning that is minimum at 8 hours and study focus that only covers analytics in education, data literacy and learning analytics.

Finally, based on the selection criteria, specific keywords were used to search for courses that relate to learning analytics. Each learning platform was queried three times, each time with one of the following search keywords. The keywords used are ‘learning analytics’, ‘analytics and education’, ‘learning analytics and education’. Each query was then filtered to include courses in English Language and learning duration of minimum eight hours.

3. Preliminary Findings

Based on the selection criteria of language and duration of learning, there were a total of 395 courses selected for further investigation consisting of 63 courses in Udemy, 169 courses in Coursera, 74 courses in Linkedin Learning, 20 courses in Skillshare and 69 courses in edX.

Upon review based on the study focus, there were ten (10) courses found with 3 courses in Udemy, 3 courses in Coursera, 2 courses in Linkedin Learning, 0 courses in Skillshare and 2 courses in edX. A description of each of these courses is provided in Table 1 of our appendix handout at the conference. The key features of the courses are described as follows:

3.1 Duration of learning

The preliminary findings show that an online course that lasts around 8 hours is best for courses with quick overviews. The duration is suitable for introducing learners to a specific topic or providing a basic understanding of a subject. A course within 8 to 16 hours allows for a more in-depth exploration of a topic, appropriate for intermediate-level content where learners can gain a solid grasp of foundational concepts and even apply them in practical exercises. In longer duration courses exceeding 16 hours, these courses have complex content, teach advanced skills, or provide comprehensive learning experiences.

3.2 Learning materials

Online learning materials refers to the educational assets shared on digital platforms. It can be reading material, videos, audios, interactive things such as simulations, pictures, quizzes, and assignments. The preliminary findings suggest that all the online courses provide learning materials in the form of video recordings, reading materials, and assessment in the form of self-paced short quizzes.

3.3 Range of Learning Topics

In an online learning course, a "topic" refers to a specific subject, theme, or area of knowledge that is being taught and studied. Learning topics in online learning courses are divided into different modules or units, and each module may cover one or more topics. Topics serve as the building blocks of the course's curriculum, guiding the progression of learning from basic to more advanced concepts. The preliminary findings show that the learning topics related to learning analytics range from fundamental concepts to technical content. Thematic analysis will be conducted to explore the depth of the range of the learning topics in the 10 courses.

3.4 Quality of Courses

In this study, we posit that the quality of the courses will be determined by the depth of the learning content. Following this developing scoping review, our next focus will be a qualitative evaluation of these identified 10 courses. Using Bloom's taxonomy (Bloom, 1956) in its most recent form as updated by Anderson and Krathwol (2001), we aim to assess the depth, scope and complexity of the learning outcomes in these courses, providing insight into their educational efficacy and quality.

4. Conclusion

Learning analytics plays a crucial role in today's teaching practices. As the educational sector continues to produce and utilise vast amounts of data, teachers need skills to interpret and apply this data effectively in their classrooms. This ability enables them to make more informed decisions about student learning, adapt teaching strategies, and evaluate educational outcomes with greater precision.

Our scoping review provides an initial overview of online courses that may be relevant for teachers to understand learning analytics. Preliminary findings from the 10 courses indicate that courses on analytics are generally designed into three learning durations: courses that require less than 8 hours of completion time, 8-16 hours, and more than 16 hours of learning time, ranging from fundamental topics in data science to highly technical aspects of data analytics. However, the learning materials available are still limited to mainly recorded videos, and a sparse number of downloadable reading materials and one-way exercises.

By identifying and analysing these courses, our review aims to identify gaps that do not fully cater to the specific needs of educators and highlight the potential areas for course development and refinement. Ensuring that teachers have access to pertinent and effective training in learning analytics is crucial for continued advancement of educational practices. While many online courses exist, their relevance and alignment with the educational context warrants further exploration. This work, therefore serves as an initial step, aiming to bridge the existing knowledge gap and support educators in their professional growth.

Acknowledgements

i-Digitics project is supported by a UK-Malaysia University Partnerships Catalyst Grant from the British Council's Going Global Partnerships programme. The programme builds stronger, more inclusive, internationally connected higher education and TVET systems.

References

Anderson, L. W., Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman.

Bloom, B. S. (1956). Taxonomy of educational objectives. Vol. 1: Cognitive domain. *New York: McKay*, 20, 24.

Chucherd, O., Vallibhakara, S. A. O., Paiwattananupant, K., Puranitee, P., Wattanayingcharoenchai, R., & Vallibhakara, O. (2023). The effect of online video-assisted teaching program on medical students learning procedure of fractional curettage. *BMC Medical Education*, 23(1), 1-8.

Malakul, S., & Park, I. (2023). The effects of using an auto-subtitle system in educational videos to facilitate learning for secondary school students: learning comprehension, cognitive load, and satisfaction. *Smart Learning Environments*, *10*(1), 4.

Ndukwe, I.G., & Daniel, B.K. (2020) Teaching analytics, value and tools for teacher data literacy: a systematic and tripartite approach. International Journal of Educational Technology in Higher Education, 17 (22)

Shah, D., Pickard, L., & Ma, R. (2023). Massive List of MOOC Platforms Around the World in 2023. https://www.classcentral.com/report/mooc-platforms/