RELATIONSHIP BETWEEN LEARNING ANALYTICS AND STUDENTS PERFORMANCE

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ABSTRACT - The fast pace of big data analytics advancement make it necessary for any organization to coincide it with their management and measurement process. It has become essential for education sectors to analyze this for the development of both learning and academic activities [1].Shikha. A, 2014). Learning analytics (LA) is the measurement and analysis of collection of data with regards of learners and their context for making learning more effective. LA is much concern with improving learner's success. This paper investigates the impact of learning analytics towards student's performance. The focus group were students in Technology Management program at UTMSPACE, Kuala Lumpur, in cohort 2017/2018. Two research objective have been identified; (i) to find the level of LA understanding among academic staffs by using questionnaire and (ii) to investigate the use of learning analytics in predicting student performance by using secondary data; course assessment report (CAR) for subject Technology Management and Operation Management. Findings from this study show that (i) there is lower level of LA understanding among academic staffs and (ii) there are several consequences of using LA in predicting student's performance.

Keywords: Learning analytics; students performance; UTMSPACE

1. INTRODUCTION

Living in era of fourth industrial revolution (4IR), data have been one of the main components in 4IR. Data is generated almost from every sector [2]. Be it in the sport sector, construction or education sector as well. The primary focus of this paper is to analyze the impact of learning analytics and student's performance. LA has been used as tools used to improve learning and education. Other series field of study also used analytics such as business intelligence, web analytics, academic analytics and action analytics. All of this uprising field has been identified as the obsolete or ladder in real time use of LA by students, instructors, and academic advisor to improve student success. The use of LA as tool to predict behavior, act on predictions and feed those results back into the process for improvement of the prediction over the time. Past research [3] stated that LA not only provides one of

many methods to not only documentation of student performance but also providing encouraging tools that helps for continuous improvement that accrediting bodies are seeking.

2. MATERIALS AND METHODS

The research used reference model proposed by [4] as it is easily to be understand about this research flow in learning analytics. As shown in figure 2.4, there are four dimensions in the reference model for LA which is; (i) What?-Knowing and analyze types of data that the system gather, manage, and use for analysis,(ii) Who?- Determine the subject of analysis, (iii)Why?- Objective for analyzing collected data by the system, lastly (iv) How?-Techniques and tools used in analyzing the collected data.

2.1 Data and environment

Main producer of data in educational mainly come from the learners that come from varied learning environment and system. Another source of data, distributed learning environment had gain increasingly popular and vital with the growth of user-generated content. Personal learning environment (PLE) concept represents the open and distributed learning environments. PLEs gather data from different source beyond LMS. The data can be in formal and informal learning channels, different format, and distributed across space, time, and media. Researcher [5] from her speech in 21st Century Learning Shift at UTM Kuala Lumpur stated that data from formal learning data, for example, course assessment report can be used to interpreted LA. For this research, distributed learning environment have been used. Course assessment report (CAR) is the formal summarization of each course that has been highlighted in this study which is Technology Management and Operation Management.

2.2 Objectives

Different stakeholders will derive different types of objectives within their point of view. Possible objectives of LA includes; (i) Monitoring and analysis – The aim of monitoring is to track student activities and generate reports in order to support decision-making be it by the educational institution and teacher as well; (ii) Prediction and intervention – The goal in prediction is to develop a model that helps to predict learner knowledge and future performance with reference from learner current activities and accomplishments; (iii)Tutoring and mentoring –

Tutoring focusing more on helping students in limited context of course and limited to teaching process; (iv)Assessment and feedback – Focus on improving effectiveness and efficiency of learning process; (v) Adaptation – The LA's aim in this objective is to portray a clear picture about steps the students need through adaptation of organizing learning resources and instructional activities; (vi) Personalization and recommendation – LA is considering highly learner-centric in personalization. The focus is to guide the learners in their learning and refinement their PLEs whenever they need to achieve their learning goals. Recommender systems help by fostering self-directed learning; (vii) Reflection – learning by reflection promotes the chance of learning by returning to and evaluation of past work and personal experiences with the aim of improving future experiences and encourage life-long learning. Based on the above objectives, the researcher had chosen reflection as the main objective of using LA in this research. In previous chapter, the researcher had mentioned about finding relationship between LA with student performance. Therefore, by evaluating past course assessment report (CAR), the researcher can detect for patterns in student performance and improve future learning experiences for the student. Researchers have fill out the Chattis et al., (2014) reference model as below;

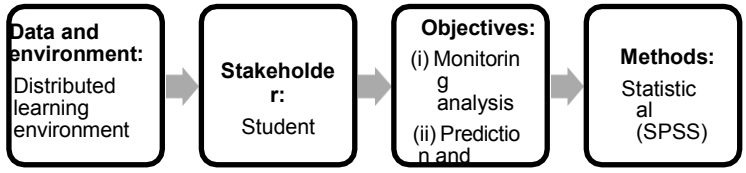

Figure 2: Chatti et al.(2004) referance model

3. RESULTS AND DISCUSSION

Correlation coefficient result showed -0.31944, which shown negative relationship between learning analytics acknowledgement and academic staffs.

In investigate research objective 2, the uses of CAR help the institution to have knowledge on problematic course that should be address well. This supported by [7] stated that the use of analytics tools can be used to identify potential students at risk in their study and improving student success. Past research [8] stated that analytics tools in educational institutions can act as the driver in the development of student requirement policies, financial decisions, hiring purpose and also improving course planning. In course technology management, in PLO 1, it indicated that the level of knowledge that students achieved throughout the course. The result shows that students achieve the same level par with KPI, 65%. For PLO3 shows the social skills and responsibilities and the class scores 77% for the

respective program outcomes. At this stage, where the students are still in year 2, researchers observe that the students have the ability to understand the basic concepts, theories and application in technology management course. Apart from that, students have social skills and responsibilities which indicate the group project that they had been assign. As explain by the course coordinator, the students have been assign to do project innovation with reusable items and made a presentation as well as demonstration to the class. This contributes higher percentage in PLO 3 where the students need to be in group to build up their project, mingles with outsider to get the reusable items and lead their team with example. Therefore, lecturers or even the department can predict that the selected sample students have high ability in understanding basic concepts, theories and application for course operation management. In PLO1 for operation management course, it showed an increase in percentage, 69%. With the basic concepts, theories and application in technology management, they perform better in this course as both subjects are inter-related. In PLO3, it showed a decrease pattern in terms of social skills, leadership and teamwork. In such, lecturers from both courses can make use the data in the PLO from technology management course to exploit it in teaching and learning for operation management course. In return, this could help to increase the success pattern of the students and identify any "defect" in their study beforehand. This result supported by [9] which stated that goal of LA include (i) predicting learner performance, (ii) suggesting to learners relevant learning resources, (iii) increased reflection and awareness on the part of the learner, (iv) detection of undesirable learning behaviors, and (v) detecting affective states (e.g., boredom, frustration) of the learner.

4. CONCLUSION

The finding can also be used as a bridge between the analytics space and the course/curriculum design environments, therefore encouraging the respective department in UTMSPACE to use analytics for course and curricular design. The achievement will encompass strains and performance of students as well as the lecturer itself.

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