Exploring the Usage of the Learning Management System in Oral Health Courses

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ABSTRACT---- ***Learning Management Systems (LMS) are being increasingly used in Higher Education to augment teaching and learning in both online and face-to-face courses. The oral health courses have adopted the same approach. This study explores the usage of the LMS by students in the oral health courses. The LMS usage data in each of the oral health courses were extracted through the learning analytics feature and analysed. The Year I students spent more time on the LMS than Year II students but less than the Year III students. Students spent more time on the LMS in clinical courses compared to nonclinical courses. A greater number of academic literary resources were accessed and downloaded through the LMS in nonclinical courses compared to clinical courses. Year III students least accessed the academic literary resources. The findings of the study, though not conclusive, have highlighted the potential implication of determinants like diversity of resources and assessment design on the usage of LMS.***

Keywords--- Learning management system, usage, clinical courses, nonclinical courses

1. INTRODUCTION

The goal of teaching and learning in professional oral health courses is to empower students with knowledge, skills, and attributes to build competence and capability. In the last twenty years, the integration of technology has aided the growth of pedagogical practices to facilitate teaching and learning through online digital technology that can be accessed through electronic devices. E-learning is a teaching and learning approach that uses electronic media and devices to deliver content, communicate, interact, and assess (Mohamed & Vengrasalam, 2022). The content for e-learning is delivered using a Learning Management System (LMS). LMS is a web-based application for delivering and administering courses. The objective of the LMS is to enable access to information at any time without requiring the presence of the teacher (Chan et al., 2021). The software used in LMS platforms has constantly evolved and made available sophisticated tools for both pedagogical and administrative tasks and activities. Through the tools offered by LMS, learning resources including lecture recordings, demonstration videos, eBooks, and digital journal articles can be posted. So also, collaborative, and engaging activities like formative & summative assessments, discussion threads and online video conferencing can be facilitated (Adtani et al., 2023; Faradillah & Budi, 2021). There are tools that can be used for administrative tasks like making announcements, communicating with individual students or student groups, evaluating assignments and posting grades.

Though LMS has been available for nearly three decades (Toring et al., 2023), its adoption in Higher Education has seen a significant leap since the COVID-19 global pandemic due to its potential to augment teaching and learning, in both face-to-face and distance learning scenarios. The usage of LMS has been positively linked to academic performance (Buckley et al., 2022; Gaftandzhieva et al., 2022), because of which there is a continued interest in factors that influence the use of LMS by students. LMS has the feature to track information about usage through learning analytics. The data generated through the learning analytics function can be used to analyse students' participation and interaction with the online modules (Chan et al., 2021).

Some of the factors that affect the usage of LMS by students include acceptance and access to technology, perceived ease of use, perceived usefulness, and perceived satisfaction (Joo et al., 2016). In addition to these factors, other factors that may influence the usage of LMS are the system content, study relevance, type of course, gender, age, socioeconomic

background, ethnic background, and the academic year level (Chan et al., 2021; Gaftandzhieva et al., 2022; Venter et al., 2012). The research findings on the usage of LMS by students have not always been without contradiction (Alshorman & Bawaneh, 2018; Bansah & Agyei, 2022; Le et al., 2023). Hence, there is still a need for further research on the usage of LMS so that teachers, students, educational technologists, and designers can work collaboratively to improve LMS to achieve better pedological outcomes.

The purpose of our study is to explore the following two questions:

- Are there differences in the use of the Learning Management System across courses at different academic levels?
- Is there a difference in the usage of the Learning Management System between practical/clinical and nonclinical courses?

2. METHODS

This is a retrospective quantitative study using course-level data. Course-level data was extracted by a learning technologist using the Learning Analytics feature on the LMS (Canvas) for the purpose of this research. Auckland University of Technology Ethics Committee confirmed no ethics approval was required for this research. The sample for this study included all students enrolled in the oral health courses attached to the Bachelor of Health Science (Oral Health) program at the Auckland University of Technology in 2022. Successful completion of the full-time undergraduate three-year program will qualify students to register as Oral Health Therapists with the dental council of New Zealand. The sample consisted of seven Oral Health courses enrolling 228 students.

The courses included in this research were two-Year I courses, three-Year II courses and two-Year III courses. The student cohort enrolled in each year were more or less the same. The two courses in Year I included one introductory practical and clinical course, and one nonclinical course. The duration of the Year I courses was one semester. The three courses in Year II included two intermediate practical and clinical courses, and one nonclinical course. The duration of all three courses was two semesters. The two courses in Year III included two advanced clinical courses and the duration of each course was one semester with one following the other.

The course level data for each of these courses was extracted using the Learning Analytics feature on the LMS(Canvas). The data obtained included the total number of logins for each course, the time spent on LMS, the lecture recordings and demonstration videos viewed. The courses on Canvas are organised in pages, and the total number of page views for each course was obtained. The digital academic resources which included eBooks and journal articles accessed and downloaded for each course were collated. The page views recorded the access and if the resources were downloaded, they were separately recorded and the ratio of page views to downloads was calculated. The course-level data was entered into IBM SPSS (Statistical Package for Social Sciences, IBM Corporation, Endicott, NY, USA) version 26 for Windows. The data were subjected to descriptive statistical tests.

3. RESULTS

The total number of enrolled students in the oral health courses was 228 in 2022. As shown in Table 1, the number of students enrolled in the seven courses ranged from 64 in the second-year nonclinical course to 84 in the first-year introductory practical and clinical course.

The highest number of total logins into the LMS was for the two second-year clinical courses, 45850 and 37198 respectively. So also, were the number of downloads. The lowest number of logins was for the two nonclinical courses. 18449 for the first-year nonclinical course and 14570 for the second-year nonclinical course. The number of times the videos of either the lecture recordings or demonstration of practical/clinical procedures were accessed was highest for the Year II intermediate practical/clinical course 1. As shown in Table 1, it was 3485. Of the two non-clinical courses, the Year II nonclinical course lecture recordings were accessed more than the Year I nonclinical course. It was 1272 for the nonclinical Year II course and 129 for the nonclinical Year I course, as shown in Table 1.

Table 1: Usage of LMS

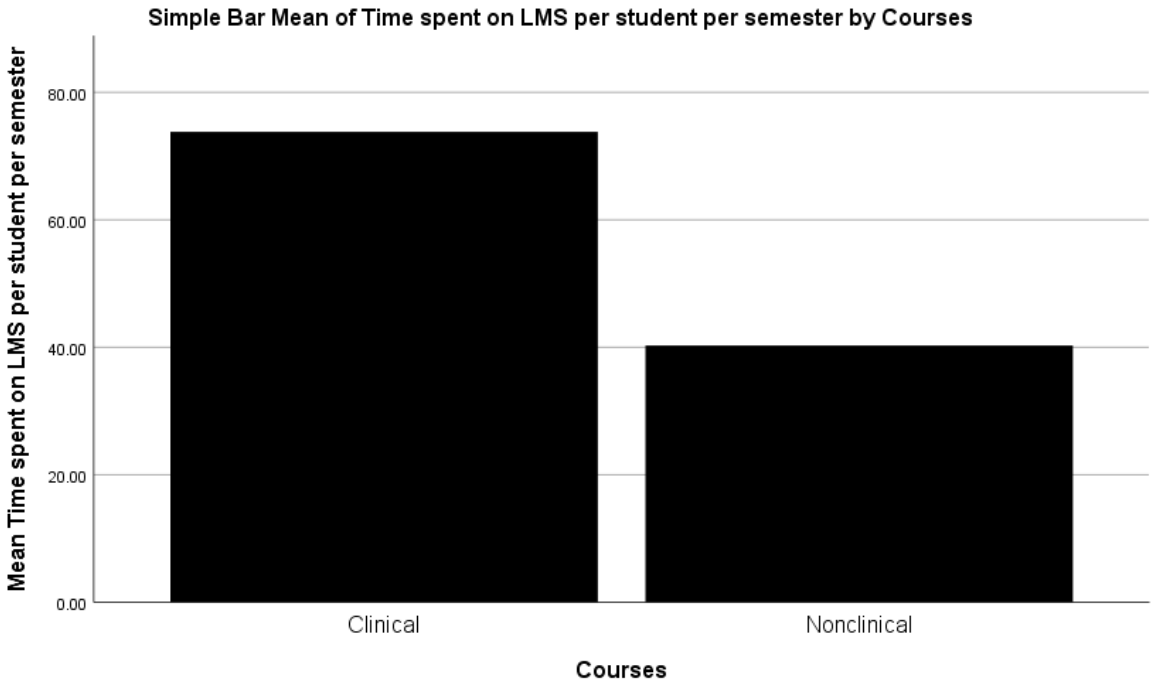
Year	Course	Total Enrolments	Number of logins	Number of Downloads	Time spent on Learning Management System	Lecture recordings/ Demonstration Videos accessed
Year I	Introductory Practical and Clinical Course	84	39285	37586	8418.46	1983
	Nonclinical Course	83	18449	10915	2601.08	129
Year II	Intermediate Practical and Clinical Course 1	72	45850	44814	7314.12	3485
	Nonclinical Course	64	14570	13786	5728.13	1272
	Intermediate Practical and Clinical Course 2	72	37198	39590	8991.28	128
Year III	Advanced Clinical Course 1	72	27258	17326	6102.74	1230
	Advanced Clinical Course 2	72	27164	20561	7573.44	0

Table 2: Usage of academic digital resources by course

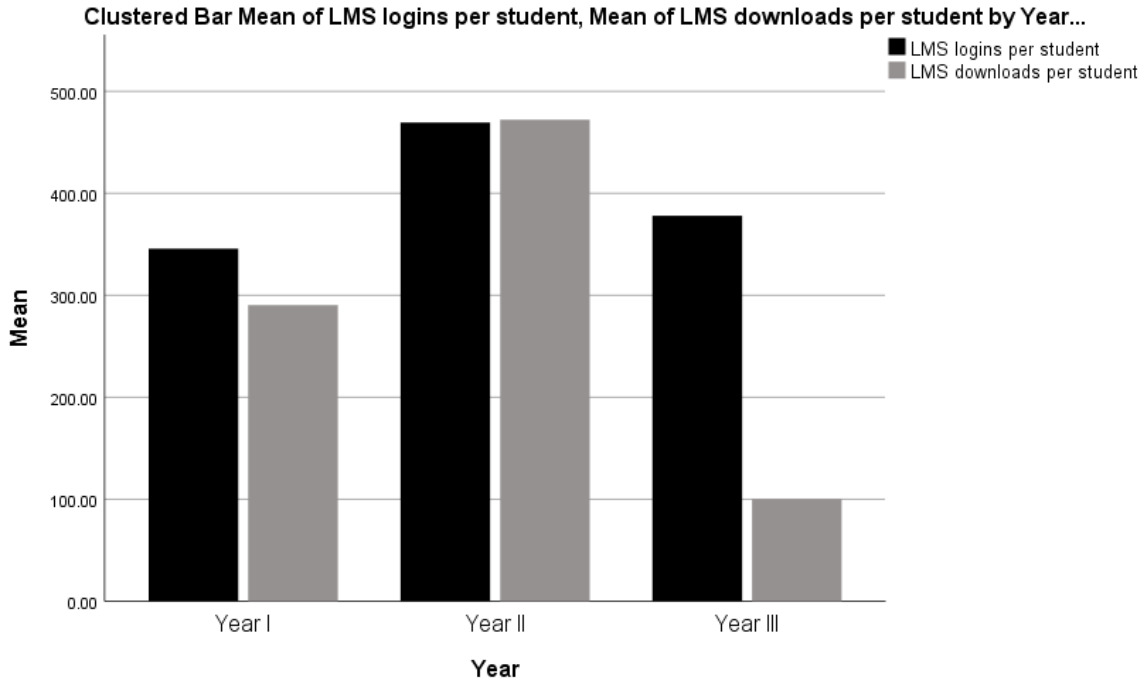
Year	Course	Digital resources accessed in each course	Digital resources downloaded
Year I	Introductory Practical and Clinical Course	2477	1201
	Nonclinical Course	1036	589
Year II	Intermediate Practical and Clinical Course 1	1849	1062
	Nonclinical Course	2989	2505
	Intermediate Practical and Clinical Course 2	1461	1092
Year III	Advanced Clinical Course 1	477	117
	Advanced Clinical Course 2	453	71

The time spent on the LMS in the clinical courses was more than in the nonclinical courses as shown in Graph 1. The Year I students spent more time than Year II students but less than Year III students. The ratio of pageviews to downloads in the Year II courses was proportionate; in contrast in the Year III courses the ratio of pageviews to downloads was disproportionate as shown in Graph 2.

Graph 1: Time spent on LMS in clinical and nonclinical courses.

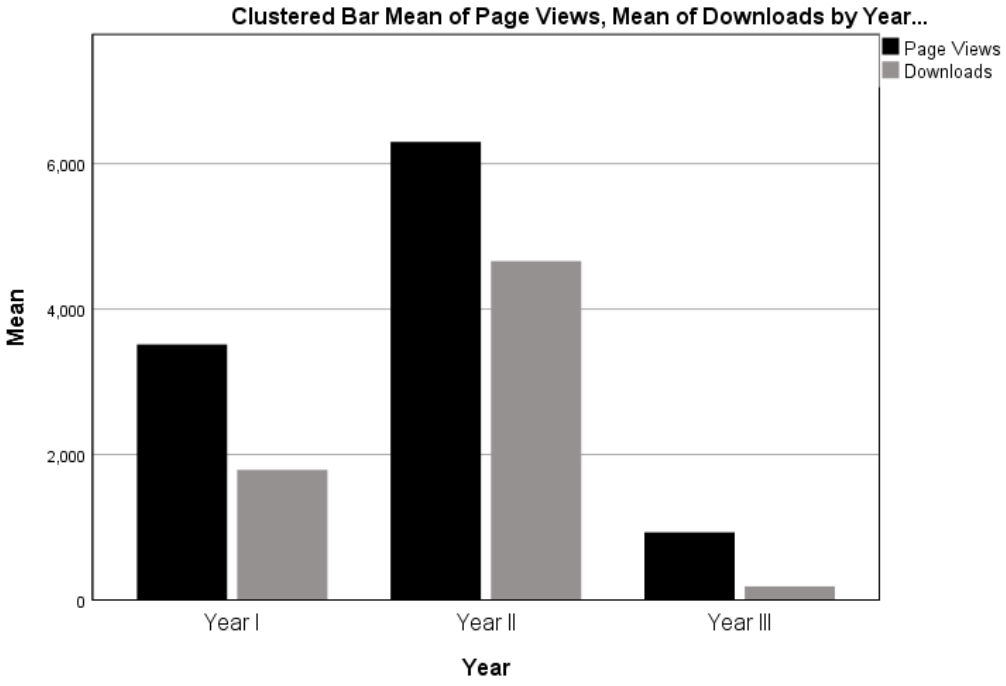


Graph 2: Logins and Downloads on the LMS per student by Year



The academic digital sources were most accessed in the Year II nonclinical course. As shown in Table 2, the resources were accessed 2989 times and material was downloaded 2505 times. The academic digital resources were least accessed and downloaded in the Year III advanced clinical courses as shown in Graph 3.

Graph 3: Year wise usage of academic digital resources per student



4. DISCUSSION

There has been ample evidence from multiple sources that access and acceptance of technology, system quality, infrastructure, perceived convenience, perceived usefulness, course structure, and course content among other variables influence students' usage of the LMS (Alzahrani & Seth, 2021; Bansah & Agyei, 2022; Chan et al., 2021; Kanthawongs & Kanthawongs, 2013; Koh & Kan, 2020).

Our study analysed the use of the LMS by Year I, II and III students enrolled in the Oral Health programme in 2022. All these students were familiar with the LMS prior to enrolling into these courses as they were introduced to it in the prerequisite courses. In 2022, all the Oral Health courses were designed to have similar structure and layout. Each course was designed with the collaboration between the course coordinator, a learning advisor, and a learning technologist because of which factors like accessibility of content, and easiness to navigate were similar in all the oral health courses. Also, subjective evidence indicated that infrastructure barriers to accessing LMS were not significant for these students. The student services unit at the university had provided laptops and internet network access for students in need. However, the areas of potential differences between the oral health courses were in the course content and students' perception of how LMS contributes to their learning efficiency and academic performance. The 2020 study on arts students concluded that the perceived quality of learning outcomes in the LMS was a significant predictor of satisfaction and usage(Koh & Kan, 2020).

The study at Abdulrahman Bin Faisal University found significant differences in students' attitudes. The humanities students' attitudes were more positive than the medical and engineering students (Alshorman & Bawaneh, 2018). Course-centricity of the information posted on the Learning Management System is likely to determine its perceived usefulness; hence, there may be variability in terms of usage of the system for each course. The findings in our study indicate that students logged in, downloaded, and spent more time on the LMS in clinical courses compared to the nonclinical courses. The clinical courses have practical and clinical demonstration videos that nonclinical courses do not have. This factor could have potentially influenced the difference. This finding aligns with a previous study that has established that the course-centricity of the LMS is likely to determine its perceived usefulness; hence, there may be variability in terms of usage of the system for each course. The perceived usefulness of a course is a factor that determines continuous intention, and continuous intention has been determined to be directly related to the actual usage of the LMS (Joo et al., 2016). In addition to the availability of significant resources on LMS, their perceived usefulness and diversity of the types of resources influence access and engagement with the online resources on LMS for a course (Alphonce & Mwantimwa, 2019; Bansah & Agyei, 2022). The second-year clinical courses had multiple online formative assessments attached to the course content to complete before practical and clinical sessions which would have increased the time spent on the LMS. This strategy of using online tests and quizzes in preparation for practical and clinical activities frees up more time for hands-on activities (Washington, 2019).

The course content, the learning objectives, and the design of the assessments in the various courses influence the usage of LMS by students. The nonclinical courses had research-based assessments with academic learning outcomes that assessed drawing from multiple perspectives and hence the academic literary sources were likely to have been accessed and downloaded more in the nonclinical courses on LMS than in the clinical courses. Helpfulness in completing assessments has been considered an important determinant of LMS usage (Alphonce & Mwantimwa, 2019). In contrast, in the Year III advanced clinical courses, academic literary resources were least accessed by students. This could be either potentially because of their self-directed learning skills or their attitude towards LMS. Students may have choosen to access information from other sources (Thepwongsa et al., 2021). In a study at Abdulrahman Bin Faisal University, it was found that students' positive attitudes towards the LMS decreased as the years gradually progressed. The final year students' attitudes were the least positive among students and positivity influences usage of LMS (Alshorman & Bawaneh, 2018). Our study also found proportionately fewer downloads of resources, indicating less engagement from the Year III students. This finding contrasts with a study of students enrolled in their second and third years at the University of Cape Coast. The authors reported finding no statistically significant difference in the level of acceptance and usage of the LMS between the second and third-year students (Bansah & Agyei, 2022).

A smaller number of videos were accessed in some oral health courses compared to the others because fewer videos were posted into LMS in those courses. System content has been linked with the usage of LMS (Daultani et al., 2021). With blended learning, the ratio of face-to-face sessions and online sessions in each course was not the same. However, determinants such as the quality of instructional design and content are also likely to have influenced the usage of LMS (Venter et al., 2012).

The strength of our study is that the course navigation system was similar in all the courses. The students enrolled were familiar with the LMS prior to enrolling into these courses. The students had used the same LMS in the prerequisite courses. Anecdotal evidence indicated no infrastructure barriers to accessing the system. Though the study has explored the usage across seven courses, it has not examined the quality of resources, the total number of resources and their relationship to learning outcomes and assessment. Neither has this study examined other social and psychological barriers to the use of LMS. Data on intrinsic motivating factors was not collected. The formative assessment and discussion forum features on the LMS were not used consistently in the courses and hence were not explored. So also, there were differences in the delivery of lectures across the courses, with some being synchronous and some being asynchronous.

5. CONCLUSION

This study has explored the usage of the LMS in the oral health courses. The key findings using information from the learning analytics data; were that students logged in and spent more time on the LMS in the clinical courses but accessed a greater number of academic literary resources in the nonclinical courses. Though these findings are far from conclusive; it has provided motivation for future research on potential determinants for differences in use of LMS like diversity of resources and assessment design. Future research with the evolving learning analytics feature will provide information that will enable the design of courses on the LMS that are pedagogically appropriate.

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