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Original Article

Role of a Learning Management System in Medical Curriculum; Students' initial perception about the use of LMS-Moodle at Fazaia Ruth Pfau Medical College

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ABSTRACT

The modern medical curriculum has to deliver a great amount of educational content and knowledge to the learners as changes in content delivery are occurring at a very high speed. New technology and tools are introduced each day for this purpose. MS Moodle helps in students` learning mainly through tools which provides students` interactions like discussions forums, timed assignments, and use of computer-based testing as E-assessment tools. During implementation of e-learning platform LMS-Moodle, it was felt necessary to examine students' perception about Moodle. **Objectives:** To assess students initial perception of about the use of the learning management system Moodle in integrated modular systems at FRPMC. **Methods:** The study design was cross-sectional and observational in nature with a quantitative data collection method. The study was conducted at Fazaia Ruth Pfau Medical College, Karachi during 2021 to 2022. Total number of participants was 100. The instrument used in the research was a questionnaire consisted of 17 statements presented with 1-5-point Likert scale for responses. The Cronbach alpha test was employed for reliability test. The analysis was done by SPSS version 23. **Results**: By analyzing overall received feedbacks of participants, the cumulative mean on 5-point Likert scale was 3.3 where 1 considered as strongly disagree and 5 as strongly agree. **Conclusions:** It was concluded that majority of participants studying in Fazaia Ruth Pfau Medical College have positive perception and experience of using Learning Management System Moodle in medical curriculum.

INTRODUCTION

The modern medical curriculum has to deliver a great amount of educational content and knowledge to the learners whereas changes occurring in content delivery are taking place at a very high speed. New technology and tools are introduced each day for this purpose. To adapt these changes in health professions education, e-learning plays a vital role in providing learners with a flexible learning environment to disseminate knowledge online [1]. For many decades many universities have been trying to incorporate distance learning programs with their existing programs but able to do with partial success due to technological constraints and lack of awareness of implementation issues [2]. However, during the past few years, many universities including medical colleges have observed a decent response in the implementing e-learning in their curriculum [3]. In addition, the utility of e-Learning and Learning Management System (LMS) came into the limelight because of the prolonged closure of educational institutes due to the COVID-19 pandemic starting at the beginning of the year 2020 [4]. On an emergency basis, schools and colleges including medical colleges needed to adopt e-learning tools for the continuation of their ongoing classes [5]. Therefore, effective learning management was a need of the hour. Irrespective of COVID-19 status, it was never easy to start this program without a strong infrastructure and a team-based approach in order to make it successful [6]. There are many important factors which play role in the successful implementation of e-learning LMS, in which the foremost factor is LMS`s user-friendliness and its cost-effectiveness. Therefore, most of the universities around the world is now choosing Moodle a Learning management system which is very user-friendly and open source free software for their e-learning programs [7]. E-learning can

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be related to many learning theories in which the most important theory, which usually linked with e-learning is social constructivism [8]. According to this theory, online learners conceive new or a shared knowledge or understanding and comprehend the meaning and merge it with their existing knowledge with their individual experiences [9]. Likewise, the theory of connectivism is also linked with e-learning where learners to learn from social interaction and team collaboration, and getting benefit from sharing their personal experiences and diverse opinions in the group of network [10]. Online teaching and learning is opening a new paradigm in education which cannot be ignored. New technology and advancements are emerging at lightning pace in medical education. Use of tablet, smart phone, smart TV are usually incorporated in these technologies. It is never too late for medical schools to align with this new technology and tools used in these technologies. The Learning Management System provides an online platform or software application that is used for tracking, reporting, assessment and delivery of educational content [11]. The concept of a Learning Management System directly comes from e-Learning. Moodle is a type of Learning Management System that is free (open source) software, which helps in curriculum planning, content delivery, e-Assessment, therefore is used by health professions educators in designing, conceptualizing, implementing online courses and other programs. Flipped classroom recently got attention which uses online learning material before the class and during class students` activities [12]. Moodle is the most widely used LMS in the world, it has been providing the most powerful tools for online learning which includes learning resources in a form of Lectures in ppt or PDF formats, online assignment, blogs, forums, lessons, quizzes, workshops, chat, wikis, live streaming, and recently getting attention are gaming tools example H5P tools which provides extra interactivity for students engagements during lesson delivery [13]. Many studies show that LMS Moodle helps in students` learning mainly through tools which provides students` interactions like discussions forums, timed assignments, and most importantly use of computer-based testing in e-assessment tools [14]. At Faizaia Ruth Pfau Medical College (FRPMC) Karachi, which was recently established in 2019, initiated the implementation of LMS in the academic programs. E-learning team was involved in the installation of LMS on a virtual server and also created profiles for each student and faculty members. Later many courses for medical education and modules in integrated modular system of curriculum were created. During Covid-19 pandemic during when schools and colleges were closed for two and half months' time, during this duration our college started using EDMODO Learning management system but later shifted to Moodle-Learning management system. Moodle continued as a main learning management system for both online delivery and to support face-to-face teaching on regular basis. For full implementation of the e-learning platform LMS-Moodle, it was felt necessary to examine students' initial perception about Moodle as a LMS that they were using in their curriculum. Our aim of the study is to know students` initial perception about the use of learning management system Moodle in integrated modular systems. Furthermore, we plan to use this research data for future improvement in teaching and learning strategies.

METHODS

The study design is cross-sectional, descriptive, and observational in nature with a quantitative data collection method [15]. A 5-point Likert scale questionnaire was devised to gather quantitative data from students. The questions were related to general perception about the use and utility of LMS-Moodle. Questions were mainly inquiring about issues related to login and registration process, students' interactive activities like discussion forums and assignments, accessing learning resources like lectures, online videos and also about use of online assessment methods and discussion forums for collaborative learning. Data was analyzed by the mean and standard deviation of all responses obtained through 1-5 point Likert scale. The overall consistency of the questionnaire was also calculated through Cronbach alpha value. The study took place at Fazaia Ruth Pfau Medical College during 2021 to 2022 for second year MBBS program. Participants were students of second years M.B.B.S program of FRPMC, total number of participants who took part in this study was 100. Sample size was calculated using W.H.O software for sample size calculation. The instrument used in the research was a questionnaire based on a 5-point Likert scale. The participants were asked to participate by indicating their agreement or disagreement with each statement on a 5-point Likert scale ranging from 1(strongly disagree) to 5 (strongly agree) research questions. The questionnaire consisted of 17 statements presented with 1-5-point Likert scale for responses [16]. This questionnaire was developed on Moodle and was filled out by students online. Consent was also taken online from students. For some students who were unable to fill out the questionnaire online due to technical difficulties, they were given hard copies of the questionnaire to fill. To test the reliability of the questionnaire, the Cronbach alpha test was employed. The Statistical Packages for Social Sciences (SPSS) version 23 was employed in the analysis. To determine the initial perception levels obtained from a questionnaire, data analysis was done based on mean,

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standard deviation scores obtained from a 5-point Likert scale questionnaire. Frequency Tables were tabulated to depict results for results section. The comparison among different variables were analysed through appropriate tables, graphs, and their percentages. Mean and standard deviation were computed for each variable of 5-point Likert scale. Data of 4 participants were incomplete so it was not included in the study. The reliability of the Likert scale was estimated using Cronbach's alpha, which showed all variables to have reliability coefficient of 0.867 which is more than 0.75 which is in acceptable range (>0.75), indicating the high level of reliability or consistency [17] (See Table 3).

RESULTS

By analyzing overall received feedbacks of participants, the cumulative mean on 5-point Likert scale was 3.3 where 1 considered as strongly disagree and 5 as strongly agree. Thus, it can be inferred by cumulative mean which is 3.3 that overall trend received from students was positive for the use Moodle as a Learning Management system in medical curriculum (Table 1).

S. No.	Questions	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Mean ± SD
1	The login process is easy	16	25	11	19	29	2.8 ± 1.5
2	The registration process is easy	14	19	18	21	28	2.7 ± 1.4
3	The interface is user friendly	10	51	16	16	7	3.4 ± 1.1
4	Downloading reading materials and lectures is easy	24	53	9	7	7	3.8 ± 1.1
5	Use assignments routinely	7	50	21	12	10	3.3 ± 1.1
6	Use discussion forums routinely	0	25	46	17	12	2.8 ± 0.9
7	Provides Flexibility in learning (anytime, anywhere)	15	45	13	11	16	3.3 ± 1.3
8	Participation in discussion forums facilitates collaborative learning	11	19	16	27	27	2.6 ± 1.4
9	Sharing knowledge helps in becoming a good team player	19	49	8	12	12	3.5 ± 1.3
10	Sharing prior knowledge with peers helps in the development of new and practical knowledge	19	39	14	11	17	3.3 ± 1.4
11	Highly motivated to use LMS-Moodle	9	55	14	9	13	3.4 ± 1.2
12	Computer-based testing is a useful tool in the assessment	10	52	11	9	18	3.3 ± 1.3
13	Training given to the use of discussion forums, quizzes, and assignments enhances my skills	15	58	5	9	13	3.5 ± 1.2
14	Online interaction improves my communication skills	10	56	11	9	14	3.4 ± 1.2
15	The LMS-Moodle platform will help develop my e-learning programs	13	48	15	12	12	3.4 ± 1.2
16	Contributes positively to my learning experience	14	53	10	9	14	3.4 ± 1.2
17	Was overall a smooth and exciting experience to use LMS technology in medical education	16	53	10	7	14	3.5 ± 1.3
				Cumulative Mean ± SD			3.3 ± 1.2

Table 1: Response frequencies with Mean and Standard Deviation

Majority of participants on question where students were asked about downloading lectures, presentation and reading material was easy and helpful more than 75 percent of students responded in Strongly Agree or Agree in this category. While training given to students in regard for using Moodle as a learning management system, more 77 percent of participants Strongly Agree or Agree and were satisfied with the training provided in making the LMS accessible. However, some students were facing some difficulties in registration and login process initially as mean score in this category was lowest among all other variables. Moreover, more the 60 percent of participants suggest that LMS-Moodle was user friendly, provides flexibility in learning, improve their communication and collaborative team-based skills and create interest and motivate them to learn (Table 2). Based on cumulative score of 5-point Likert scale it can be concluded that overall experience and perception of using Moodle as learning management system was positive among all the participants and have positive impact on medical curriculum.

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Questions	Strongly Agree & Agree	Percentage
Interface is user friendly	61	61.00%
Downloading of learning material	77	77.00%
I use assignments and discussion forums	57	57.00%
Provides Flexibility in learning (anytime, anywhere)	60	60.00%
Sharing knowledge with peers helps in development of new and practical knowledge and becoming a good team player	63	63.00%
Highly motivation to use LMS-Moodle	64	64.00%
Computer based testing is useful tools in assessment	62	62.00%
Training given to use of discussion forums, quizzes, and assignments enhances my skills	73	73.00%
Online interaction improves my communication skills	66	66.00%
The LMS-Moodle platform will be helpful in developing my own e-learning programs	61	61.00%
Contributes positively to my learning experience	67	67.00%
Was overall a smooth and exciting experience to use LMS technology in medical education	69	69.00%

Table 2: Cumulative scores and percentages of strongly and Agree Category of 5 point Likert scale Items

S.No.	Activity Name	Frequency
1	No. of students enrolled on LMS	300
2	No. of modules attended	18
3	No. of lectures downloaded	720
4	No. Of study guide downloaded	18
5	No. of online quizzes attended	7
6	No. of assignments submitted on LMS	5
7	No. of TBL resources downloaded	11

Table 3: FRPMC Students activity on LMS

The reliability of the Likert scale was estimated using Cronbach's alpha, which showed all variables to have a maximum score > 0.6 – 0.7 (0.87), indicating the high reliability of each item of questionnaire (Table 4).

Cronbach's Alpha	Mean ± SD	Variance	N of Items
0.867	3.265 ± 0.329	0.108	17

Table 4: Reliability & Summary Item Statistics

DISCUSSION

This study sketches our initial perception of integrating a learning management system in the medical curriculum. Our study showed that students found the LMS Moodle registration and login process very easy and convenient. They beheld the interface as handy, accessible and user friendly. Same experience was shared by Luo et al., in their study in 2002 [18]. The LMS Moodle is primarily an interactive tool for conceptual learning. We also availed the tool to provide reading material and lectures to the students and this parameter was received very enthusiastically. In our study 78% of the students found the lectures notes very easy to download and enjoyed the learning capacity of flexible nature thoroughly (60%). In line with previous studies, Seluakumaran et al.,(2011) and Subedi et al.,(2020) we also noted that students were highly motivated to use Moodle as their primary LMS [19, 20]. Prior reading material and lectures promoted active learning and help students to grasp the knowledge and concept better, facilitating in their understanding of subject for exam preparation. However, it was discerned that some of our lecturers uploaded their lectures after face to face interactions due to concerns of skipping the traditional lectures. Our observation was in line with other authors like Cader et al., and Devis et al., [21, 22]. Contrary to this De lange et al., in their study revealed that uploading of lecture notes in precedence to the class room lectures did not affect students attendance [23]. Accordingly, we also encouraged teachers to post in advance that definitely allowed the students to fathom the lectures more vividly. Besides prior skimming of the lectures will cognate them to ask the queries at the end of the lectures. Moreover, beforehand lectures lessen the burden of writing notes during lectures and enable them to concentrate more on the concepts being taught. It was pertinent from student's feedback of our study that only 30% were in consonance that participation in a discussion forum facilitates collaborative learning. We observed that a very small percentage of students utilized the discussion tool (25%) routinely. Similar observation was found out by Kumar et al., in their study that students though regularly visited and viewed discussion but remained reluctant to participate [24]. This may be due to the dearth of facilitation and encouragement from their tutors who lagged in the queries response and took part in the discussions less frequently. So it is highly recommended that tutors should post the comments and reply to discussion forums vehemently in order to impart analytical thinking and upgrade the student's cognitive learning. Li Q in his article also suggested that the facilitators should also be designated among the students who can lead the discussion forum more vigilantly [25]. Another solution to this is to grade the participants on their participation and posting of the content. This will influence the students to take full advantage of this forum, which is a very effective tool for engaging them in peers' oriented learning. This study also showed that more than half of the students resorted to assignment regularly. This is contrary to the study by Link et al., where this parameter very effectively complimented the learning process [26]. The unwillingness of the students for assignment submission might be due to lack of familiarity with web based online system. For grading of academic achievement, we also took formative and final summative assessment via Moodle. 62% of the students

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agreed that this computer based testing proved to be a useful tool for them. In unison to this a study by Susilowati et al., also described the LMS role in improving students' performance based on assessment including average score improvement from 1.2 % to 3.8 % [27]. However, we observed that deficient resources, i.e., electricity failure, poor internet connection and students' nescience with computer based testing created a great hindrance for the optimum effectiveness of this tool [26]. This study indicates that Moodle can boost the students cognitive learning and enhance performance achievement. In harmony of this several other studies by Pinilla et al., and Dantas et al., also concluded the same findings [27-29]. Overall our study depicts that Moodle provides continuous positive learning exposure for self-learning and evaluation, strong peer sharing of knowledge and beneficial teachers' interaction in supplementing their learning capabilities and academic performance.

CONCLUSIONS

It was concluded that majority of participants studying in Fazaia Ruth Pfau Medical College have positive perception and experience of using Learning Management System Moodle in medical curriculum. It can also contribute in developing future e-learning program which would further facilitate students`learning.

Conflicts of Interest

The authors declare no conflict of interest.

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