

ATTITUDE AND COMPETENCE TO USE MADRASATI (M LMS) AMONG SCHOOL TEACHERS IN RIYADH, SAUDI ARABIA

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ABSTRACT

Attitude and competence are two factors that affect the acceptance and utilization of new technology in education. In this regard, the full utilization of the new Madrasati (M) technology among teachers in public schools in Riyadh is still challenging. Thus, this study aimed to determine the moderating effect of gender and age on the relationship between teachers' attitudes and competence in utilizing M LMS technology in public schools in Riyadh, as mediated by behavioral intention. The survey method and quantitative approach were employed. Data were collected from 374 teachers out of the population of 13,782 teachers in schools implementing M LMS in Riyadh. The finding of the tested model showed a potential positive mediation role of BI on attitude (ATT) and competence (COM) to use M LMS among public school teachers in Riyadh. The overall mean showed that ATT1 was high among the eight items used after CFA testing, while ATT11 had the lowest mean score. Among the seven items used for CFA testing, COM18 had the highest mean score. The results also indicated that the utilization of M LMS is high among teachers. They visit M LMS three times a week and spend between 61–90 minutes per visit. The finding also revealed the direct effect of COM over ATT on M LMS utilization through mediator BI. The relationship between ATT and M LMS, as moderated by gender and age, is statistically insignificant, suggesting that ATT has no significant moderating effect on M LMS utilization among teachers. Meanwhile, COM to use M LMS positively and significantly affects M LMS acceptance and utilization in Riyadh. In conclusion, the COM to use M LMS plays a more crucial role in accepting and utilizing public school teachers in Riyadh than their ATT. Therefore, it is recommended that future studies use a longitudinal design to obtain more accurate findings.

Keywords: *Attitude, Competency, Madrasati (M LMS), Utilization*

1. INTRODUCTION

This Attitude and competence are two key teachers' attributes that determine the effectiveness and success in teaching and learning [1]. Attitude may positively or negatively impact a teacher's competence toward the usage of educational technology in schools [2]. This is because both attitude and competence lead to better performance in teaching and learning. Competence is the ability to adopt and adapt to the best attitude toward handling new things or changes for optimal delivery [3].

In the meantime, attitude is a factor that defines what a teacher's behavioral intention entails toward new technology. Teachers' knowledge can change by developing a new attitude toward new technology, specifically adopting or rejecting it [4] and establishing beliefs that influence their behaviors [5]. Teachers' attitudes have been identified as the main predictor of the new technological utilization in schools for learning essential skills [6]. In the Kingdom of Saudi Arabia (KSA), it is still challenging school for teachers to accept the full utilization of Madrasati (M) LMS because some believe the new technology does fit well with their micro-or macro-performance and expectations [7,8]. In this light, Saudi teachers'

attitudes toward the utilization of M LMS determine the success of its implementation across public schools in Saudi Arabia [8].

Competence also plays an essential role in technological adoption in education. Studies have found that teachers' lack of competence is the key cause of the rejection of new technology in teaching and learning [9]. In other words, competence affects the adoption of new technology in schools [10], and there are various factors affecting teachers' competence in adopting and using new technology in schools [11]. These factors include a lack of expertise, skills, and understanding of basic operating procedures of new technology, for example, LMS used in schools [12,13]. Along with discussing the best ways to use technology in the classroom to help students learn their modules more effectively, teachers' competence to effectively handle new technology has become crucial for its successful implementation at all levels, particularly in Saudi Arabia.

Public schools are spread across the kingdom of Saudi Arabia, and Madrasati (M) is currently adopted in all public schools in KSA, including in Riyadh [14]. The Madrasati broadband connects all the middle and secondary public schools. In the project's first phase, all the participating schools were connected to 10Gbps internet, and wireless access points were provided throughout all schools [7]. The remaining schools will be gradually connected to high-speed internet in the subsequent phases [15]. Teachers in these public schools should undoubtedly take advantage of the new Madrasati technology. However, the adoption and use of Madrasati are linked to the teachers' acceptance and attitudinal change [16].

Moreover, demographic factors, including age and gender, have a significant moderating effect on the utilization of technology. Previous studies have examined the moderating role of age and gender [17,18] in the relationship between variables linked to teachers' attitudes and behavior toward technology utilization. Binyamin et al. [19] found the negative moderating effect of age, gender, and experience on technology utilization among EFL teachers. Nonetheless, some studies found that gender and age play insignificant roles as moderators of technology utilization [17,20]. Therefore, in this study, the moderate role of age and gender in influencing the utilization of M LMS among teachers in Saudi public schools was examined. This study strives to fulfill the knowledge gaps on teachers'

intention toward technology adoption and utilization and overcome the insufficient evidence on the effect of attitude and competence on teachers' utilization of LMS in public schools.

Teachers' attitudes are often misjudged, misinterpreted, and misconstrued, which hinders the integration of digital technology into teaching and learning [21]. Teachers' lack of sufficient background knowledge and skills in using technology has affected the adoption rate and utilization of 2.0 LMS technology in KSA [22,23]. In this light, the lack of technology competence can hamper teachers' creative abilities [10], affecting students' achievements. Despite little strides in the implementation of M LMS, there is still much to be achieved to achieve the full acceptance and usage of the new technology among public school teachers in Riyadh, as aspired in Saudi Arabia's Vision 2030, due to the poor attitude and low competence in the utilization of M LMS among these public school teachers in Riyadh.

Despite the fact that the technology is two years old, teachers in Riyadh continue to find it difficult to accept and use M LMS. Attitude and competence are two factors noted to have potential effect on acceptance and utilization of new technology in education. Studies have identified teachers' lack of competence in using M LMS as one of the hindrances for its use in Saudi Arabia. However, there is still no study on the utilization of Madrasati in public middle and secondary schools in Riyadh. Therefore, this study aims (1) to determine the mediating role of behavioral intention in the relationship between teachers' attitudes and competence in using Madrasati LMS in Saudi public schools in Riyadh, (2) to determine whether behavioral intention significantly influences the utilization of Madrasati among teachers in Saudi public schools in Riyadh. (3) to determine the role of gender and age as a moderator for the utilization of Madrasati among the teachers in Saudi public schools in Riyadh. The specific focus was on the following research questions: (i) What are teachers' attitude, as shown through behavioral intentions, toward using M LMS in Saudi public schools in Riyadh? (ii) What are teachers' competency levels, as shown through behavioral intention, in M utilization in Saudi public schools in Riyadh?

The outcomes of this study could provide a better understanding of the utilization of M LMS among teachers in Saudi public schools, especially in Riyadh. It could present useful information on M

LMS utilization to encourage teachers and the Ministry of Education to enhance its utilization. The findings could also enrich the theoretical knowledge on M LMS utilization in Saudi education. It will also help policymakers to develop and improve the existing regulations to achieve successful implementation within the goals of Saudi Arabia's Vision 2030.

2. LITERATURE REVIEW

The world is becoming a global village, where everything is being digitalized. Almost everything nowadays is computerized, from manual to electronic, from conventional face-to-face learning to e-learning, from mounted to application or software programs [24,25]. Technology emerges to assist individuals in their vigorous tasks by computerizing the process. The education system is moving from manual to fully automated processes, easing the learning activities [11]. In KSA, contemporary technology has continuously been provided at all stages, from primary school to university level [26]. Consistent with modern technology used in the education sector, the KSA implemented Madrasati (M) as one of the recent technologies and e-learning to improve and enrich teaching and learning in the kingdom through the Learning Management System (LMS) in public schools. The Madrasati (M) implementation aligns with KSA Vision 2030, launched by the Ministry of Education, bringing about a significant digital transformation in teaching and learning in K-12 education in the KSA, including Riyadh [14,27].

There are 30,625 schools in Saudi Arabia, out of which 26248 (86%) are public schools, and 4,377 (14%) are private schools. Out of this number, there are 4115 schools in Riyadh [28]. Across KSA, primary and secondary education is free for all children, while they can attend kindergarten based on parents' preferences. The schools in Riyadh are among the most established in KSA, offering excellent K-12 general education. In the meantime, as one of the cities with the fastest-growing population in KSA, Riyadh is facing several challenges concerning education.

2.1 Madrasati LMS (M LMS) and its Utilization

Madrasati (M) is an all-inclusive, large-scale initiative that provides LMS for all the public schools in Saudi Arabia [7,29]. The initiation of the M LMS path the way for a substantial digital

transformation in K-12 education in the KSA. M LMS provides a virtual learning environment and a course management system that offers solutions and adaptability for both teachers and learners [30]. Moreover, the M LMS technology allows teachers, students, and school management access to daily and weekly activities of learners' virtual classes [14,31]. It also helps teachers share the learning resources and manage students' enrolment, record-keeping, and activities [32,33].

Studies have indicated issues with teacher behavioral intention and the utilization of MLMS technology in Saudi Arabia. Scherer et al. [34] assessed the teachers' acceptance and adoption of digital new technology in education in Riyadh using the unified theory of acceptance and use of technology (UTAUT). The study found that teachers in Riyadh have low interest and intention toward adopting new technology because they feel it may not serve their future interests. Almutairi et al. [22] applied the UTAUT model to evaluate teachers' behavioral motivation toward technological acceptance and utilization in KSA. They found that teachers participated in technological usage when they perceived the importance and benefits of using such technology would ease their teaching career and teaching process. Even though these studies did not solely focus on M utilization in public schools, but rather, common issues faced by teachers, it can be concluded that effective implementation of LMS as an educational technology mainly relies on teachers' behavioral intentions, attitude, and competence, which ultimately affects their utilization of LMS in teaching and learning [35,36]. As the level of M utilization and acceptance among Saudi teachers is linked to their technological performance expectancy, there are still challenges in increasing M utilization levels among teachers. The lack of study on M LMS adoption and utilization in relation to teachers' attitudes and technological competence is yet to be reported, particularly in Riyadh. As a result, the focus of this work will be on this element and its factors (attitude and competence) among teachers in Riyadh.

2.2 Attitude

Subsub A positive attitude predicts actual technology use [8]. Hence, individuals' attitude has been a widely measured factor for technology usage. According to Thomas et al. [37], attitude and level of confidence are strongly related to user experience. The study found that teachers' exposure and knowledge of technology positively affect their

attitude toward computers. In this sense, teachers' attitudes toward new technology are the key factor for the initial acceptance of LMS technology and its utilization. The attitude of Saudi teachers toward the utilization of M determines the success of its implementation across public schools in Saudi Arabia [38].

In promoting the integration of M LMS technology into public schools, teachers' beliefs and attitudes toward technology use in teaching and learning are crucial for its effective implementation [39,40], specifically in Riyadh. According to Bervell et al. [41], teachers' intentions to use LMS-enabled blended learning in distance education mediate the role of attitude based on technology-related response. The behavioral intention toward LMS acceptance and usage has an inherent potential effect on the teachers' attitudes toward teaching. Behavioral intention positively affects teachers' attitudes toward using new technology. The attitude shaped by intention is crucial to the cultural and social values in a specific context [42], including the attitude of teachers in Riyadh. Previous study has not clearly defined the role of attitude as a critical factor influencing M LMS adoption, specifically its involvement in M LMS utilization among teachers in Riyadh. As a result, the focus of this research will be on the attitude factor as a determinant influencing M LMS adoption and use in Riyadh.

2.3 Competence

Competence acquired via teaching refers to the capability or skills to perform a particular task [43]. Competence can be further divided into skills, attitudes, and knowledge [44], which expounds that the cognitive realm associated with psychological skills (i.e., knowledge), psychomotor realm associated with physical abilities (i.e., skills), and affective realm for growth in emotions or responsive regions (i.e., attitudes) [45,46].

In the context of modern technology in education, competence is considered the capability to use technology effectively in teaching and learning [47]. Technological skills are indispensable in improving technology in education. Educational organizations provide their instructors with the essential professional training and inductions in computer technology to get them ready to use e-learning [48]. Neglecting the competence of teachers in modern technology in education may cause teachers to fail in

the utilization of new knowledge in teaching and learning.

Competence plays a major role in computer learning and skills. The use of computers assists educators in facilitating learning by training them to be competent and even accelerating students' learning. However, teachers in schools and colleges face various challenges with competence to operate or use new computer-enabled technology [10]. These challenges include a lack of adequate expertise, skills, and knowledge of basic operating procedures of the new technology, for example, the M LMS implementations in schools [12,13,15]. The teachers' competence to effectively handle M LMS technology has become crucial for successfully implementing it at all levels of education in Saudi Arabia [10,49].

Within the LMS context, Chi et al. [49] developed a fundamental technology competence scale that consists of nine fields: fundamental computer functional skills, operating maintenance and troubleshooting, Microsoft word operation, worksheets, database, network operation, telecommunication, media communication, and social-legal and ethical matters procedures. Every field has at least five items based on a four-point scale. They found that the technological competence scale could measure the teachers' abilities in computer operations. The finding in Chi et al. [49] is supported by the theory reported by Barragán-Sánchez et al. [50], which indicates that digital teaching competence is a measurement of the self-perceived level of competence where teachers are educated to be eco-responsible through self-reflection. According to gap in studies, no research has reported the contribution of competence to M LMS usage, especially its effect. Refocusing current research efforts on this area as a crucial component would enhance research knowledge. This would also provide a remedy to the ongoing issue of M LMS acceptance among Riyadh teachers. Therefore, competency as an important aspect is a new variable in this study that will likely explain the acceptance and use of M LMS among Riyadh school teachers.

2.4 Gender

Studies have used gender as a direct moderator in UTAUT between technological adoption and teacher utilization. Yu [51] used gender and age as moderators and found that gender significantly moderated the effects of performance expectancy

and perceived financial cost on behavioral intention. Chawla and Joshi [52] uncovered that both gender and age moderate the relationship between select antecedents and attitude and intention, and the influence is seen more in males and younger users. Wiseman et al. [20] found that gender and computer use are significantly related to technology usage in Saudi Arabian classrooms; male teachers use technology more often for teaching than their female counterparts. According to Al-Hunaiyyan et al. [18], 70.5% of male teachers at the University of Saudi Arabia participated in the web-based directive (WBI), while only 29.5% of female teachers were willing to do so.

On the other hand, Almuqayteeb et al. [53] found that gender does not significantly predict the frequency of use. Although some researchers acknowledge that gender is one of the factors influencing the use of computer technology in education, other studies have found that female consumers are more sensitive to other people's opinions and therefore influence factors [54]. Furthermore, as the Saudi Arabian education system segregates males from females, it is vital to compare how different female and male teachers use technology in their respective institutions. Gender as a predictor of new technology acceptability, the demographic context of gender in M LMS use is not well understood. In this light, gender may influence behavioral intention and acceptability, as well as attitude and competence in the use of M LMS. Since Saudi Arabia provides an education system that separates males and females, this can add to the understanding of M LMS adoption in Riyadh as a new contribution.

2.5 Age

Age plays a significant role in technological adoption and usage. Al-Hunaiyyan et al. [55] demonstrated that age is a moderating factor among UTAUT toward technology utilization. Khechine et al. [56] studied the UTAUT model for blended learning: the role of gender and age in the intention to use webinars and found that only the age variable had a moderating effect. Yu [51] found that age considerably moderated the effects of facilitating conditions and perceived self-efficacy on actual adoption behavior. For instance, younger learners are more concerned with their performance, while older learners are more worried about facilitating conditions. Emiroğlu [57] considered the age range among faculty members to be relatively wide, with the participants ranging from 20 to 57 years old, and

the effect between the two variables was more significant. Moreover, Mahdi and Al-Dera [17] tested age as a moderator, but it was not recommended because it was a continuous variable. These studies indicate that age has a moderating role in new technology acceptance and utilization. This study will address the research vacuum created by conflicting findings and discrepancies among different studies on the positive or negative effect and accuracy of the moderating influence of age on new technology adoption, such as M LMS. In addition, the age of teachers in Riyadh may influence their degrees of competence in using M LMS. Older teachers are more likely to accept and use M than younger teachers because to their expertise with technological help in delivering instructional materials, whereas younger teachers may be contemplating the M LMS technology's simplicity of use. Hence, the moderating influence of age is put to the test in this study, which adds to the body of knowledge in the field.

2.6 Conceptual Framework

Figure 1 presents the conceptual framework of this study. This study hypothesizes that teachers' attitudes and competence to use M LMS directly influence their M LMS utilization, and this relationship is mediated by behavioral intention. This conceptual framework is tested using two research models: the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Technology Acceptance Model (TAM) model. These two models are combined to explore and understand the behavioral intentions of M LMS users in public schools and their M LMS utilization. By exploring the role of attitude and competence in using M LMS, TAM is an adaptation of the original UTAUT. The conceptual framework demonstrates that teachers' attitudes and competence in using M LMS in Riyadh public schools are affected by their behavioral intention and other moderator factors (gender and age). Similarly, Fadil and Khaldi [58] developed a framework to understand LMS technology perceptions.

The UTAUT model has been widely used to examine the acceptance and use of technology compared to other theories. This study combined UTAUT and two variables from TAM (attitude and competence to use M) and developed a prediction model. The model is a definitive model synthesizing what is known and forms the basis for future research. It is assumed that this conceptual framework effectively determines UTAUT and

TAM factors that influence a teacher's behavioral intention to use M LMS. It will be helpful since there is still a shortage of empirical research testing BI as a mediator of LMS use [42, 59]. This model could enrich the scarce prediction model in the context of Saudi Arabia and M. LMS in particular.

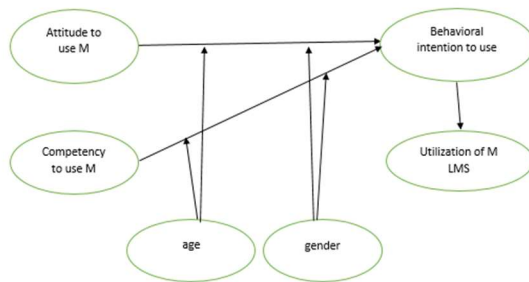


Figure 1: Research Conceptual Framework

This study is aimed to determine whether teachers' attitudes and competence to use M, as mediated by behavioral intention and moderated by gender and age, significantly affect the utilization of technology in Saudi public schools in Riyadh. This study hypothesizes that:

- H1: Behavioral intention mediates the attitude for M utilization among teachers.
- H2: Behavioral intention mediates the competence to use M for M utilization among teachers.
- H3: Gender moderates the influence of attitude on M LMS utilization among teachers.
- H4: Gender moderates the influence of competence to use M on M LMS utilization among teachers
- H5: Age moderates the influence of attitude on M LMS utilization among teachers.
- H6: Age moderates the influence of competence to use M on M LMS utilization among teachers.

3. METHODOLOGY

3.1 Research Design

This study employed the quantitative survey method to determine attitude and competence to use M, as mediated by behavioral intention, significantly affecting the teachers' technology utilization in public schools in Riyadh, Saudi Arabia. These factors, including attitude and competence to use M, were selected to examine teachers' behavior

intentions on M LMS utilization. This quantitative approach was used to test cause-and-effect relationships and ascertain large populations' views, attitudes, and practices. It is most commonly used to determine usage practices and outcomes [60]. Research findings are typically observable and quantifiable when using a quantitative approach. Positivism favors quantitative approaches, including surveys, structured questionnaires, and statistics, because they have good reliability and representativeness [61]. The epistemology of positivism supported the methodology of this study.

This study used the quantitative approach to measure the relationships between independent and dependent variables. It is important to understand the factors influencing M LMS utilization among teachers in public schools in Saudi, specifically their attitude and competence in using M LMS and determine the teachers' behavioral intention using the system. The quantitative approach is an appropriate and reliable way to understand the nature of relationships among variables and provide a rich contextual basis for interpreting and validating the results [62]. According to Zhu et al. [60], a quantitative approach is important in examining associations between variables. It provides a systematic and standardized method for evaluating variation and testing theories by examining the relationships among variables.

3.2 Study population

Riyadh has a population of over 7.5 million and a 95.32% general literacy level that is increasing at an average rate of 7.84% annually [63,64]. The sample is representative of the general population. Hence, the study findings could be generalized to the wider population [65,66]. The target populations of this study are the teachers in public middle and secondary schools in Riyadh, KSA, where the Madrasati is applied.

This study's population is teachers in public schools implementing Madrasati (M) in Riyadh. It is assumed that they have sufficient experience in using the M LMS. Regarding the technologies used in all three phases, teachers are thought to have adequate experience handling and working with a wide range of technologies, including M LMS. Al-Shehri [67] and Al-Sharhan et al. [33] showed that the utilization and effectiveness of technology could be measured when the technology is used for at least six months. According to information provided by

the M. LMS administration, 13,782 teachers in K-12 schools in Riyadh utilize Madrasati, which forms the population of this study. Based on Cochran's formula, the minimum sample size for this study is 374. Furthermore, considering the suggestion made by Hair et al. [68] and the results from the Raosoft® software according to Cochran's formula, the minimum sample size for this study was set to 374 samples.

3.3 Instrumentation and data collections

The questionnaire method was designed in online Google form format (using online survey software and a questionnaire tool) to collect data by e-mailing it to the respondents (i.e., the teachers). A survey instrument aims to gather facts, opinions, and behaviors from the primary participants by posing questions through questionnaires [69]. The reasons for choosing an online survey include, firstly, data acquired from a survey can effectively measure the main effect between two or more relationships. Second, the online survey has been widely used in related studies. Third, websites are accessible and automatically code and tabulate the responses. This helps the researchers to compile results more quickly [70]. In addition, this online survey is also advantageous because it reaches a large number of respondents, is convenient, allows the participant to be anonymous, is low cost, and is time-effective [71].

A cover letter and consent form were attached to the distributed survey questionnaire. The information provided on the consent form highlights (1) the aim, expected duration, and procedures of the research; (2) the participants' right to decline and withdraw from the study; (3) any potential penalties for withdrawing from the study; (4) any potential threats or adverse actions that may influence the decision to participate, and (5) any anticipated benefits, (6) threats to confidentiality; (7) inducements to participate, and (8) researchers' contact information and whether the respondents have any questions regarding the study [96,71,72].

This study used a 5-point Likert scale for the survey questionnaires as they are the most widely used instrument in quantitative research on technology adoption and e-learning [60,73]. The questionnaire items were rated using a five-point Likert scale from 5 = "strongly agree" to 1 = "strongly disagree," with higher scores representing higher utilization. The respondents are asked to

express their agreement or disagreement based on a five-point rating scale of 1 to 5.

The target respondents were informed about the study's purpose, its threats to confidentiality, and its benefits. Consequently, the respondents were informed that they were free from risk to their confidentiality or no cost if they chose to partake in the survey. Additionally, they were told that whether to partake in the survey or not is completely their choice, but their support will be greatly appreciated and important to this research. The respondents were informed that the survey's participation was anonymous and voluntary. Hence, they were not required to state their names, and all information will be treated as confidential. Directions on how to fill out the survey and how long the study will take to complete were also provided. The consent form was attached as the first page of the survey was the consent form, followed by essential information on the aim of the study, its confidentiality, benefits, confidentiality assurance, and researchers' contact information.

The copies of the questionnaire were sent to all targeted teachers in public schools implementing Madrasati in Riyadh, KSA. The emails sent contained a direct link to the survey and the consent letter. The link to the survey was shared during the school working hours and at an appropriate time (less busy hour) for the teachers because they usually have less time to access their e-mail during the weekends.

Although the minimum sample size of 374 was adequate to examine the hypotheses for this study, 500 survey questionnaires were randomly distributed online to the target respondents. The researcher of this study decided to oversample in anticipation of problems such as sampling errors or prospective participants being uncooperative and not willing to complete the questionnaires. Out of 500 questionnaires distributed, 425 responses were returned.

Before the data analysis, the questionnaires were screened for missing data. A total of 12 responses were found to contain errors and incomplete values. Therefore, only 413 responses were used for the actual data analysis. The return rate of the valid data was a total of 85%. According to Pallant [74], a 60% rate of return could be considered adequate for analysis and reporting.

3.4 Reliability and Cronbach's alpha (α)

A Cronbach's alpha test was performed to assess the internal consistency of every variable. Adeniran [75] indicated 0.7 as a satisfactory reliability coefficient. The competence to use M has the highest reliability ($\alpha=0.968$) followed by attitude ($\alpha=0.878$), while the lowest level was M LMS (Volume) ($\alpha=0.716$). This showed that all nine variables were reliable. Their reliability values exceeded the recommended threshold of 0.700, which paved the way for data analysis through Cronbach's Alpha statistics.

3.5 Data Analysis

The Statistical Package for Social Science (SPSS, version 23) was applied to analyze the data collected quantitatively through descriptive statistics such as frequencies, means, percentages, and standard deviations. The descriptive statistic is usually the first test of assumptions to recognize patterns within data, with a numerical and graphical understanding of data patterns [76,77]. The significance level was set at $p=0.05$ for all variables.

All collected responses were checked carefully for missing and outliers, resulting in 413 responses being used. The collected data was also entered into the structural equation modeling (SEM) using AMOS v23 to test the proposed hypotheses. In AMOS, the data were analyzed in three stages: confirmatory factor analysis (CFA), measurement model analysis, and structural model analysis, according to Morin et al. [78]. Furthermore, SEM also enhances the reliability and validity of the outcomes because it considers measurement errors for each variable [34].

In this study, a test of outliers, a check of the skewness and kurtosis values for data normality, and a CFA were observed as preliminary data examination before the actual analysis. For the current study, the skewness values ranged from -0.038 to 1.506, while the kurtosis values ranged from -1.506 to -0.038. As a result, the data were assumed to be normally distributed with all skewness and kurtosis values.

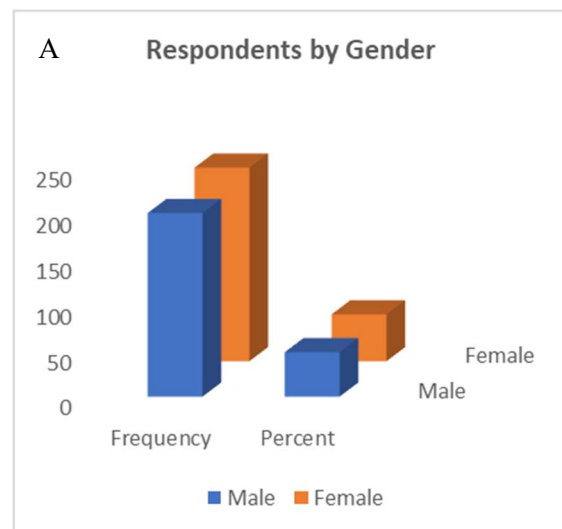
The multivariate analysis was also performed. The results indicated that the height D2 value was 170.85, which belongs to case 370 and 71 items in endogenous and exogenous variables and relative estimation errors. Thus, the maximum D/df equals

$170.85/71 = 2.40$, far from the cut-off value of 3.5. Hence, it can be concluded that the results of D2 values do not indicate the presence of multivariate outliers for all observations.

4. RESULTS

The demographic variables were measured considering five items: gender, age, education level, experience, and the number of Madrasati (M) workshops attended. The demographic information for the respondents is shown in Figures 1 and 2. As shown in Figure 1, the majority of respondents is females at 51.33% ($n=212$) while 48.67% ($n=201$) are males.

The respondents were also categorized into four groups according to their age range: 30 years old and less, 31-40 years old, 41-50 years old, and 51 years old and above. 27.36% ($n=113$) of the respondents are in the age range of 30 years old and less, 21.79% ($n=90$) are in the range of 31-40, 29.54% ($n=122$) are aged 41-50, representing the highest value, while the lowest percentage of respondents are in the age range of 51 years old and above with 21.31% ($n=88$).



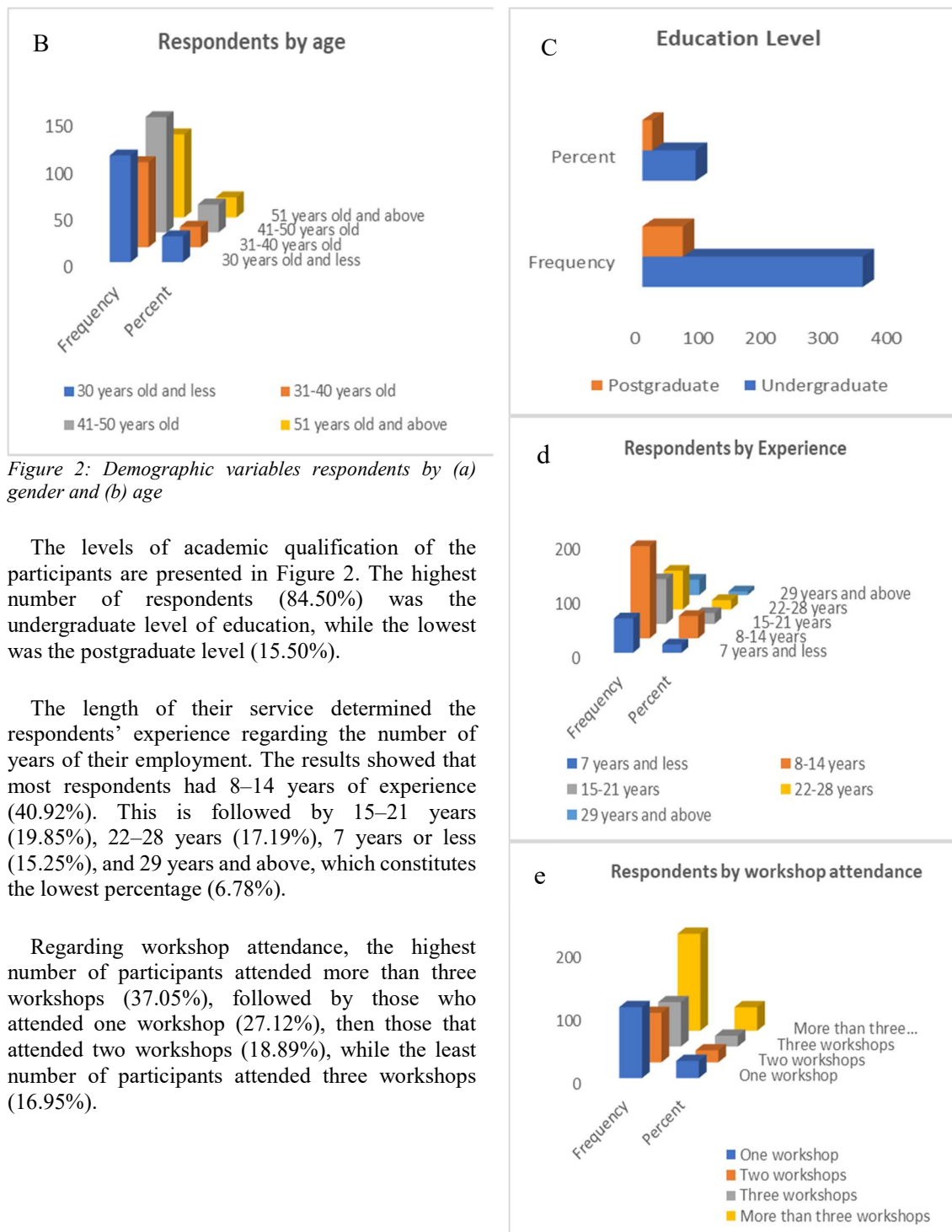


Figure 2: Demographic variables respondents by (a) gender and (b) age

The levels of academic qualification of the participants are presented in Figure 2. The highest number of respondents (84.50%) was the undergraduate level of education, while the lowest was the postgraduate level (15.50%).

The length of their service determined the respondents' experience regarding the number of years of their employment. The results showed that most respondents had 8–14 years of experience (40.92%). This is followed by 15–21 years (19.85%), 22–28 years (17.19%), 7 years or less (15.25%), and 29 years and above, which constitutes the lowest percentage (6.78%).

Regarding workshop attendance, the highest number of participants attended more than three workshops (37.05%), followed by those who attended one workshop (27.12%), then those that attended two workshops (18.89%), while the least number of participants attended three workshops (16.95%).

Figure 3: Demographic variables respondents by (c) education level, (d) experience, and (e) workshop attendance

4.1 CFA of Attitude to Use M LMS

CFA was conducted to test the model fit, convergent validity, and construct reliability of attitude by assessing the fit indices, the factor loading, average variance extracted (AVE), and construct reliability (CR). All standardized factor loadings were positive and greater than 0.5; subsequently, the model fitted [68,79,80]. To get the model fit, Hair et al. [69] suggested achieving at least 3 fit indices to establish model fit, and the recommended fit indices include Relative Chi-Square, RMSEA, and any one of GFI, AGFI, CFI, NFI, and TLI.

In terms of the CFA result, all criteria for fit indices were fulfilled, except for RAMSA and Relative Chi-Square. The RAMSEA is higher than 0.08, and the relative Chi-square is higher than 4. Meanwhile, all other fit indices are less than 0.90 (Figure 3). In Figure 3 of CFA, for the construct of attitudes, 11 items were measured with all the items' factor loadings greater than 0.5, except for ATT2, ATT3, and ATT8. As the AVE did not reach 0.5. 3 items (ATT2, ATT3, and ATT8) were deleted from the model to obtain model fit. It can be concluded that after deleting 3 items, all the factor loadings are higher than 0.50, the AVE is higher than 0.50, and all the fit indexes achieved their required criteria, including RMSEA and relative Chi-Square, which confirms the convergent validity [68,80]

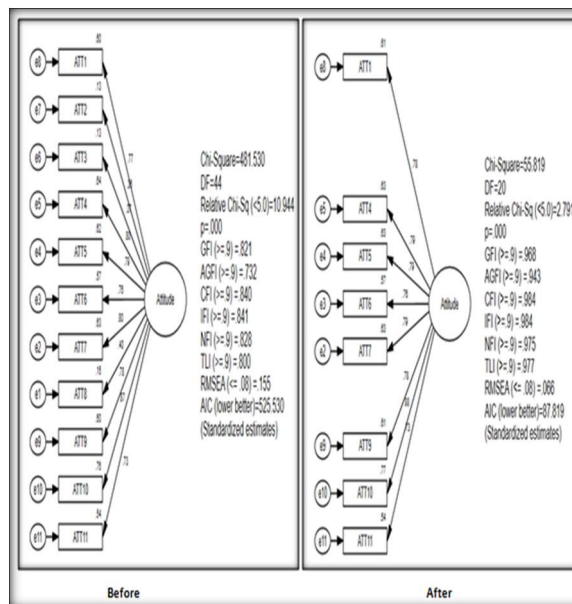


Figure 4: CFA of Attitude

4.2 CFA of Competence to Use M LMS

The CFA of competence was measured through convergent validity and construct reliability by assessing the fit indices, the factor loading, average variance extracted (AVE), and construct reliability (CR). The study found that all standardized factor loadings are positive and greater than 0.5, indicating the fit of the model [68,79,82]. Hair et al. (2010) suggested achieving at least 3 fit indices to establish model fit, and the recommended fit indices include Relative Chi-Square, RMSEA, and any one of GFI, AGFI, CFI, NFI, and TLI. In the case of the CFA competence construct, all the criteria for the fit indices were not fulfilled, including RAMSA and relative Chi-Square, as the RAMSEA is higher than 0.08, the relative Chi-square is also higher than 5, and all other fit indices are less than 0.90 (Figure 4). There are 18 items under competence, with the factor loadings of some items, including from COM8 to COM14, being less than 0.50. There are 11 items with loadings less than 0.50 causing the AVE to be lower than 0.5 [81]. Therefore, these 11 items (from COM8 to COM14) were deleted from the model to obtain the model fit. After deleting 11 items, all the factor loadings are higher than 0.50, and the AVE is higher than 0.50. Subsequently, all the fit indexes achieved their required criteria, including RMSEA and relative Chi-Square, confirming adequate convergent validity [68].

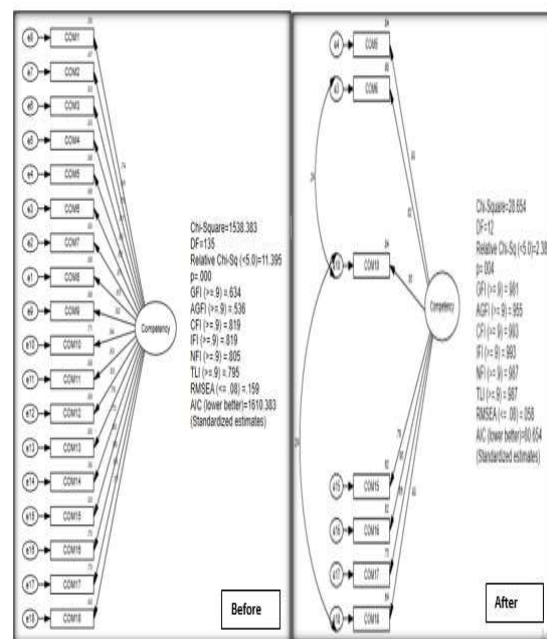


Figure 5: CFA of Competence

4.3 Attitude toward utilizing M LMS

This section presented the findings related to teachers' attitudes toward M LMS utilization Table 1 indicates the means, standard deviation, and frequency percentage. The results indicated that the overall mean related attitude is high ($m = 3.54$; $SD = 1.06$). Among the eight items retained after CFA testing, (ATT1) recorded the highest mean score ($m = 3.62$) while item (ATT11) had the lowest mean score ($m = 3.38$). This result showed that although the LMS is user-friendly and has user-friendly features, its use might be time-consuming. In addition to the fact that the MLMS is a highly time-consuming process, as conveyed by the teachers, who thought the user-friendliness was adequate. Teachers should be equipped with reliable information to increase their understanding of the M process to guide its effective utilization. Therefore, the teachers might accept the M LMS for its capability of presenting relevant information and content.

Table 1: Attitude toward the utilization of M LMS

Item	SD	D	N	A	SA	M	SD
ATT1	Frequency 11.00	41.00	117.00	171.00	73.00	3.62	0.98
	%	2.66	9.93	28.33	41.40	17.68	
ATT4	Frequency 18.00	48.00	131.00	142.00	74.00	3.50	1.05
	%	4.36	11.62	31.72	34.38	17.92	
ATT5	Frequency 17.00	57.00	118.00	146.00	75.00	3.50	1.07
	%	4.12	13.80	28.57	35.35	18.16	
ATT6	Frequency 15.00	49.00	103.00	152.00	94.00	3.63	1.07
	%	3.63	11.86	24.94	36.80	22.76	
ATT7	Frequency 23.00	51.00	123.00	136.00	80.00	3.48	1.11
	%	5.57	12.35	29.78	32.93	19.37	
ATT9	Frequency 16.00	50.00	110.00	150.00	87.00	3.59	1.07
	%	3.87	12.11	26.63	36.32	21.07	
ATT10	Frequency 21.00	46.00	99.00	162.00	85.00	3.59	1.09
	%	5.08	11.14	23.97	39.23	20.58	
ATT11	Frequency 32.00	47.00	132.00	137.00	65.00	3.38	1.12
	%	7.75	11.38	31.96	33.17	15.74	
Total						3.54	1.06

SD: Strongly Disagree, D: Disagree, N: Natural, A: Agree, SA: Strongly Agree M=mean, ATT= Attitude

4.4 Competence in using M LMS

This section presented the findings related to the competence of LMS usage among teachers. Table 2 indicates the mean, standard deviation, and frequency percentage. Table 2 indicates a high overall mean ($m = 4.00$; $SD = 0.87$) for attention. Among the seven items kept after CFA testing, COM18 had the highest mean score ($m = 4.18$). The mean score for item COM15 was $m = 3.87$. Table 2 shows that while M LMS is user-friendly and has user-friendly features, its usage is time-consuming. In this light, the teachers accepted the M LMS for its capability of presenting relevant information and content. This finding implies that the M LMS includes well-designed lessons and feedback, which can help improve teachers' knowledge. Moreover, competence is one of the most crucial factors that significantly impact learning management systems utilization among teachers. Therefore, teachers should be equipped with the adequate knowledge and competence to use learning management systems in line with M LMS utilization.

Table 2: Teachers' competence in using M LMS

Item	SD	D	N	A	SA	M	SD
COM5	Frequency 14.00	37.00	39.00	193.00	130.00	3.94	1.04
	%	3.39	8.96	9.44	46.73	31.48	
COM6	Frequency 10.00	21.00	31.00	204.00	147.00	4.11	0.92
	%	2.42	5.08	7.51	49.39	35.59	
COM10	Frequency 9.00	16.00	28.00	218.00	142.00	4.13	0.86
	%	2.18	3.87	6.78	52.78	34.38	
COM15	Frequency 17.00	61.00	47.00	178.00	110.00	3.73	1.13
	%	4.12	14.77	11.38	43.10	26.63	
COM16	Frequency 12.00	36.00	35.00	194.00	136.00	3.98	1.01
	%	2.91	8.72	8.47	46.97	32.93	
COM17	Frequency 16.00	31.00	44.00	196.00	126.00	3.93	1.03
	%	3.87	7.51	10.65	47.46	30.51	
COM18	Frequency 11.00	15.00	29.00	191.00	167.00	4.18	0.91
	%	2.66	3.63	7.02	46.25	40.44	
Total						4.00	0.87

SD: Strongly Disagree, D: Disagree, N: Natural, A: Agree, SA: Strongly Agree M=mean, COM= Competence to use M LMS

4.5 Level of M LMS Utilization

The mean scores in Table 3 reflect the frequency of teachers' utilization of M LMS. The second level of utilization (LUV2) displayed a high utilization level with a mean of 3.59 and SD of 1.08. Teachers use the system 3 times and spend around 61–90 minutes per session. These findings indicate that the teachers frequently utilized the M LMS. In this regard, this category is the second most important reason for the M LMS utilization.

Table 3: Level of M LMS utilization

Item	Never brows e in M	Less than 30 minute s / visit	31 – 60 minute s / visit	61- 90 minute s / visit	More than 90 minute s / visit	M	SD
LUV 1 Frequency %	16.00	61.00	97.00	144.00	95.00	3.58	1.11
LUV 2 Frequency %	3.87	14.77	23.49	34.87	23.00	3.65	1.05
LUV 3 Frequency %	12.00	49.00	106.00	150.00	96.00	3.64	1.03
LUV 4 Frequency %	2.91	11.86	25.67	36.32	23.24	3.53	1.11
LUV 5 Frequency %	9.00	49.00	118.00	142.00	95.00	3.56	1.09
LUV 6 Frequency %	2.18	11.86	28.57	34.38	23.00	3.56	1.09
LUV 7 Frequency %	15.00	68.00	102.00	139.00	89.00	3.56	1.09
LUV 8 Frequency %	3.63	16.46	24.70	33.66	21.55	3.56	1.09
LUV 9 Frequency %	14.00	61.00	107.00	142.00	89.00	3.56	1.09
LUV 10 Frequency %	3.39	14.77	25.91	34.38	21.55	3.56	1.09
Total						3.59	1.08

4.6 Moderating effect of Gender and Age on M LMS

This section discusses the findings of hypotheses H3 to H6. Table 4 and Table 5 present the moderating effect of gender and age on individual paths. Once the moderation effects were established in the overall structural model, we proceeded to test the moderating effect on the individual paths. The moderating effect was established if: 1) beta for the male group was insignificant, as well as a beta for the female group was insignificant, and 2) beta for all age groups was insignificant.

Gender was found to have no moderating effect on teachers' attitudes toward using M LMS. As shown in Table 4, the beta value of the male respondents' attitude toward the use of M LMS is not significant, with the p-value of 0.826, which is higher than 0.05. Similarly, the beta value of females for attitude is not significant, with the p-value of 0.429 and higher than 0.05. Hence, gender does not have any significant moderation role in the relationship between attitude and M LMS.

Moreover, gender was found to have no moderating effect on teachers' competence in M LMS utilization. The beta value of the male for competence to use M LMS is not significant as the p-value was 0.0248 higher than 0.05. Similarly, the beta value of a female for competence to use M LMS is also not significant as the p-value is 0.104 and higher than 0.05. This implies that gender has no significant moderating role in the relationship between competencies and M LMS.

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Moderating effect of gender on an individual path

Hypotheses	Beta	SE.	CR.	P	Decision
H3 Male M LMS <--- ATT	0.014	0.059	0.219	0.826	Does not moderate
H3 Female M LMS <--- ATT	-0.049	0.045	-0.791	0.429	Does not moderate
H4 Male M LMS <--- COM	0.110	0.115	1.154	0.248	Does not moderate
H4 Female M LMS <--- COM	0.136	0.064	1.624	0.104	Does not moderate

It can be concluded that age has no moderating effect on teachers' attitudes toward utilizing M LMS. Table 5 shows that the beta values of all the age groups for attitude on M LMS utilization are not significant as the p-values are higher than 0.05. This finding implied that age does not significantly moderate the relationship between attitude and M LMS.

It was found that age has no moderating effect on competence to utilize M LMS among teachers. According to Table 5, the beta values of all the age groups for competence on M LMS utilization were not significant as the p-values were higher than 0.05. Thus, age has no significant moderating role in the relationship between competence and M LMS.

Table 5: Moderating effect of age on Individual path

Hy. No.	Age Groups	Relationships	Beta	SE.	CR.	P	Decision
H5	30 years old and less	M LMS <--- ATT	0.084	0.084	0.836	0.403	Does not moderate
	31-40 years old	M LMS <--- ATT	0.051	0.080	0.590	0.555	Does not moderate
	41-50 years old	M LMS <--- ATT	-0.106	0.085	-0.204	0.838	Does not moderate
	51 years and above	M LMS <--- ATT	-0.106	0.047	-1.271	0.204	Does not moderate

Hy. No.	Age Groups	Relationships	Beta	SE.	CR.	P	Decision
H6	30 years old and less	M LMS <---	COM-0.093	0.181	0.546	0.585	Does not Moderate
	31-40 years old	M LMS <---	COM 0.078	0.172	0.629	0.529	
	41-50 years old	M LMS <---	COM 0.152	0.103	1.599	0.110	
	51 years and above	M LMS <---	COM 0.152	0.070	1.342	0.179	

Table 6: Mediation effect of attitude on M LMS through behavioral intention

Hypothesized Path	Beta	P-Value	95% Bootstrap BC CI		Decision
			Lower Bound	Upper Bound	
Direct Model					
Attitude ↗ M LMS	0.008	0.864			
Mediation Model					
Attitude ↗ M LMS	-0.030	0.507			No Mediation
Std. Indirect Effect	0.032	0.032	0.004	0.074	

Note: Indirect effect is significant if zero (0) falls outside of LB and UB

4.7 Mediating Effect

This study determines the mediating effect of behavioral intention (BI) in the relationship between the IVs (attitude and competence) and DV (M LMS). The bootstrapping approach was applied to examine the possible mediation effect of BI in the relationship between attitude, competence, and M LMS. The bootstrapping method estimates the magnitude of the indirect effects and examines the statistical significance of indirect effects through AMOS software.

The results showed good upper and lower limits of the 95% confidence interval. These values correspond to 2.5th and 97.5th percentiles from the lowest to the highest rank-ordered estimates of the indirect effect derived from the 500 samples. The derivation of the mediating effect of BI in this study is based on the percentile confidence interval. After excluding zero, the indirect effect is statistically significant at a 0.05 level of significance with bias-corrected.

According to Table 6, the bias-corrected 95% percentile confidence interval (LB = 0.004, UB = 0.074), excluding zero between LB and UB. Thus the direct and mediation effects are not statistically significant. Therefore, the finding revealed that the indirect effect of attitude on M LMS through mediator BI is not statistically significant at the 0.05 level. When comparison was made, the direct and mediation model betas are not statistically significant, implying that BI has no mediation effect in the relationship between attitude and M LMS. Thus, the hypothesis was not supported due to inadequate statistical evidence.

The results in Table 7 demonstrate a 95% bias-corrected percentile confidence interval (LB = 0.001, UB = 0.159), excluding zero in between LB and UB. This finding revealed the indirect effect of competence on M LMS through mediator BI, which is statistically significant at the 0.05 level. The mediation model beta is significant, and the standardized indirect effect is also significant. This finding suggests that BI partially mediates the relationship between competence and M LMS. Thus, sufficient statistical evidence supported the hypothesis, and the null hypothesis was rejected.

Table 7: Mediation effect of competence on M LMS through behavioral intention

Hypothesized Path	Beta	P-Value	95% Bootstrap BC CI		Decision
			Lower Bound	Upper Bound	
Direct Model					
Competence ↗ M LMS	0.198	0.000			
Mediation Model					
Competence ↗ M LMS	0.121	0.044			Partial Mediation
Std. Indirect Effect	0.074	0.048	0.001	0.159	

Note: Indirect effect is significant if zero (0) falls outside of LB and UB

4.8 Model Testing Influence of M LMS Utilization

The model was built to predict the ICT usage of the M LMS. Various connections (R2) were developed to accomplish this target with a specific end goal. Each beta incentive for each auxiliary way was rounded up to the nearest value. By alluding to the relapse weights (full intervention) in Table 6, the R2 and Beta values were acquired once the test for arbiter test as directed.

Based on this regression, Table 8 showed that attitude (ATT) and competence (COM) influenced M LMS utilization among teachers through behavioral intention. Behavioral intention (BI) was found to support ATT ($P = 0.000$) and COM ($P = 0.000$), which indicates that behavioral intention (BI) mediates the above factors influencing M LMS utilization. This finding indicates that BI plays a significant role in influencing ATT and COM and suggests strong support for attitude and competence to use M LMS among public school teachers in Riyadh.

Table 8: Regression Weights: (Full Mediation Model)

Model		Estimate	S.E.	P-value
BI	<-- ATT	0.182	0.047	0.000
BI	<-- COM	0.422	0.069	0.000
UMLMS	<-- ATT	-0.030	0.037	0.507
UMLMS	<-- COM	0.121	0.058	0.044

4.9 Structural Model Analysis

Structural Equation Modeling was used to determine the influence of attitude and competence on M LMS and BI. The maximum likelihood estimation technique was used to estimate the model. The proposed hypothesis in the relationship between attitude and M LMS is statistically not significant ($Beta = -0.025$, $t = -0.663$, and $P = 0.507$), indicating acceptance of the null hypothesis as the p-value is greater than 0.05 and the t-value is less than 1.96 (Table 9), confirming no significant effect. This suggests that attitude has no significant effect on M LMS. The proposed hypothesis on the relationship between competence and M LMS is statistically significant with a positive direction. The results ($Beta = 0.176$, $t = 2.687$, and $P = 0.007$) confirmed the significant relationship as the p-value is less than 0.05 (Table 9). Furthermore, the t-value is higher than 1.96, confirming the significant effect at the 95% confidence interval. The last proposed hypothesis was found statistically significant with a positive direction (Table 9). The results ($Beta = 0.176$, $t = 2.687$, and $P = 0.007$) confirmed the significant relationship as the p-value is less than 0.05, while t-value is higher than 1.96. These results suggest that the alternative hypotheses on COM and BI were accepted while the null hypothesis on ATT was rejected.

Table 9: Path Co-Efficient Results

Hypotheses	B	Beta	SE.	C.R./t	P	Decision
M LMS <--- BI	0.122	0.176	0.046	2.687	0.007	Significant
M LMS <--- ATT	-	-	0.037	-0.663	0.507	Not Significant
M LMS <--- COM	0.118	0.121	0.058	2.012	0.044	Significant

5. DISCUSSION

5.1 Attitude toward M LMS utilization

The relationship between attitude and M LMS was revealed to be statistically insignificant. This outcome showed that attitude has no significant effect on M LMS. This suggests that M utilization and acceptance among Saudi teachers cannot be associated with their attitude. Based on the current findings, behavioral intention does not entail the teachers' attitudes toward M utilization as new technology. The attitude of Saudi teachers toward the utilization of M does not influence the success of its implementation across public schools in Saudi Arabia.

These findings may be attributed to the fact that one's attitude is not solely based on behavioral intentions. This is because they are two different matters with different effects. Another reason is that some teachers in KSA are slow to accept M LMS because they believe the technology may not fit well within their micro- or macro-performance and expectation cultures [7]. Therefore, the attitude of teachers toward acceptance of M technology is not directly linked with the Unified Theory of Acceptance and Use of Technology (UTAUT) in Riyadh. The present findings did not agree with the results reported by Watson et al. [21]. The authors show that teachers' attitudes hinder digital technology integration into teaching and learning. This implies that attitude has no impact on M LMS among teachers in Riyadh.

Furthermore, another reason for the insignificant relationship between attitude and M LMS might be attributed to teachers' perception of information content and its usage in Riyadh. Alkinani and Alzahrani [38] indicated the feature of the information content in Madrasati has a great impact on teachers' experience of the Madrasati's effectiveness and practicality, which results in a positive attitude toward Madrasati. Oraif & Elyas [83] showed that the teacher's attitude is purposeful, efficient, and effective in instructional delivery but

positive as it assures the learner's involvement in the teaching process. These previous findings supported the results obtained in this study, as the authors indicated that teachers' attitude is not just a passive beneficiary of the delivered instruction by the teacher, ensuring the distinctiveness of specific learning. Additionally, Bervell et al. [41] considered individual differences using e-teaching and learning, which entails existing potential and abilities. As a result, teachers might acquire a positive attitude toward basic educational improvement, causing different behaviors and positive involvement.

Another study focused on Moodle utilization and demonstrated teachers' attitudes and experience toward e-learning are linked to their perception of educational technology [84]. This technology (Moodle) enhanced teaching performance and the level of teachers' understanding of the instructional contents, but not their attitudes. It could be concluded that most teachers in Saudi Arabia preferred a direct approach in delivering their lesson sessions, which might have had less impact on their attitudinal change toward LMS. This previous finding supported the current insignificant relationship between attitude and M LMS.

Due to the integration of ICT into LMS technology and its utilization in public schools among teachers, BI may play a more significant role than teachers' attitudes toward teaching and learning [8,39,40]. In line with this, M LMS focuses more on social factors than emotional factors, on how teachers interact with LMS technology and the environment (e.g., Riyadh), representing their behavioral intention toward such interaction. This process stems from the learning event's intrinsic belief and intention. Teachers' perception of new technology is a key factor associated with the initial acceptance of LMS technology and future behavior concerning LMS utilization, rather than the teachers' attitudes.

5.2 Competence to Use M LMS

The relationship between competence and M LMS was found to be significant, indicating a significant and positive relationship. The teachers' competence to effectively handle M technology has become crucial for the successful implementation of new technology at all levels of education in Riyadh. According to Alghamdi and Holland [23], teachers have successfully integrated technology into teaching. Their competence in delivering the required instructional materials is critical for M LMS

adoption and utilization. Consistent with Chi et al. [49] and Nilsson [73], competence can affect the teacher's delivery of instructional knowledge to the learners. Competence in using M provides teachers with the necessary background knowledge and skills to facilitate the adoption rate and use of M LMS technology in KSA [15,22,23].

The results indicate that competence in using M LMS can be attributed to school teachers' positive time utilization and management in course content delivery. According to Barri [84], competence in technology utilization has become increasingly significant with time, and it has gradually been accepted as critical for the realization of educational objectives. The potential advantages of the adoption of M LMS included the integration between schools and individuals (e.g., teachers) [85]. Hence, the term "competence" represents a blend of abilities, experience, and attitudes suitable and adequate for a particular context [86]. In the context of M technology, competence to use M LMS refers to the teachers' ability to effectively use all the selected features of the LMS, where a strong relationship between competence and M LMS was found to be significant. In support of this finding, studies have shown that competence to use M technology encompasses the successful and efficient use of technology for access and learning [2,3,43]. Moreover, digital competence entails the positive and significant utilization of e-technology for education [87,88]

It was also found that BI partially mediates the relationship between competence and M-LMS. Competence is an important factor determining the rate of technology utilization because it directly influences the use of M LMS among academicians [11,38]. Teachers are becoming competent at applying the M LMS technology in their classrooms, allowing the teachers to play a more effective function as enablers. The present result supported Chi et al.'s [49] work through the theory reported by Barragán-Sánchez et al. [50], which stated that digital teaching competence is a measurement of the self-perceived level of competence teachers have to educate in eco-responsible use of technology. However, lack of competence can be deemed one of the obstacles teachers encounter in incorporating technology into their classrooms.

5.3 Madrasati (M) Utilization among Teachers

The findings of this study indicated that M utilization among teachers was extremely significant

as a new technological adoption among Riyadh schools. The success of any initiative to implement technology at any educational level depends strongly upon the attitude of the instructors involved. These factors are considered key influences in measuring possible issues with new technology acceptance by school teachers in KSA and Riyadh [42]. Although the M utilization rate among Saudi teachers can be linked to attitude and competence in utilizing technology in general, the full M utilization among teachers remains a very difficult issue in Saudi Arabia. While behavioral intention affects teachers' attitudes toward M technology, their attitudes toward the utilization of M do not determine the success of its implementation across public schools in Saudi Arabia. Teachers' knowledge changes from developing an attitude toward technology, then either adopting or rejecting it in their teaching and learning processes [4], establishing a belief that their attitude influences behaviors [5]. Teachers' attitudes have been identified as the main predictor of the new technological utilization in schools. Positive attitudes promote less proficient teachers to learn the essential skills for technology application in teaching [6].

The utilization of M LMS is also linked to social factors, particularly on how teachers interact with M LMS technology and the environment (e.g., Riyadh), impacting their behavioral intention toward such interaction. In this platform, it is possible to recognize, regulate, and manipulate particular outcomes of the teaching process by altering selected aspects of a teacher's explicit behavior, which can be quantitatively measured. Teaching can be regarded as a distinct behavior. Hence, any alteration affecting behaviors could affect the quality of teaching [89].

Competence in using new technology, such as M LMS, also affects its adoption in schools. Competence plays a major role in computer learning and skills in teaching because the computer assists educators in facilitating learning by training them to be competent and even supports their teaching processes. In addition to discussing how the best technology can be used in the classroom to help teachers effectively teach their modules, Teachers' competence to effectively handle computer-related technology has become crucial for the successful implementation of new technology at all levels of education, especially in Saudi Arabia [90].

5.4 The moderating role of mediator and moderators

This study indicated that behavioral intention significantly moderated the relationship between attitude and competence on M utilization among teachers, which implies positive usage of the new technology. Teachers' intentions appeared to be positive toward making better use of M LMS to improve their school achievements [91,92]. This demonstrates that the teachers must participate in certain activities or tasks if they intend to benefit from them. Behavioral intention plays a crucial role in learning and development as it explains how new technology is utilized to improve student learning and instructional material delivery. According to Alharbi et al. [35], behavioral intention plays a mediating role in influencing the use of technology. Similarly, Al-Sharhan et al. [33] found that teaching can be enhanced through the teachers' behavioral intentions toward the use of LMS. These earlier findings support this results we obtained here. Altogether, the findings showed that mediating effects of behavioral intention were significant on M LMS utilization among teachers in Riyadh.

Therefore, it confirms that gender, to some extent, has a moderating effect on the overall model of the study. Both male and female beta values for male attitude and competence to use M LMS are not significant. This could be because male and female students are segregated in Saudi Arabia, particularly in Riyadh. There are no mixed-gender schools under Saudi policies [20]. Similarly, Binyamin et al. [19] showed that gender does not have a moderating effect on acceptance of LMS in Saudi Arabia. Since gender can moderate the influence of male attitude and competence on M LMS utilization among Saudi teachers, this factor might not be in the context of female teachers in other schools. However, the current findings do not agree with the report by Yu [51] that indicated gender and age as moderators have significant effects on performance expectancy on behavioral intention.

The beta values of respondents aged 31–40, 41–50, and 51 years and above were not significant. This implied that age was not a significant factor moderating the relationship between competence and M LMS. This could be because younger teachers have different perceptions of using M LMS to deliver instructional material content than older teachers. However, this result contradicts the results reported by Yu [51], where age considerably moderated the effects of perceived self-efficacy on

technology adoption behavior. Similarly, Emiroğlu [57] reported that age (between 20 and 57) significantly affects new technology utilization among faculty members. This result contradicted the finding of this study, as age plays no role in the delivery of instructional material through M technology in the context of Saudi Arabia. Therefore, age did not significantly moderate the relationship between attitude and competence in M LMS utilization.

6. CONCLUSION

This study showed two directions of findings, both supporting the M LMS acceptance and utilization among teachers in Riyadh. On the one hand, the relationship between attitude and M LMS as moderated by both gender and age turned out to be statistically insignificant, suggesting that attitude has no significant effect on M LMS utilization among teachers. In contrast, gender and age had no moderating effect on them. Saudi teachers' M utilization and acceptance level of M LMS cannot be linked with their attitude. BI does not affect teachers' attitudes toward M utilization and its implementation in public schools across Riyadh. Meanwhile, teachers' competence in using M LMS was found to positively and significantly affect M LMS acceptance and utilization in Riyadh. The moderation role of gender and age on the relationship between competence and M LMS is significant. In this light, teachers' competence to effectively utilize M technology has become crucial for successfully implementing M technology at all education levels in Riyadh's public schools.

The competence in M LMS utilization among teachers is reflected through their ability to use it to present relevant information and content. The analysis results indicate that the M LMS includes well-designed lessons, and the feedback helps improve teachers' knowledge. The overall associated behavioral intention toward the M LMS utilization is significantly higher among teachers who attended workshops that helped them learn the use of the M LMS in a more detailed manner. Therefore, it can be concluded that competence to use M LMS is crucial to acceptance and utilization among public school teachers in Riyadh, instead of their attitude toward the new technology. It is recommended that further research should be conducted to determine whether there are other factors affecting the utilization of M LMS in the Saudi public schools in Riyadh and whether another related theory can be used. This study concentrated

on only public schools in Riyadh. Thus, future studies are recommended to examine M LMS use in all regions in Saudi Arabia and private schools. Furthermore, this study examined teachers' perceptions of their attitudes and competence in M LMS and BI. These aspects can change over time as new knowledge and experience are accumulated. Thus, future studies might use a longitudinal design to obtain more accurate findings. The moderators of this study were age and gender. Other factors such as time and experience may also moderate the relationship between BI and another factor or variable. Therefore, these variables should be deemed as moderators in future studies.

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