Artificial Intelligence in Learning Management System: A Case Study of the Students of Mass Communication

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Abstract-

Artificial Intelligence (AI) in learning and education is not new. However, the rise of the Covid-19 pandemic led to a focus on its role in Learning Management Systems (LMS). This study also examined the role of AI in the LMS with features including Natural Language Processing and Reasoning. The researchers used a self-proposed model and gathered data from the mass communication students in two public sector universities in Pakistan. Results revealed that Artificial Intelligence is integral to Learning Management Systems (LMS) in the selected institutions. Further, the effect of Natural Language Processing (NLP) on Reasoning indicated these two factors as interlinked, improving the quality of LMS. Additionally, Natural Language Processing significantly mediated the effect of AI on the LMS, showing that language processing facilitates LMS usage among students. Finally, the results also indicated the significant mediation effect of Reasoning on the relationship s between AI and the LMS. Overall, the results also remained supported towards the incorporation of Artificial Intelligence (AI) along with Natural Language Processing (NLP) and Reasoning in Learning Management Systems (LMS). The researchers conclude that AI in Learning Management Systems is widely applied in Pakistani institutions. The young students also acknowledge the benefits of AI-enabled LMS that have enhanced their learning experiences and provided them with logical solutions and answers to their complex queries. Further, the study limitations are discussed and highlighted accordingly.

Keywords: *Artificial Intelligence, Learning Management Systems (LMS), Mass Communication, Pakistan*

Introduction

Artificial Intelligence has become an integral part of several aspects of daily life. As a part of our daily activities and matters, Artificial Intelligence is facilitating us in many ways (Ruangkanjanases et al., 2020). For instance, Artificial Intelligence in education is a relatively trending phenomenon. One of the primary roles Artificial Intelligence plays in education is that it is incorporated n different levels of education (Paszkiewicz et al., 2022). Today, from beginners to Postgraduate level education, all are gaining maximum benefit from Artificial Intelligence. As noted by Ruangkanjanases et al (Ruangkanjanases et al., 2020), technology has long been incorporated into our lives. Yet, its role in education is under scrutiny, as AI's benefits for learners, educators, and institutions are due to the wider availability of remote devices and online curricula (Jaakkola et al., 2020). With the rise of Artificial Intelligence, this technology is helping in many ways(Raj & Seamans, 2019). Students consider it an important part of their educational journey, enhancing their learning experiences (Memon et al., 2019). For example, students across the globe are continuing their educational journey through Learning Management Systems (LMS) offered by their institutions (Cavus et al., 2021). Learning Management Systems (LMS) provide an intuitive and centralized system for managing educational activities. These systems assign the students coursework, monitor students' progress, facilitate communication between students and educators, and also generate reports regarding students' educational activities and performance (Berente et al., 2021). In this regard, these Learning Management Systems accommodate all parts of a course into a single space with content categorization (Alturki & Aldraiweesh, 2021). This means that students can check their grades individually for each course, attain course material, and submit their projects and assignments as categorized by the LMS (Pasha et al., 2021). Another important factor accelerating interest in AI-enabled Learning Management System was the availability of Digital Tutors, which helps learners with problem-solving and the best responses to their queries (Case, 2020).

However, special consideration to Artificial Intelligence in Learning Management Systems (LMS) was given during the Covid-19 pandemic. This focus was to provide the students with the ease of access, credibility of information, and useful outcomes, which may help sustain educational activities through online education (Al-Skaf et al., 2021; Habes, Salloum, et al., 2020; Salloum et al., 2021). As noted by Thao & Van Anh (Thao & Van Anh, 2020), the conventional patterns of formal education, grading, results, and interaction between educators

and students are transformed due to AI-enabled Learning Management Systems. As a result, institutions today focus on improved Learning Management Systems besides their formal educational patterns. Now Article Intelligence in the Learning Management Systems also helps learners by providing them with course material with just a single click (Raza et al., 2021). For example, traditional distance education was based on acquiring the course material in hardcopies through institutions or libraries. Today, eBooks and online syllabus are available to ensure education without barriers (Hu Au & Lee, 2017a). According to Ruangkanjanases et al (Ruangkanjanases et al., 2020), Artificial Intelligence in Learning Management Systems is equipped with some primary qualities, including perceptions, Reasoning, problem-solving, language processing, and others (Cavus et al., 2021; Davenport & Ronanki, 2018; Jaakkola et al., 2020). These qualities help the LMS system to deal effectively with queries, student record keeping, and content management. Consequently, Artificial Intelligence helps to determine the students' performances and helps them to search for their desired content in the better possible way (Raj & Seamans, 2019).

Study Objectives

The previous discussion about Artificial Intelligence in Learning Management systems indicates the significance of technology in the educational arena (Hu Au & Lee, 2017b). However, despite its utmost importance during the Covid-19 outbreak, studies have yet to address AI in Learning Management Systems from the student's point of view. Also, the wider implementation of Artificial Intelligence in the Pakistan indicates its potential role in education. Thus, by keeping in view these gaps, this research aims to examine the opinion of Pakistani students about AI in the Learning Management System. This study is divided into five sections, from the introduction to the conclusion and limitation. The focus was to provide the readers with systematic and empirical evidence of the relevant phenomenon, adding significantly to the literature concerning AI in Learning Management Systems.

Review of Literature

Artificial Intelligence in Pakistan

Artificial Intelligence in the Pakistan is not a new phenomenon (Habes et al., 2023). Artificial Intelligence has been incorporated and used in many private and public sector organizations for the last few decades. As Pakistan is also focusing on achieve sustainable development and

growth is the hub of technology and development, the incorporation of Artificial Intelligence in different sectors, including education is a great concern for all. Recently an increased consideration towards online learning and providing the students with safe learning environment further enhanced the need of AI-enabled online learning systems in Pakistan (Habes et al., 2023). According to G.S.M.A (GSMA, 2020), Artificial Intelligence is important because the government focuses on investing in the future generation by preparing them to cope with the challenges and keep pace with the changing technological environments (Iqbal et al., 2022). Many public and private sector institutions provide students with degrees and courses regarding Artificial Intelligence in the educational sector. These educational programs are primarily for the undergraduate, graduate, and postgraduate levels, providing the young generation with familiarity, skills, and opportunities in technology and innovation (Pasha et al., 2021). Besides, providing the students with Learning Management Systems (LMS) accompanied by Artificial Intelligence is another important side of technology in the Pakistan's educational sector. As noted by (Gubareva & Lopes (Gubareva & Lopes, 2020), Artificial Intelligence has a positive, constructive role in understanding human needs. It enhances human knowledge and learning and recommends a typical pattern of organizing humans inside the circle of educational arenas where AI is executed (Popenici & Kerr, 2017).

Artificial Intelligence in Learning Management System:

According to Pasha et al (Pasha et al., 2021), Artificial Intelligence in Learning Management Systems indicate a brighter future for education. Incorporating Artificial Intelligence in Learning Management Systems provides several tangible benefits, such as personalized content, automatic error correction, and curriculum automation. As noted by Hwang & Lee (Hwang & Lee, 2019),, today, it is time to improve the educational sector with certain technologies. Artificial Intelligence in the Learning Management Systems indicates the institution's keen interest in providing learners with technology-enhanced learning facilities (X. Chen et al., 2020). Even many professional organizations, i.e., telecommunication, corporations, banks, and others, also contain a small number of niches where Artificial Intelligence is merged with Learning Management Systems for their employees' training and professional development (Habes, Ali, & Anwar, 2021; Habes, Ali, Khalid, et al., 2021b; Harley et al., 2016; Tahat et al., 2022a). According to Van Der Werff et al (Van Der Werff et al., 2017), although different organizations

also practice a traditional pattern of education, Artificial Intelligence in Learning Management Systems are widely preferred to save the time and effort of their learners.

Salloum & Al-Emran (Salloum & Al-Emran, 2018) further argued that an effective Learning Management System is an important component for the learners to access training programs, presentations, and lessons. One such element in the online learning environment is Artificial Intelligence incorporated Learning Management System (LMS) (Al-Khresheh, 2022). Today, many educational institutions worldwide prefer Artificial Intelligence in their Learning Management Systems to provide students with maximum benefit (Hu Au & Lee, 2017a). According to AAA, one of the primary factors adding value to AI-enabled Learning Management Systems (LMS) is the reduction of human labor. Today, AI-enabled systems help users with user-friendly systems that also help increase students about the importance and role of technology.

H1: Artificial Intelligence has a significant effect on Learning Management Systems

Language Processing and Reasoning:

According to Mirbabaie et al (Mirbabaie et al., 2021), with technological advancement, we can infuse and process human thoughts in machines designed to mimic and think like humans. These thinking and functional capabilities are associated with Artificial Intelligence. Some applications in Artificial Intelligence involve Natural Language Processing (NLP), Expert Systems, Computer Vision, and Speech Recognition. Especially, Reasoning plays a vital role in Artificial Intelligence (Somasundaram et al., 2020). The AI-enabled systems involve the logical process of making predictions, drawing conclusions, and constructing an approach concerning a certain thought with the help of existing information and knowledge (Gubareva & Lopes, 2020).

As noted by Rathod et al (Rathod et al., 2019)., Reasoning is an important aspect of Artificial Intelligence to understand the human brain, thinking patterns, drawing conclusions, and further improving the functions of AI in our lives. Dobratulin & Nezhurina (Dobratulin & Nezhurina, 2022) further categorizes Reasoning into different forms: Inductive Reasoning, Deductive Reasoning, Monotonic Reasoning, Common Sense Reasoning, Abductive Reasoning, and others. For example, Lee (Lee, 2020) cited an example of Reasoning in Natural Language Processing (NLP) by using Artificial Neural Networking (ANN) computations, replicated on a larger scale,

and trained about the larger data sets. As Sugandini et al (Sugandini et al., 2018) stated, these systems contain language models such as GPT-3 and BERT that can understand power universal language and generation base, which can b adopted to understand, write, and the reason for the tasks.

H2: Language Processing has a significant effect on Reasoning

Language Processing in Artificial Intelligence:

Natural Language Processing, also known as language understanding, is a prominent approach in Artificial Intelligence that helps the computer learn and understand like humans speak and write (Zhang et al., 2020). According to I. B. Hong (Hong, 2018), language processing and understanding are comparatively difficult, as it involves many unstructured data. The style and language in which people communicate with each other vary from person to person, making language processing a complex phenomenon. Sometimes, understanding the context is also a concern, as it requires semantic analysis for Machine Learning to grasp language processing and processing. Furthermore, language processing and understanding can be structured differently as it would be based primarily on the specific Machine Learning approach according to the type of analysis (Saengchai et al., 2019).

The same case is in AI-enabled Learning Management Systems (LMS) where different suites of programs and libraries are implied for statistical and symbolic natural language processing written in Python (Sarkar & Khare, 2019). According to Persson & Torssell (Persson & Torssell, 2020), Natural Language processing helps with almost all language processing tasks, including creating text classification datasets, tokenizing, etc. Notably, these tasks are utilized for refining a problem and coding required to solve the relevant problem. For instance, Syntax analysis involves drawing out the exact meaning according to the sentence structure according to the formal grammar and its rules (L. Chen et al., 2020; X. Chen et al., 2020; Ouyang & Jiao, 2021).

H3: Language Processing significantly mediates the effect of Artificial Intelligence on the Learning Management System

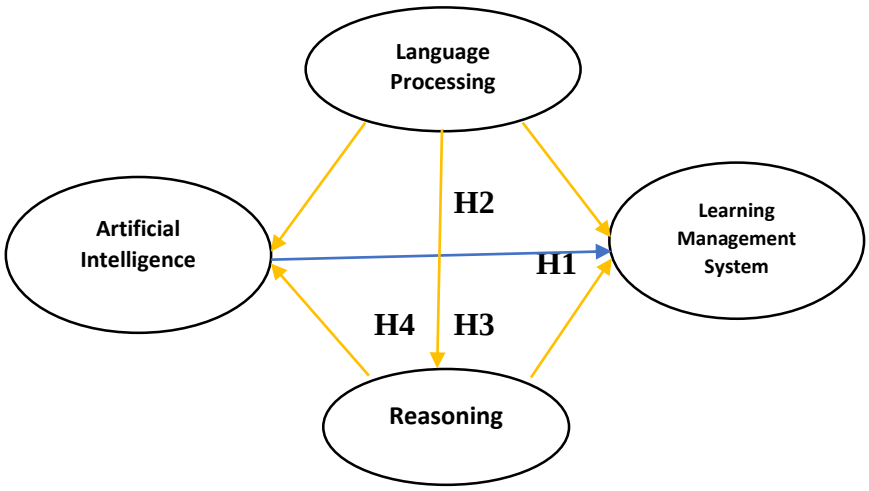
Reasoning in Artificial Intelligence:

As discussed earlier, Reasoning is an important component of Artificial Intelligence (Samuel et al., 2018). Villegas-Ch et al (Villegas-Ch et al., 2021), further described Reasoning as a representative piece of information to the computer that it can use to solve even complex problems, including having a dialogue in natural language or providing the internet user with the best possible recommendations. Ishfaq & Mengxing (Ishfaq & Mengxing, 2021) further noted that Reasoning in Artificial Intelligence is derived from Psychology regarding how humans solve their problems in a way that may make complex systems easy to understand, design, and build.

As Mishra & Shukla (Mishra & Shukla, 2020) argued, Reasoning involves approaches that help to generate conclusions from the available information by using logical Reasoning, primarily induction and deduction. Reasoning in Artificial Intelligence plays an important role in employing knowledge-based systems (Che et al., 2021). Reasoning in Artificial Intelligence involves two modes, i.e., batch and interactive processing (Barakina et al., 2021; Tosyali, 2021; Yu et al., 2021) An interactive system interface to ask questions or enable the users to flow the reasoning process. Batch systems gather all the information and provide the best possible answer without guidance or user feedback (Rzepka et al., 2020a).

H4: Reasoning significantly mediates the effect of Artificial Intelligence on the Learning Management System

Figure 1
Explanatory Model of Current Research



. Methodology:

Research Design:

This research involves an experimental design. According to Berente et al (Berente et al., 2021) experimental research is conducted when the researcher proposes a hypothetical statement that further reflects the study problem and is empirically tested with suitable tests. As this research is based on four preliminary hypotheses, the experimental design was the most suitable approach. The researchers designed structured survey questionnaires for data-gathering purposes and sent the questionnaires through emails. The questionnaires were based on the Five-Point Likert scale, as the respondents had to select the best possible matching statement according to their opinion (Habes et al., 2022). However, the sources of questionnaire scale items are summarized in Table 1. The data was gathered from August 22nd, 20222, to September 30th, 2022. After the data gathering, the researchers evaluated the questionnaires and further analyzed the data by using SPSS and AMOS ver. 23.

Table 1

Source of Questionnaire Items

Constructs	Source(s)	No. of Items
AI-based LMS	(Pasha et al., 2021; Thao & Van Anh, 2020)	04
Language Processing	(Sarkar & Khare, 2019; Saengchai et al., 2019)	04
Reasoning	(Mishra & Shukla, 2020; Rzepka et al., 2020)	04
Learning Management System	(Al-Skaf et al., 2021; Habes, Salloum, et al., 2020; Salloum et al., 2021)	04

Sampling Approach:

As the study focused on the role of AI-enabled systems on LMS, a random sample of *n*= 250 respondents was selected from *n*= 2 public sector universities in Capital City Islamabad resulting in a 98.4% of response rate. The sample size chosen is justified as this study involved Structural Equation Modelling. Secondly, the sample selection was also evaluated based on G* Power Analysis as recommended by Ali and their colleagues (Ali et al., 2021). Based on the sample calculations by G* Power analysis as it revealed an ideal sample size with *n*= 1 exogenous

variable should be not less than *n*= 74 respondents. Thus, the selected sample size was ideal. Notably, the researchers randomly selected the study respondents from the departments of mass communications. There were no other selection criteria, as people having LMS accounts were the focus of the study. Consequently, using random sampling also nullified the researchers' own bias (Tahat et al., 2022b).

Research Ethics

The researchers kept basic research ethics under consideration. First, the researchers ensured the participants that their data would be confidential. Second, the researchers also provided the respondents with informed consent. The respondents were briefed about the study topic, objectives, and the potential generalizability of the results (Habes, Ali, et al., 2020). Finally, the respondents were also informed that they could discontinue responding whenever they want, without any further obligations (Jeljeli et al., 2022).

Data Analysis

To examine the validity and reliability of the model, the researchers first analyzed the internal consistency among the survey scale items (See Table 2). For this purpose, the researchers used two criterion-based approaches, including Factor Loading and an average of each conduct, also known as Average Variance Extracted (Habes, Ali, et al., 2020). Calculations indicated that all the Factor Loadings exceed the alpha value of 0.5, ranging from .655 to .992. Besides, the average value of each construct also remained exceeding 0.5 (.775 to .901), indicating that both criteria affirm the internal consistency among the survey scale items (Habes, Ali, Khalid, et al., 2021a). To analyze the reliability, the researchers once again applied the two-criterion including Cronbach Alpha and Composite Reliability (Dermawan et al., 2020). Results indicated the Cronbach Alpha value ranges from .742 to .811, and the Composite Reliability value range from .992 to 1.70, surpassing the alpha value of 0.7. Thus, it is found that the reliability of the survey scale items is also established.

Table 2
Validity and Reliability of Measurement Model

Constructs	Scale Items	Loadings	AVE	CA	CR
Artificial Intelligence	AI1	.753	.775	.793	1.65
	AI2	.714			
	AI3	.858			
	AI4	.752			
Language Processing	LAN1	.992	.896	.742	.992
	LAN2	.878			
	LAN3	.819			
	LAN4	.728			
Reasoning	REA1	.833	.856	.811	1.70
	REA2	.805			
	REA3	.932			
	REA4	.655			
Learning Management System	LMS1	.800	.901	.766	1.355
	LMS2	.882			
	LMS3	.991			
	LMS4	.696			
	LMS5	.932			

Concerning the discriminant validity of the measurement tool, the researchers applied a two-step approach, including the Fornell-Larcker criterion (Jeljeli et al., 2022) and Heterotrait-Monotrait Ratio (Tadesse et al., 2018). First, the researchers calculated the Heterotrait-Monotrait Ratio using the correlation values attributed to each item in the scale (See Table 3b). Results revealed the HTMT value at .281, which is lower than the alpha value of 0.85 (Ali et al., 2021). Besides, the Fornell-Larcker criterion involved calculating the square of each AVE value. As indicated in Table 3(b), the squares of all the AVE values are greater than the correlation values mentioned in the relevant table. Overall, the results concluded that the discriminant validity criteria of the measurement tool are affirmed.

Table 3(a)

Discriminant Validity of Measurement Model (Heterotrait-Monotrait Ratio)

	AI	LAN	REA	LMS
AI				
LAN	.537			
REA	-.229	.046		
LMS	-.587	-.810	-.071	

Note: AI is Artificial Intelligence, LAN is Language Processing, REA is Reasoning, and LMS is Learning Management System

Table 3(b)

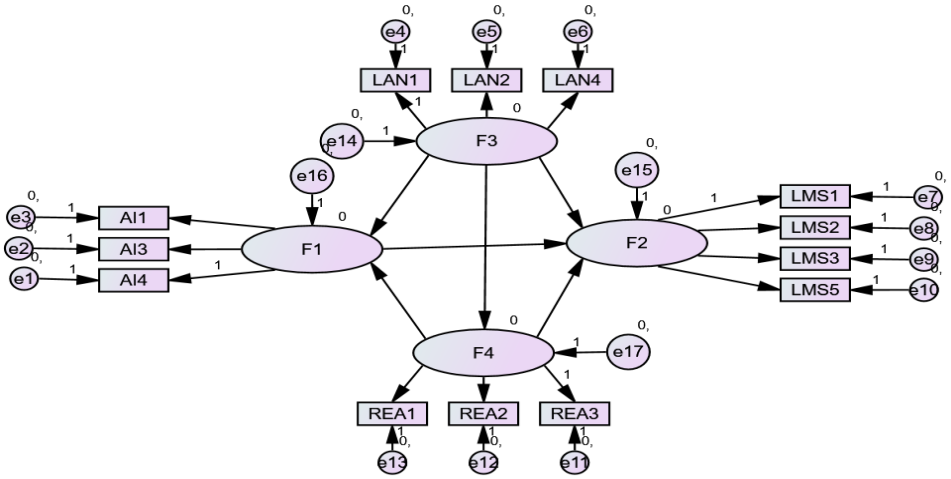
Discriminant Validity of Measurement Model (Fornell-Larcker Criterion)

	AI	LAN	REA	LMS
AI	**.600**			
LAN	-.132	**.802**		
REA	.335	-.026	**.732**	
LMS	.339	.710	.164	**.811**

Note: AI is Artificial Intelligence, LAN is Language Processing, REA is Reasoning, and LMS is Learning Management System

The goodness of fit usaslly indicates the extent to hich the observed value fit well with the expected data (Tenenhaus et al., 2009). In other words, goodness of fits shows the extent to which the sample data fits inot the expected data set from the population (Mérigot et al., 2010). Thus, the relevant test in this research indicated a chi-square value x^2= (11) and probbality level at 0.003. The Tucker-Lewis Index was .921 and the Non-Fit Indices value at .821. Additionally, the Standardized Root Mean Square Value at .253. Overall, the results indicate a good fit of the model and the observed data fit wel with the expected data in the population.

Figure 2
Goodness of Fit



As the current research involves Artificial Intelligence as the exogenous variable, the researchers examined its predictive power concerning the endogenous variables (Habes, Ali, Elareshi, et al., 2021). R^2 analysis revealed a 78.8% variation in Langauge Understanding, 60.1% in Reasoning,

and 48.5% in the Learning Management System (See Table 4). Altogether, it was found that the predictive power of the exogenous variable remained strong.

Table 4

R^2 Analysis of the Exogenous Variable

Constructs	R^2
Learning Management System	.485
Language Processing	.788
Reasoning	.601

According to Habes, Ali, & Pasha (Habes, Ali, & Pasha, 2021), path analysis in Structural Equation Modelling helps determine the significance of the relationships between exogenous and endogenous variables. Also, it analyzes the strength of this proposed relationship according to the gathered data. Thus, the researchers examined the structural relationships proposed by the four preliminary research hypotheses in his research (See Table 4, Figure 3). First, the H1 of the study assumed a significant, direct effect of Artificial Intelligence on the Learning Management System that remained accepted with a significance level at p> .000. As noted by Lawal et al (Lawal et al., 2022),, Artificial Intelligence in online learning systems are widely facilitating student in many ways as it not only content but also helps the student to access the services they want, search the most relevant options, check their academic grades, and even maintain their profile and privacy in a best possible manner. Further, H2 of the study indicated a direct, significant relationship between Language Processing and Reasoning. Language processing and further Reasoning are two distinguishing features of a system with Artificial intelligence. User language processing and recognition further help Artificial intelligence to function accordingly and provide the most suitable solutions and options. The results remained consistent with the AI-based system. They were well-enabled to process the language and suggest options and solutions based on Reasoning with a significant level at p> .000.

Table 5

Path Analysis of the Structural Model

HYP.	Relationships	*β*	*t*	*P*	*Status*
H1	AI→ LMS	.594	11.922	.000***	Significant
H2	LAN→ REA	.431.	5.372	.000***	Significant
HYP.	**Relationships**	***β***	***Indirect Effects***	***P***	***Status***
H3	AI→ LAN→LMS	.586	3.971	.054*	Significant
H4	AI→ REA→ LMS	.344	5.674	.043**	Significant

Note: AI is Artificial Intelligence, LAN is Language Processing, REA is Reasoning, and LMS is Learning Management System

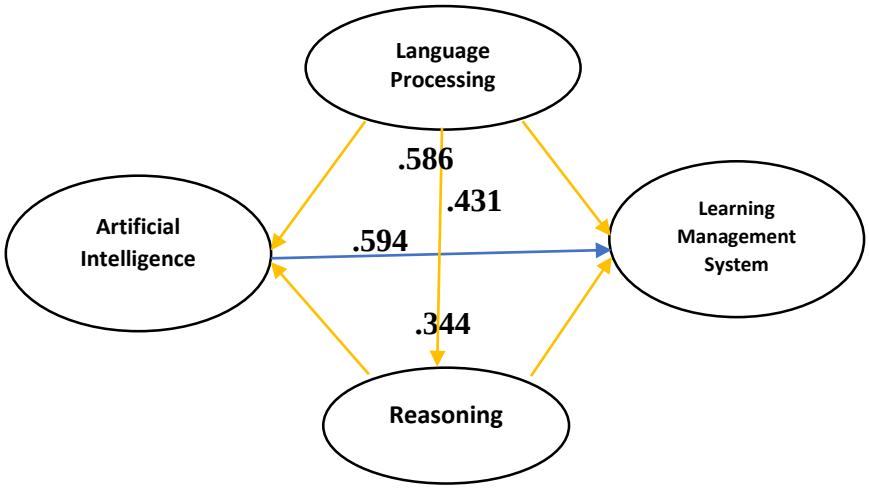
Moreover, the H3 of this research proposed a significant, indirect effect of Language Processing on the relationship between Artificial Intelligence and Learning Management Systems. As (Fadilla et al (Fadilla et al., 2018). stated, the Language process is an integral part of Artificial intelligence. Computer systems with language processing abilities easily understand the commands and requirements of the users. The system process the language and manipulates it to make it more understandable for the system to respond accordingly. Thus, results remained consistent as the significance level at p> .054 and the value of the indirect effect at 3.971also indicated the role of Language Processing as further strengthening the relationship between Artificial Intelligence and the Learning Management System. Finally, the mediating role of Reasoning was also proposed in the H4 of this study. According to Rzepka et al (Rzepka et al., 2020b), Reasoning in Artificial intelligence involves concluding logically. Besides, Reasoning also helps to construct approaches, make predictions, and function accordingly. Hence, with a significance level of .043 and indirect effects at 5.674, Reasoning has a significant indirect effect on the relationship between Artificial Intelligence and the Learning Management System.

Discussion on Results

Learning Management Systems (LMS) are important as they not only help the students resume their educational activities online but also keep records of student grades, academic submissions, and course engagement (Pasha et al., 2021),. Especially when Artificial Intelligence is now incorporated into these relevant systems, monitoring, training, course selection, and administration have improved (Memon et al., 2019). As noted by Al-Khresheh (Al-Khresheh, 2022)., Artificial Intelligence in Learning Management Systems (LMS) has enhanced constant

accessibility and provides students with personalized learning experiences. Talking particularly about the current study, Artificial Intelligence in Learning Management Systems is widely seemed as revolutionizing distance learning in the United Arab Emirates. The study respondents agreed with the role of Artificial Intelligence in upgrading their Learning Management systems with significant effects of language processing (Raza et al., 2021).

Figure. 3



The first hypothesis of the research, "**H1: Artificial Intelligence has a significant effect on Learning Management Systems",** was followed by fur root questions. The questions were based on the respondents' general opinion about Artificial Intelligence in Learning Management Systems (LMS), their attitude towards AI-enabled LMS, its usage, and their level of satisfaction. According to most respondents (79.2%), AI-enabled LMS is a significant part of their learning journey, especially when they resort to e-learning. 78.8% of respondents widely agreed that they have a positive attitude toward Artificial Intelligence in Learning Management Systems as it helps them access their academic profiles and records. As a result, 78.1 respondents revealed that they frequently use Learning Management Systems and are (80.3%) satisfied with them. Here X. Chen et al (X. Chen et al., 2020).cited an example of disabled students using Artificial Intelligence in Learning Management Systems to access their educational records, lectures, and syllabus. As AI converts spoken words into transcripts, hearing-impaired students can easily understand the lectures and check their academic grades on the Learning Management Systems.

Regarding the second hypothesis, "**H2: Language Processing has a significant effect on Reasoning",** the respondents were asked four root questions, including NLP helping them to enter keywords and search for the most relevant results, conversion of lectures in other languages, using the virtual assistance, and searching for the most relevant books, and study material through voice commands. 76.5% of respondents primarily rely on keyword search, which helps them reach and select the options they are searching for. 80.2% of respondents also agreed that their Learning Management System helps them convert the lectures into local language or subtitles for a better understanding. Besides, 79.6% of respondents indicated their agreement that they also resort to virtual assistance for solving any relevant problem and also search for the study material by using voice commands. Gubareva & Lopes (Gubareva & Lopes, 2020) also support this widely agreed role of Natural Language Processing in AI-enabled LMS as it noted that the relevant system is an effective pathway to save time and effort. Especially when the students have limited time or want to search and get the material quickly, Natural Language Processing is an ideal component of AI-enabled LMS.

Third hypothesis **"Language Processing significantly mediates the effect of Artificial Intelligence on the Learning Management System**". Four root questions were associated with the relevant hypotheses. First, 83.7% of respondents agreed that the keywords they use for search help them to access the option and command they are looking for. Respondents (81.5%) also indicated their agreement that they frequently prefer using voice commands to search when using the Learning Management Systems. According to the respondents (84.7%), using keywords and voice commands helps to reach the correct options further facilitating their searching efforts. Respondents also argued that Learning Management Systems having language and voice recognition systems further add more value to them and increase their online learning acceptance. These results are consistent with the arguments by Sarkar and Khare (Sarkar & Khare, 2019) as they also highlighted the importance of statistical and symbolic natural language processing of AI-enabled systems. Notably, Natural Language Processing (NLP0 is equipped by machine learning methods (ML) that enhance its capacity, usage, and processing.

Finally, the last hypothesis **"Reasoning significantly mediates the effect of Artificial Intelligence on the Learning Management System**" also indicated wider agreement from the respondents. Precisely speaking, 83.7% of respondents agreed that entering complex information

or search details in Learning Management Systems helps them to draw best possible conclusion. According to the respondents (80.6%), looking for the suitable answers to the questions also improves the quality of Learning Management System through Artificial Intelligence. Respondents (79.6%) also agreed that Artificial Intelligence in the Learning Management Systems is based n logical reasoning. Consequently, they consider (82.5%) drawing interferences and using reason is a potential quality of Artificial Intelligence particularly in the Learning Management Systems. These results indicated compatibility with the argumentation by Rzepka et al (Rzepka et al., 2020a). As noted, reasoning under the Artificial Intelligence focuses on the truth value. Despite the value of truth and false exist, the truth value is a basic consideration and an integral part of reasoning in the Artificial Intelligence.

Practical Implications

This study focused on Artificial Intelligence in Learning Management Systems, particularly in the context of features that further strengthen LMS acceptance among young users. Notably, the reliance on Learning Management Systems has increased during and after the Covid-19 pandemic (Pasha et al., 2021) which further indicates the importance of online learning in the current era. This study also highlighted its usage, the role of improved technology, and its incorporation to enhance students' learning experiences. Additionally, this study provides practical insights regarding the role of overall technology in education when mass communication students excessively rely on the Learning Management Systems in Pakistan. Considering the dimensions and contributions of Artificial Intelligence in the student's learning and education process is imperative. Especially in developing countries where technology acceptance is gradual (Ali et al., 2021), Artificial Intelligence's role in learning further highlights a struggle to bring technical reformations in the existing educational patterns.

Conclusion

Artificial Intelligence plays a vital role in learning as it is now aware of how users think and do. Artificial Intelligence provides tailored solutions to students searching for the required information and details, especially in Learning Management Systems. This study provided a baseline for the research regarding technology-enhanced learning in Pakistan, further filling the gap regarding AI in online learning systems. Any times Artificial Intelligence also help young students select their next courses and guide them through reasoning. Ease of use, logical

solutions to the problems. Language processing and recommending the best suitable matches all highlight the importance of Artificial Intelligence in Learning Management Systems. Thus, it is concluded that AI in Learning Management Systems is widely applied in Pakistani institutions. The young students also acknowledge the benefits of AI-enabled LMS that have enhanced their learning experiences and provided them with logical solutions and answers to their complex queries.

Study Limitations

Although this study fills the existing literature gap, it has some primary limitations. First, this study is conducted in Islamabad, Pakistan. The results represent the population, yet their generalizability could be better in other regions. Second, the results only selected the mass communication students, while the LMS is equally used in other disciplines. Finally, the third limitation involves selecting only two factors Natural Language Process and Reasoning) as the features of Artificial Intelligence. Notably, Artificial Intelligence is also equipped with other characteristics that limit the scope of current research.

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