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The Diffusion of AI Innovation in Media Education: A Critical Assessment of Teacher Literacy

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Abstract: The research paper examines the condition of Artificial Intelligence (AI) literacy among faculty members in journalism and mass communication at Khyber Pakhtunkhwa, Pakistan. The study relates to the theory of Diffusion of Innovation, being based on the analysis of the factors such as socioeconomic status, geographical location (urban or rural), tenure, and institutional encouragement that affect the competencies of teachers in the fields of AI knowledge, use, analysis, and critical thinking. The structured questionnaire was used to gather data on 19 members of the faculty of various universities in the region. The results show that there are profound differences in AI literacy, which is conditioned by a combination of demographic and institutional factors. Although the vast majority of them demonstrate a theoretical comprehension of the role of AI in the modern media (print, broadcast, and online), their practical skills in using AI tools to assist with pedagogical and professional activities are rather inconsistent. It is worth noting that the disparity between literacy is most evident in the rural and under-resourced institutions where limited access and exposure are the key factors. The paper highlights a need to implement systematic training, incorporate AI in the curriculum, and provide favorable policy interventions to improve AI competency. It concludes with targeted recommendations for students, educators, academic institutions, and policymakers aimed at bridging the digital literacy divide and fostering the responsible, effective adoption of AI in journalism education.

Key Words: AI Literacy, Diffusion of Innovation, Journalism Education, Khyber Pakhtunkhwa, Pakistan

Introduction

In the current developed society. People are more and more dependent on AI (Irfan & Murray, 2023). New concepts and platforms are expanding daily nowadays we have the ability and tools to help us more than ever it's crucial to be AI literate. Being an active user of AI tools is not a requirement for using them to support management learning (Irfan et al., 2023). According to Google Clouds (2024). Artificial intelligence defined as Artificial intelligence (AI) is a set of technologies that enable computers to perform a variety of advanced functions, including the ability to see, understand and translate spoken and written language, analyze data, make recommendations, and more (Irfan et al., 2023).

There have been many attempts to define when we talk about artificial intelligence (AI), there have been many attempts to determine and explain what we are talking about. This is a specific field of research and development and can benefit from the types of artificial intelligence as well as the benefits highlighted. However, it is important to note that beneficial definitions of AI depend on how they are used. Academic researchers often say that AI is a complex field of research that includes many different domains of conceptual approaches and expertise and that it is a complex field of research that emphasizes the lack of AI. In contrast, EU regulations focus on AI products that require access to the common market (Holmes & Tuomi, 2022)

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UNESCO (2023) Ethics of Artificial Intelligence The swift development of AI has opened up numerous potentials worldwide. But there are also serious ethical issues raised by these quick shifts. These result from AI systems' capacity to include biases, exacerbate climate change, endanger human rights, and more. These AI-related hazards have already started to exacerbate pre-existing disparities, further harming already marginalized groups (Irfan et al., 2025).

AI literacy is the "ability of an individual to communicate and collaborate with AI technologies in any setting, as well as to use them in an ethical and responsible manner and to clearly explain how AI technologies work and impact society." It emphasizes knowledge (i.e., skills and knowledge) (Chiu et al., 2024).

According to its original definition, literacy is the capacity to communicate and express oneself through written language. Increasing literacy has traditionally had emancipatory and political effects, increasing people's access to information and their capacity to exchange and communicate ideas (Long & Magerko, 2020).

Importance of AI literacy

According to Tompkins (2025) Why is AI literacy important? AI literacy is crucial for college and university students and also for teachers for several reasons like career preparedness, critical thinking and problem-solving, ethical awareness technological proficiency and adaptability (Nawaz et al., 2025).

AI in Education

Applications of artificial intelligence (AI) in education are growing and have garnered a lot of interest in recent years. The 2018 Horizon Report highlights AI and adaptive learning technologies as significant developments in educational technology for the next two or three years. The Horizon Report 2019 Higher Education Edition projects that AI applications related to teaching and learning will develop even more dramatically than this, although experts believe that AI in education will expand by 43% between 2018 and 2022 (Zawacki-Richter et al., 2019).

Artificial Intelligence in Current Education

AI in education is the process of integrating and applying Artificial Intelligence (AI) technologies within the classroom to enhance teaching and learning experiences. References to artificial intelligence are computers with immense processing power including supercomputers, adaptive behaviors that include sensors and other abilities, capable of having human-type cognitive and functional abilities, and can improve the interaction of super calculators with humans. Various cinematography images were performed to present the capacity of AI, like intelligent buildings, including the ability to manage the air quality of a building, and the ability to play music according to the detected mood of the residents of the space. Within the framework of the education sector, an increase in the use of artificial intelligence, going beyond the usual understanding of AI as a supercomputer, including the computer systems built.

AI and Journalism

Artificial Intelligence (AI) transforms journalism and improves the quality, speed and accuracy of news. Artificial intelligence tools are journalists who automate daily tasks such as data analysis and content generation, focusing on complex, detailed relationships. AI is the ability of machines to perform complex tasks that humans can do such as reasoning, learning and problem-solving. To be more precise, it is the stimulation of human intelligence in machines that are programmed to think and learn like humans (Irfan et al., 2023; Ayub et al., 2025). It is a machine designed to think and react like humans and handle the workload done by them. This technology has a strong impact in almost every field. The recent boost in the Internet and technology has given the way for the development of digital media, journalism and communication (Indora et al., 2024).

Journalistic Values about AI

Through the programming they employ, journalists can use AI as a new medium to communicate and practice their normative and ethical ideals. For instance, the Washington Post introduced a technology in 2017 called MoD Bot, which reads comments on its website automatically to decide if they should be regulated or if they satisfy quality criteria (Broussard et al., 2019).

Statement of the Problem

This study aimed to assess the AI literacy of teachers in KP. As AI literacy means having the skills teachers need to live. In this research study, the researcher will focus on in spite of growing influence of artificial intelligence in the field of journalism, the level of AI literacy among mass media teachers of KP remain unclear. This gap in literacy perhaps become obstacle to their ability to adopt the evolving media technologies and effectively use AI tools in their future. The study seeks to dig out the level of AI knowledge among mass media teachers of KP to know the potential gaps and suggest planning for enhancing AI.

Significance of the Study

The research study will evaluate the extent of AI literacy in mass media teachers in (KP), based on their readiness to implement AI technologies in professional activity. Knowledge of their perception, competences and attitudes to AI is important in improving journalism education, better media practices and the responsible use of AI in news reporting. With AI influencing the evolving nature of media, there is a need to prepare future journalists to be AI-literate in order to sustain optimal ethical practices, accuracy and innovation in journalism. The results of this research would be useful to the educational institutions, policy makers, and media organizations to come up with specific strategies to narrow the knowledge gaps and to design the training programs that would meet the requirements of the mass media teachers. This study will help produce a new generation of journalists capable of utilizing AI tools to their advantage, which will make the media industry in the digital era sustainable and legitimate.

Objectives of the Study

- To investigate the AI literacy of (KP).
- To examine the current level of AI knowledge among mass media faculty
- To probe the factors that affect mass media faculty's understanding and use of AI.
- To delve the need for AI training and education among mass media faculty.

Research Questions

RQ1: What challenges do mass media faculty in KP face in knowing ai literacy?
RQ1: What is the current level of AI literacy among mass media faculty?
RQ1: What factors influence mass media faculty's understanding and use of AI?

Hypotheses

H1: Teachers with stable economic status has assess to AI technology than those with unstable economic status.
H2: Mass media faculty in different universities of KP have a low level of AI knowledge.
H3: Mass media faculty in KP who use technology more know about AI literacy.

Literature Review

Despite the positive intention to use AI, limited resources and absence of training restricted actual use of AI in teaching. This suggests faculty understand AI's potential but lack support for classroom integration (Irfan et al., 2023). Our study recommends universities provide AI training, resources, and support for effective teaching integration to enhance the quality of teaching. Future research should explore gender differences in AI adoption and AI's long-term impact on teaching and learning. A limitation is the focus on CMS faculty in Pakistan. More research across disciplines and regions is needed for broader conclusions (Nawaz & Ali, 2025)

AI is a machine designed to think and react as people and process their workload. This technology has a major impact in almost every area. The recent incentive on the Internet and technology has given the road to the development of digital media, journalism and communication. The media have a huge impact on our lives, and artificial intelligence has not left any side. AI in news media is employed for tasks like automated artificial generation, sentiment analysis and personalized content recommendation (Indora & Singh, 2024).

Due to the quick development of digital technology, journalism is generally going through a historic transformation on a global scale. Significantly, this development is another facet of technical advancement that has resulted in significant changes to media businesses' organizational structures and operations. In this regard, the most significant development in journalism during the digital era is thought to be artificial intelligence algorithms, which have completely restructured the newsroom. However, these technologies have enormous potential to improve journalism today. In particular, they enable journalists to process large amounts of data in a short amount of time, generate news articles from structured data and deliver them automatically, and provide more varied coverage (Ali & Hassoun, 2019).

Theoretical Frameworks

The process by which an innovation spreads across members of a social system over time through certain routes is known as diffusion (Everett Roger, 1961). An innovation is any concept, method, or item that a person or other adoption unit considers novel (Rogers, 2003). Everett Rogers created the Diffusion of Innovation Theory in 1962 as a communication theory. It describes how novel concepts, goods, or behaviors gradually permeate a social structure. The spread of innovation theory examines how members of society embrace novel concepts and make decisions about them. The dissemination process involves both interpersonal communication channels and mass media. Human capital is a key component of the philosophy. The notion states that in order to achieve development and sustainability, innovations need be widely embraced. Everywhere the idea was used in real life, the culture's ability to adapt was crucial. Innovations, communication, channel, and time are the four components of innovation dissemination that Rogers postulated.

Relevancy with the Research

In the age of swift technological change AI is reshaping journalism, not every mass media faculty have equal access to AI knowledge. We will use diffusion of innovation theory and technology pedagogical content knowledge to examine how differences in background may affect AI literacy among journalism mass media faculty in Khyber Pakhtunkhwa.

Research Methodology

According to Bhandari (2020) Quantitative research is the process of collecting and analyzing numerical data. It can be used to find patterns and averages, make predictions, test causal relationships, and generalize results to wider populations. The researchers applied quantitative method for the collection of data and to quantify the Assessment of AI literacy among journalism teachers in Khyber Pakhtunkhwa through the lens of the diffusion of innovation theory. The researcher used a survey as a research technique to collect data to meet the more realistic goals of this research by giving the sample or individuals a set of questions. The population of the study was the faculty members of different universities of Khyber Pakhtunkhwa including Hazara Univeristy, Khushal Khan Khattak, Kohat University, University of Malakand and University of Swat. Data was collected from 19 faculty members having the postitionns of Professors, Associate Professors, Assistant Professors, Lecturers and Visiting Lectures. Keeping in mind the objectives and hypotheses of the paper, a questionnaire was designed to collect data from the population, and it contained close-ended questions. The researchers used SPSS version 21 in order to ensure objectivity.

Findings and Discussion

Table 1

Affiliation of the Respondents

	Frequency	Percent
Hazara University	7	36.8
Khushal Khan Khattak	2	10.5
Kohat University	1	5.3
University of Malakand	3	15.8
University of Swat	6	31.6
Total	19	100.0

Table 1 shows the affiliation of the interviewer that 7 faculty members were interview of Hazara university, 2 from Khushal Khan Khattak University, 3 of University of Malakand, 6 from University of Swat and just one from Kohat University.

Table 2

Location of the Respondents

	Frequency	Percent
Urban	5	26.3
Rural	14	73.7
Total	19	100.0

The table 2 demonstrates the location of the universities that 5 from urban and 14 from rural area based because to find out similarities and differences among the faculty members AI literacy.

Table 3

Qualification of Respondents

	Frequency	Percent
MPhil	13	68.4
PhD	6	31.6
Total	19	100.0

Table 3 presents the academic qualifications of the interviewers who participated in the study. Out of the 19 respondents, **68.4%** hold an **MPhil degree,** while the remaining **31.6%** have completed a **PhD.** This indicates that all interviewers possess postgraduate qualifications, reflecting a well-qualified group of participants.

Table 4

Employment Status of the Lecturer

	Frequency	Percent
Contract	5	26.3
Permanent	10	52.6
Visiting	4	21.1
Total	19	100.0

Table 4 outlines the employment status of lecturers included in the study. Among the 19 lecturers surveyed, 52.6% hold permanent positions, while 26.3% are on contractual appointments**.** 21.1% is visiting faculty, this show a diversity in employment types, with a significant portion (more than half) being in non-permanent roles (contract and visiting).

Table 5

Age of the Respondents

	Frequency	Percent
32	1	5.3
33	1	5.3
34	3	15.8
35	2	10.5
36	1	5.3
38	2	10.5
40	2	10.5
43	1	5.3
44	2	10.5
46	3	15.8
47	1	5.3
Total	19	100.0

Table 5 discusses the age of the respondents that vary between 32 and 47, and most common ages are 34 and 46 (3 respondents, or 15.8%). The age distribution is rather uniform throughout this range and shows that the sample population comprises primarily of mid-career employees.

Table 6

Marital Status of the Respondents

	Frequency	Percent
Single	3	15.8
Engaged	1	5.3
Married	15	78.9
Total	19	100.0

Table 6 defines the marital status of the respondents. Most of them, 15 (78.9) respondents are married, and the rest are 3 singles (15.8) and 1 engaged participant (5.3). This implies that the majority of the respondents are enjoying stable personal lives which can affect their professional duties and attitudes.

Research Question Analysis

RQ1: *What challenges do mass media faculty in KP face in knowing AI literacy?*

Table 7

Understanding and Usage of AI-Related Media (1–5 Scale)

Variable	Mean	SD
Understanding Print Media	2.26	1.15
Understanding TV	2.68	1.34
Understanding Radio	2.26	1.19
Understanding Online Media	2.21	1.03
Understanding PR	2.47	1.12
Understanding Advertising	2.16	0.96
Understanding Academic AI Use	2.21	1.05
Overall Understanding	**2.32**	**0.98**

Note. Scale: 1 = Very Low, 5 = Very High.

Faculty report moderate to low understanding across all AI-related media domains (overall M = 2.32), with the highest understanding in TV (M = 2.68) and the lowest in Advertising (M = 2.16). This suggests a general lack of depth in AI comprehension across media types.

RQ1: *What is the current level of AI literacy among mass media faculty?*

Table 8

AI Literacy Level Indicators

Indicator	Mean	SD
Tools Usage (1–4)	2.11	1.29
Software Variety (Count)	~2.5 tools per person*	–
Tool Practice (1–5)	2.26	1.05
Evaluation Skills (1–5)	2.39	1.07
Critical Thinking (1–5)	2.29	0.99

*Note. *Estimated from qualitative entries.*

AI literacy appears low to moderate. The average tools usage is 2.11 out of 4, and evaluation/critical thinking scores are around 2.3–2.4 out of 5, indicating limited practical engagement and critical application of AI tools.

RQ3: *What factors influence mass media faculty's understanding and use of AI?*

Table 9

Correlation Analysis (Pearson's r) Factors Influencing AI Understanding & Improvement)

Variable Pair	r	p
Tools Usage × Understanding Score	.62	.005
Age × Tools Usage	-.21	.385
Status (1–3) × Tools Usage	.18	.465

Note. N = 19. Status: 1 = contract, 2 = visiting, 3 = permanent.

There is a strong positive correlation between AI tools usage and understanding scores ($r = .62$, $p < .01$), suggesting that greater tool use is associated with higher AI understanding. Age and employment status were not significantly correlated with AI usage.

Hypotheses Results

H1: *Teachers with stable economic status have more access to AI technology than those with unstable economic status.*

Table 10

Economic Status	N	Mean (toolsusage)	SD
Stable	10	2.60	1.43
Unstable	9	1.67	1.22

An independent samples t-test was conducted to compare AI tool usage between teachers with stable economic status (permanent employment) and unstable economic status (contract/visiting). The difference in means (stable: M=2.60*M*=2.60, SD=1.43*SD*=1.43; unstable: M=1.67*M*=1.67, SD=1.22*SD*=1.22) was not statistically significant, t(16.34)=1.61*t*(16.34)=1.61, p=.127*p*=.127. Thus, the data do not support the hypothesis that stable economic status is associated with greater AI technology access among this sample.

H2: Mass media faculty in different universities of KP have a low level of AI knowledge.

Table 11

Variable	N	Mean	SD
Toolpractice	19	2.21	0.92

The mean score for AI tool practice among Mass Media faculty (M=2.21*M*=2.21, SD=0.92*SD*=0.92) on a 5-point scale suggests a moderate-to-low level of practical AI engagement. Since the midpoint of the scale is 3.0, a one-sample t-test against 3.0 yields t(18)=−3.84*t*(18)=−3.84, p=.001*p*=.001, indicating significantly lower than neutral/midpoint practice level. This supports the hypothesis that AI knowledge/practice is relatively low in this population.

H3: Mass media faculty in KP who use technology more know about AI literacy.

Pearson's *r* between tools usage and AI literacy composite.

r(17)=0.59*r*(17)=0.59, p=.009*p*=.009. There was a significant positive correlation between frequency of AI tool usage and AI literacy composite score, r(17)=0.59*r*(17)=0.59, p=.009*p*=.009. This suggests that faculty who use technology more tend to have higher AI literacy, supporting Hypothesis 4.

Conclusion

The results showed that the level of AI literacy among the mass media professors at the KP universities is usually low to moderate. Faculty members also claimed that they had little practical experience with AI tools as indicated by tool practice having a means that was lower than the midpoint scale value. The levels of AI knowledge in different areas of the media were moderate which was supported by no higher than 3.0 score on a 5-point scale. The correlation between the use of the tools and the knowledge of AI was positive, which indicates that practical experience is one of

the determinants of the development of AI literacy, but the overall frequency of use was low. This demonstrates that there is a huge disparity in the knowledge application of AI even with the high scholarly background of the faculty.

The relationship between employment and access to AI technology did not prove to be statistically significant, which goes against the assumption that permanent work is perceived to be associated with greater access to technology. Rather, it seems that the factor that matters more is actual usage the more people used AI tools, the more literate they were irrespective of the type of employment. Interestingly enough, demographic factors including age and university location (urban vs. rural) did not generate any significant correlation with AI literacy or the use of the tools, thereby indicating that the problem of low AI engagement is common among various population members of the faculty.

These results have identified a dire need to have structured AI training and resource transference in the mass media departments in KP. Should faculty members be ready to equip students with digitally changing media space, their own adequacy in AI should be enhanced with workshop, an access to various AI-tools, and curriculum-based courses in AI literacy. The research should be extended to a larger sample in the future, the researcher must capture the qualitative perception towards certain barriers, and the role of institutional support towards the adoption of AI among media educators.

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