

Analyzing the Association of Institutional and Professional Factors on Multimedia Adoption in Colleges of Basic Education in Kuwait

Rabab D. Alsaffar*

College of Basic Education, Faculty, The Public Authority for Applied Education and Training, Kuwait
P.O Box 23778 - Code Safat 22081
rd.alsaffar@paaet.edu.kw
*Corresponding author

<https://doi.org/10.24191/ajue.v22i2.016>

Received: 9 April 2025

Accepted: 15 May 2025

Date Published Online: 5 June 2026

Published: 5 June 2026

Abstract: The purpose of this study was to analyze the impact of institutional and professional factors on multimedia adoption in Colleges of Basic Education. Specifically, it examined the association of barriers such as Lack of Technical Support, Resistance to Change Among Faculty, Inadequate Training for Multimedia Use, and Limited Access to Necessary Equipment with Access to Multimedia Resource, Institutional Support, Teacher Efficacy on Multimedia, and Professional Development Opportunities. A quantitative research methodology using positivist paradigm was employed using survey strategy, with a sample size of 252 faculty members from CBE, in Kuwait. The analysis of variance reveals significant associations of technical support, faculty resistance, and training adequacy with multimedia adoption. However, limited access to equipment showed no significant impact, highlighting that systemic factors play a more crucial role. The study has key theoretical implications by reinforcing the applicability of the Technology Acceptance Model and Unified Theory of Acceptance and Use of Technology, emphasizing the need for integrated support structures. Practically, it calls for enhanced training programs, technical support systems, and change management strategies to foster effective multimedia adoption. These findings provide insights for policymakers to align educational reforms with digital transformation goals in Kuwait.

Keywords: Access to Multimedia, Institutional Support, Multimedia Resources, Multimedia Use, Resistance to Change.

1. Introduction

Integration of multimedia into the academic curriculum has become a critical priority round the globe, owing to the benefits derived through it. Research indicates that multimedia adoption enhances their educational experience in many different ways such as better student engagement, accommodating to different learning styles, and providing innovative ways of learning (Dmello et al., 2024; Fisher & Baird, 2020). While the advantages of using multimedia are numerous, its adoption is frequently impeded by challenges like inadequate infrastructure, lack of proper training, and resistance for change from faculty members (Ahmad et al., 2023; Phulpoto et al., 2024). Several researchers have investigated factors influencing multimedia adoption, with a focus on the role of infrastructure, access to resources, teacher competence, and institutional support mechanisms that facilitate technology integration in higher education (Aljazzaf, 2020; Mumtaz, 2024; Abuhassna, 2025). There is also a disparity, in terms of research output on these lines, between developed regions in the exploration of challenges in implementing multimedia effectively in educational settings (Azad, 2024; Jain & Babbar, 2024).

In the context of Kuwait, multimedia integration in higher education is yet to gain momentum. The current focus is directed towards the strengthening of the Colleges of Basic Education that are established for training and developing qualified teachers. These colleges operate under the governance of Public Authority for Applied Education and Training (PAAET). PAAET has been encouraging and supporting the use of multimedia technologies since the past almost a decade and want to invest more on this highly promising technology. The constraints observed by earlier researchers in the integration of multimedia in education range from a lack of technology support to inadequate access to resources (Aljazzaf, 2020). While some local studies have identified barriers like lack of proper teacher training in multimedia and institutional support (Saad et al., 2024), the examining of the combined impact of contextual and professional factors on multimedia adoption, specifically addressing teacher-related challenges and resources availability is limited. So, this research is an attempt to fill this gap by analyzing the relationship between these factors and barriers in multimedia integration, providing empirical insights that are currently underexplored in Kuwaiti higher education.

The motivation to this research stems from the growing demand for multimedia integration into basic educational courses, aligning the education system with the national agenda for digital transformation in Kuwait which has clear-cut directives on education and training (Ottesen et al., 2023). Effective multimedia adoption can enhance the quality of education and improve teaching outcomes when both teachers and the students have realized its usefulness and find it interesting to be engaged with the educational technology. However, to achieve these objectives, it is essential to identify and address barriers that impede multimedia adoption, emphasizing institutional and professional dimensions. The outcomes of this research is particularly significant for policymakers, educators, and institutions seeking to foster a more multimedia-based educational environment in Kuwait.

Under the backdrop of this educational scenario in Kuwait, the aim of this research is to analyze the impact of institutional and professional factors on barriers to multimedia adoption in Colleges of Basic Education in Kuwait. Specifically, it investigates the association between the access to multimedia resources (AMR), institutional support (INS), teacher efficacy on multimedia (TEM), and professional development opportunities (PDO) and the dependent variables, namely, lack of technical support (LTS), resistance to change among faculty (RCAF), inadequate training for multimedia use (ITMU), and limited access to necessary equipment (LANE).

2. Theoretical Background

The theoretical foundation of this study is provided by the Technology Acceptance Model (TAM) (Tang et al., 2023), which sets the paradigm to explore the adoption of multimedia in educational contexts (Alsaffar, 2025). The basic principle of TAM is that perceived usefulness and perceived ease of use affects the intention to adopt new technologies (Davis, 1989). In this study, the variables mentioned before can be better understood through TAM. This model suggests that addressing these barriers can enhance the perceived ease of use, thereby facilitating greater multimedia adoption among educators in Colleges of Basic Education.

The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), which is basically the extension of TAM, which broadens the scope by incorporating additional factors such as social influence, facilitating conditions, and user expectations. UTAUT provides a comprehensive framework to understand how these institutional and professional factors influence the adoption of multimedia (Chenhui et al., 2024). The dependent variables of this study, namely AMR, INS, TEM, and PDO have been identified based on their relevance per UTAUT. By examining the role of facilitating conditions and social influence, UTAUT helps to reveal the complexities of multimedia integration in Kuwait's higher education context.

Lastly, Institutional Theory (INT) which deals with the role of organizational norms, culture, and support mechanisms in shaping technology adoption in educational institutions (Alsaffar et al., 2022; Gaytan, 2009; Jan et al., 2012) is of relevance to this research. According to INT the institutional support and resources are critical enablers of multimedia integration into education (Burch, 200). It aligns with the independent variables in this study, particularly focusing on how access to resources and institutional backing can affect teachers' readiness and motivation to use multimedia (Lin et al., 2024; Pramono et al., 2021). Institutionally, the INT helps identifying the organizational influences

that may contribute to faculty resistance, providing a clearer view of how systemic challenges impact the adoption of multimedia in Kuwaiti colleges.

In the light of the usage of these three theories in the study of multimedia in education, the following four hypotheses have been postulated.

H1: There is a significant association of LTS with AMR, INS, TEM and PDO.

H2: There is a significant association of RCAF with AMR, INS, TEM and PDO.

H3: There is a significant association of IMTU with AMR, INS, TEM and PDO.

H4: There is a significant association of LANE with AMR, INS, TEM and PDO.

3. Research Methodology

The research methodology was designed to systematically investigate the association between institutional and professional factors with multimedia adoption variables in the Colleges of Basic Education in Kuwait. A structured, quantitative approach was employed to ensure objective measurement, consistency, and reliability across the identified dimensions of the study. Following sections describe the details of research methodology.

3.1 Study Area

This study was conducted in Kuwait a country which is keen on diversifying its economy and building competitive human resources. Government's interest in starting the Colleges of Basic Education and providing a strong multimedia support is one of the ways in which it is moving toward this goal. Aspirants of higher studies in specialized areas, with a minimum of 12 years of prior study, are the students of the courses offered in this college. Having realized the importance of modern pedagogical methods and curriculum upgradation at regular intervals to keep abreast of science and technology, the top leadership has considered the integration of technology, mainly in the form of multimedia in education, to ensure that the quality of teaching and learning is in par with the global standards. As multimedia is the main form of technology being used in these colleges, the selection of study area is quite relevant to the objectives of this research.

3.2 Research Design

In terms of the temporal domain, this research is a cross-sectional design based on the positivist paradigm. Quantitative data was collected from the teaching faculty members in the Colleges of Basic Education in Kuwait using convenience sampling through the structured questionnaire. The data was codified and input into Excel for the descriptive statistics and analysed using ANOVA to determine the significance in differences in perceptions across different contextual factors.

3.3 Sampling Procedure

The sample includes 252 participants who were the teaching faculty in the Colleges of Basic Education in Kuwait. To ensure representativeness of the sample the data. This selection allowed for an in-depth examination of how different contextual factors affect perceptions on multimedia integrated education. The sample size was chosen based on convenience sampling to ensure adequate statistical power for the ANOVA tests conducted in the study, allowing for meaningful comparisons across demographic groups. The data was collected both through self-administered questionnaire using Google forms and hardcopies, precisely 46 through Google forms and 206 in the form of hard copy. The data collection period was from August 2024 to February 2025. The G-Factor analysis was undertaken to confirm the sample size adequacy.

3.4 Data Collection Instruments

The measurement instrument used in this research was questionnaire. It was developed using established scales from existing literature that align with these constructs, ensuring the scales have demonstrated reliability and validity in prior studies. However, the scales were adapted for context,

which involved modifying wording or adding items to suit the specific research setting and target population. This was because the earlier scales were used in measuring variables associated with use of technology in different settings such as advanced economies even though they were in the context of educational research. This was followed by the pre-testing of the questionnaire through pilot survey to identify any ambiguities or issues with the questions. Based on feedback from the pilot run, the items in the questionnaire were revised to enhance clarity, readability, and overall coherence. Finally, the refined questionnaire was tested for reliability and validity checks using statistical methods, ensuring that it accurately measured the intended constructs before it was used for the primary data collection.

The research construct, explanation, standard scales, and sample items chosen are shown in Table 1.

Table 1

The dimension, explanation, standard scales, items chosen

Dimension	Explanation	Standard scales	Sample Items
Independent variables (Marked as High, Medium, and Low)			
1. Lack of Technical Support	It refers to the inadequacy of assistance provided to users when encountered with technical issues with multimedia tools. It could be delayed responses, limited expertise, or inadequate resources, etc.	<ul style="list-style-type: none"> • Computer User Support Scale (Igbaria & Iivari, 1995) • Technical Support Quality Scale (Doll & Torkzadeh, 1988) 	My confidence in relying on technical staff for multimedia-related challenges is:
2. Resistance to Change Among Faculty	It refers to reluctance of teaching faculty to adopt new teaching methods, technologies, or innovations due to perceived risks, lack of familiarity, or comfort with existing practices.	<ul style="list-style-type: none"> • Resistance to Change Scale (Oreg, 2003) • Acceptance and Resistance to Change Scale (Cinite et al., 2009) 	The level of resistance I feel toward adopting new multimedia tools is:
3. Inadequate Training for Multimedia Use	It refers to the lack of sufficient, relevant training programs that equip teaching faculty with the skills and confidence to effectively integrate multimedia tools into their module delivery.	<ul style="list-style-type: none"> • Technology Integration Confidence Scale: (Christensen & Knezek, 2001) 	The relevance of the training I received to my specific multimedia teaching needs is:
4. Limited Access to Necessary Equipment	It refers to the barriers to the use of essential multimedia tools, devices, or technology required for effective teaching and learning.	<ul style="list-style-type: none"> • Digital Resource Access Scale (Selwyn, 2009, July) • Institutional Technology Support Scale (Teo, 2011) 	The availability of multimedia equipment needed for teaching is:
Dependent variables (Measured on Likert 5-point scale)			
5. Access to Multimedia Resources	It refers to the availability and ease of use of various multimedia tools, software, and content that support teaching and learning processes.	<ul style="list-style-type: none"> • Educational Resources Accessibility Scale (Al-Fadhli, 2008) • Technology Integration 	My access to multimedia tools and technologies needed for my teaching is adequate.

Dimension	Explanation	Standard scales	Sample Items
		Availability Scale (Zhao & Frank, 2003)	
6. Institutional Support	It refers to the encouragement and providing of infrastructure by an institution to facilitate the use of multimedia in education.	• (Eisenberger et al., 1986)	The guidance from my institution on how to effectively use multimedia in teaching is adequate.
7. Teacher Efficacy on Multimedia	It refers to confidence of the faculty on how effectively multimedia tools could be used in teaching.	• Teachers' Sense of Efficacy Scale (Tschannen-Moran & Hoy, 2001) • Computer Self-Efficacy Scale (Compeau & Higgins, 1995)	I am confident in my ability to effectively integrate multimedia tools into my teaching.
8. Professional Development Opportunities	It refers to formal training, workshops, seminars, and programs aimed at enhancing the skills and knowledge of the faculty in using multimedia tools effectively.	• Organizational Support for Professional Development Scale (Maurer & Tarulli, 1994) • Training and Development Scale (Noe & Wilk, 1993)	My institution provides adequate opportunities for professional development in multimedia integration.

4. Results and Analysis

Results includes both descriptive statistics and inferential statistics which are discussed in the following sections.

4.1 Descriptive statistics

4.1.1 Sociodemographic factors of respondents

The socioeconomic characteristics of the sample (n=252) reveal a predominantly female representation (72.2%), with males comprising 27.8% (Table 2). Most participants are aged 30 to 50 years (69.8%), with the largest group in the 30-40 years range (37.3%). Nearly half of the respondents are single (49.2%), followed by married individuals (35.3%). In terms of education, master's degree holders form the majority (49.2%), while assistant professors constitute half the respondents (50.0%). Also, half of the respondents report a monthly income between 1001 and 2000 KWD, and a significant proportion (46.8%) received moderate training in multimedia use. Courses taught vary, with mathematics (31.7%) and science (24.2%) being the most common. Experience with multimedia is primarily above 10 years up to 15 years (48.6%), indicating substantial exposure among the participants. Even though the sociodemographic variations in the dependent variables is not a part of this research the details have been provided for a fair understanding of the distribution of the respondents to this survey.

Table 2

The Socioeconomic Characteristics (n=252)

Characteristics	Number	Percentage
Gender		
Male	70	27.8
Female	182	72.2
Other	Nil	Nil
Age		
Above 20 up to 30 years	50	19.8
Above 30 up to 40 years	94	37.3
Above 40 up to 50 years	82	32.5
Above 50 up to 60 years	26	10.3
Above 60 years	Nil	Nil
Marital Status		
Single/unmarried	124	49.2
Married	89	35.3
Divorced	12	4.8
Widowed	27	10.7
Educational qualification		
Ph.D.	22	8.7
Master's degree	124	49.2
Bachelor's degree	106	42.1
Designation		
Professor	37	14.7
Associate Professor	89	35.3
Assistant Professor	126	50.0
Income/month		
1001 to 2000 KWD	126	50.0
2001 KWD to 3000 KWD	89	35.3
More than 3000 KWD	37	14.7
Training received		
No training	9	3.6
Basic training	96	38.1
Moderate training	118	46.8
Advanced training	29	11.5
Courses taught		
Language studies	34	13.5
Mathematics	80	31.7
Science	61	24.2
Humanities & Social Sciences	36	14.3
Technical courses	41	16.3
Experience in using multimedia		
Less than 5 years	11	4.3
5 years up to 10 years	83	29.2
Above 10 years up to 15 years	112	48.6
Above 15 years	46	17.9

4.1.2 Reliability measures

The overall internal consistency is satisfactory (Table 3), with Cronbach's Alpha values ranging from 0.81 to 0.89 if any item is deleted (Cut off 0.7, Bonett & Wright, 2015). The mean scores vary across the items, with PDO, AMR, and TEM having the highest mean values of 3.08, indicating a relatively higher agreement or availability of these factors. On the other hand, LANE shows the lowest mean at 0.84, suggesting limited access to necessary equipment. The standard deviations for items such as AMR, PDO, and TEM are higher (1.63), reflecting greater variability in responses, while items like ITMU, LTS, and RCMF exhibit lower variability with standard deviations around 0.82. The skewness and kurtosis values indicate that the distributions are fairly symmetrical (close to zero skewness), though some distributions (e.g., LANE) are more negatively skewed. Additionally, the negative kurtosis values suggest that the distribution of responses is flatter than a normal distribution, particularly for AMR, PDO, and TEM (-1.64), indicating broader dispersion. Thus, the data reflects good internal consistency and reliability, suggesting that the scale is a robust measure for the factors under study and also normally distributed as the skewness and kurtosis values are within -1 to +1 and -3 to +3 (Demir, 2022).

Table 3

The reliability measures (N = 252)

	Mean	Std. Deviation	Skewness	Kurtosis	Scale Mean if Item Deleted	Cronbach's Alpha if Item Deleted
AMR	3.07	1.63	-0.06	-1.64	17.90	0.81
INS	3.07	1.63	-0.05	-1.65	17.90	0.81
ITMU	2.20	0.83	-0.38	-1.44	18.77	0.87
LANE	1.99	0.84	0.02	-1.58	18.98	0.89
LTS	2.23	0.82	-0.46	-1.35	18.73	0.87
PDO	3.08	1.63	-0.07	-1.64	17.89	0.81
RCMF	2.25	0.82	-0.49	-1.35	18.72	0.87
TEM	3.08	1.63	-0.06	-1.64	17.89	0.81

Note. AMR = Access to Multimedia Resources; INS = Institutional Support; INF = Institutional Factors; IMTU = Inadequate Training for Multimedia Use; LANE = Limited Access to Necessary Equipment; MLA = Multimedia Learning Adoption; PDO = Professional Development Opportunities; PRF = Professional Factors; TEM = Teacher Efficacy on Multimedia; LTS = Lack of Technical Support.

4.2 Inferential statistics

The results obtained for the ANOVA for the study of the association of LTS, RCAF, ITMU, and LANE with AMR, INS, TEM and PDO are as follows.

4.2.1 Association of Lack of Technical Support

The ANOVA results support the hypothesis H1, indicating that LTS significantly affects all four variables i.e., AMR ($F = 4.27, p = 0.02$), INS ($F = 4.13, p = 0.02$), TEM ($F = 4.40, p = 0.01$), and PDO ($F = 4.53, p = 0.01$) (Table 4), revealing that the extent (high, medium, and low) of LTS can make a statistically significant difference to the dependent variables of this study. These findings suggest that lower levels of technical support are linked to reduced access to multimedia resources, limited institutional backing, diminished teacher efficacy in multimedia use, and fewer opportunities for professional development. This association highlights the crucial role that adequate technical support plays in facilitating multimedia integration by impacting resource availability, institutional encouragement, teacher confidence, and development opportunities.

Table 4

Association of Lack of Technical Support

		Sum of Squares	df	Mean Square	F	Sig.
AMR	Between Groups	22.14	2.00	11.07	4.27	0.02
	Within Groups	645.25	249.00	2.59		
	Total	667.39	251.00			
INS	Between Groups	21.52	2.00	10.76	4.13	0.02
	Within Groups	649.01	249.00	2.61		
	Total	670.53	251.00			
TEM	Between Groups	22.76	2.00	11.38	4.40	0.01
	Within Groups	643.48	249.00	2.58		
	Total	666.24	251.00			
PDO	Between Groups	23.40	2.00	11.70	4.53	0.01
	Within Groups	643.69	249.00	2.59		
	Total	667.08	251.00			

Note. AMR = Access to Multimedia Resources; INS = Institutional Support; TEM = Teacher Efficacy on Multimedia; PDO = Professional Development Opportunities.

4.2.2 Association of Resistance to Change Among Faculty

The ANOVA support the hypothesis H2, indicating that RCAF significantly affects all four variables i.e., AMR (F = 3.84, p = 0.02), INS (F = 3.92, p = 0.02), TEM (F = 3.74, p = 0.03), and PDO (F = 3.64, p = 0.03) (Table 5), revealing that the extent of RCAF is associated with perceived differences in available resources, institutional support, multimedia efficacy, and professional development opportunities, highlighting the importance of addressing these areas to support multimedia integration effectively.

Table 5

Association of Resistance to Change Among Faculty

		Sum of Squares	df	Mean Square	F	Sig.
AMR	Between Groups	19.95	2.00	9.97	3.84	0.02
	Within Groups	647.44	249.00	2.60		
	Total	667.39	251.00			
INS	Between Groups	20.47	2.00	10.24	3.92	0.02
	Within Groups	650.06	249.00	2.61		
	Total	670.53	251.00			
TEM	Between Groups	19.45	2.00	9.72	3.74	0.03
	Within Groups	646.79	249.00	2.60		
	Total	666.24	251.00			
PDO	Between Groups	18.97	2.00	9.49	3.64	0.03
	Within Groups	648.11	249.00	2.60		
	Total	667.09	251.00			

Note. AMR = Access to Multimedia Resources; INS = Institutional Support; TEM = Teacher Efficacy on Multimedia; PDO = Professional Development Opportunities.

4.2.3 Association of Inadequate Training for Multimedia Use

The ANOVA results support the hypothesis H3, indicating that ITMU significantly affects all four variables i.e., AMR ($F=4.36$; $p=0.01$), INS ($F= 4.47$; $p= 0.01$). TEM ($F=4.25$; $p=0.02$), and PDO ($F=4.12$; $p=0.02$) (Table 6), revealing that the extent of ITMU is linked to variations in access, support, efficacy, and professional development related to multimedia resources, highlighting the need to address these barriers for effective multimedia integration.

Table 6

Association of Inadequate Training for Multimedia Use

		Sum of Squares	df	Mean Square	F	Sig.
AMR	Between Groups	22.58	2.00	11.29	4.36	0.01
	Within Groups	644.81	249.00	2.59		
	Total	667.39	251.00			
INS	Between Groups	23.22	2.00	11.61	4.47	0.01
	Within Groups	647.31	249.00	2.60		
	Total	670.53	251.00			
TEM	Between Groups	21.97	2.00	10.99	4.25	0.02
	Within Groups	644.27	249.00	2.59		
	Total	666.24	251.00			
PDO	Between Groups	21.38	2.00	10.69	4.12	0.02
	Within Groups	645.70	249.00	2.59		
	Total	667.09	251.00			

Note. AMR = Access to Multimedia Resources; INS = Institutional Support; TEM = Teacher Efficacy on Multimedia; PDO = Professional Development Opportunities.

4.2.4 Impact of Limited Access to Necessary Equipment

The ANOVA results does not support the hypothesis H4, indicating that the LANE does not have any effect on any of the dependent variables i.e., AMR ($F=0.44$, $p=0.64$), INS ($F=0.46$; $p=0.63$), TEM($F=0.42$; $p=0.66$), PDO ($F=0.40$; $p=0.67$) (Table 7), revealing that the extent of LANE does not significantly affect the variations in access, support, efficacy, and professional development related to multimedia resources.

Table 7

Association of Limited Access to Necessary Equipment

		Sum of Squares	df	Mean Square	F	Sig.
AMR	Between Groups	2.35	2.00	1.18	0.44	0.64
	Within Groups	665.03	249.00	2.67		
	Total	667.39	251.00			
INS	Between Groups	2.49	2.00	1.25	0.46	0.63
	Within Groups	668.04	249.00	2.68		
	Total	670.53	251.00			
TEM	Between Groups	2.23	2.00	1.12	0.42	0.66
	Within Groups	664.01	249.00	2.67		

		Sum of Squares	df	Mean Square	F	Sig.
	Total	666.24	251.00			
PDO	Between Groups	2.12	2.00	1.06	0.40	0.67
	Within Groups	664.96	249.00	2.67		
	Total	667.08	251.00			

Note. AMR = Access to Multimedia Resources; INS = Institutional Support; TEM = Teacher Efficacy on Multimedia, PDO = Professional Development Opportunities.

5. Discussions and Implications

The testing of the hypothesis 1 revealed the crucial role of technical support in facilitating multimedia integration by impacting resource availability, institutional encouragement, teacher confidence, and development opportunities. This finding aligns with previous research on these variables in some other settings. Several researchers have found that insufficient technical support is a major barrier to multimedia integration, often resulting in reduced access to necessary resources and institutional disengagement in various other settings of technology based education (e.g., Akram et al., 2022; Muslim et al., 2025). Alieto et al., (2024) highlighted that inadequate support systems undermine teacher efficacy in using technology, affecting their willingness and confidence to integrate such technologies into their teaching practices in digital classrooms. The current results, showing that lower levels of technical support correlate with diminished professional development opportunities, are consistent with earlier findings, which underscore the importance of technical support in creating effective training environments (e.g., Ajayi & Udeh, 2024). The findings are also corroborated by the study of Hennessy et al., (2015), which demonstrated that adequate technical infrastructure enhances professional development by enabling smoother access to training and multimedia resources. Additionally, Noe and Wilk (1993) observed long back that robust technical support fosters an environment conducive to learning, further validating the link between technical support and professional growth opportunities. Thus, the findings of this study emphasize that enhancing technical support is not merely a supplementary factor but a critical enabler of multimedia adoption. By impacting key variables like AMR, INS, TEM, and PDO, technical support determines the effectiveness of multimedia integration efforts.

The results for Hypothesis 2 indicate a significant association RCAF with AMR, INS, TEM, and PDO. These findings suggest that when faculty exhibit resistance to change, it negatively impacts the availability of multimedia resources, limits institutional encouragement, reduces teacher confidence in using multimedia, and curtails opportunities for professional growth. This is consistent with previous research by Laferrière et al., (2013), which found that RCAF is a key barrier that hinders technological integration in educational settings. Similarly, Hamlaoui (2021) found that faculty resistance often stems from insufficient training and support, affecting not only teacher efficacy but also the overall culture of innovation within institutions.

The results for Hypothesis 3 reveal a significant association between IMTU and all the dependent variables of this research. This finding aligns with prior studies, such as Hunduma & Mekuria (2023), who emphasized that training deficiencies impede resource access, limit institutional backing, and negatively impact teacher confidence in using new technologies. Similarly, Morgado et al., (2024) observed that insufficient training is a critical factor that restricts teachers' engagement with professional development opportunities, directly influencing their capacity to adopt multimedia effectively. Moreover, Alnimran & Alhalafawy (2024) highlighted that inadequate training acts as a major barrier, not only hindering technical proficiency but also reducing motivation to utilize available resources. These findings confirm that training inadequacies are deeply intertwined with access to resources, institutional support structures, teacher efficacy, and opportunities for professional growth, reinforcing the central role of training in successful multimedia integration.

Surprisingly the results for Hypothesis 4 indicate no significant association between LANE and the dependent variables of this research. This finding contrasts with earlier studies, such as Jjagwe et al., (2024), which highlighted that limited access to equipment directly affects resource availability and institutional support, thereby constraining teacher efficacy and professional development efforts.

Similarly, Ahmad et al., (2023) suggested that equipment limitations were a critical barrier to effective multimedia adoption, with significant implications for teacher engagement and institutional backing. However, the current findings align with research by Clark & Mayer (2023), who argued that equipment access alone may not be sufficient to drive meaningful multimedia integration, as other factors, like training and organizational culture, often play more influential roles. Additionally, Stringer et al., (2024) observed that teacher efficacy and professional development were more strongly impacted by factors such as pedagogical training and institutional policy rather than mere access to equipment. These contrasting results suggest that while equipment access is generally important, its influence on the integration of multimedia resources, support, teacher confidence, and professional growth may be moderated by other underlying factors in the educational environment.

6. Implications of the Study

Implications of this study include the theoretical and practical and implications. While the former contributes to the advancement of the body of knowledge, the latter will be useful to the top level management of the colleges of basic education, faculty, and the the content developers of multimedia resources.

6.1 Practical Implications of the Study

The findings through the four hypothesis testing provide practical implications in the form of suggestions for successful multimedia adoption in Kuwait's Colleges of Basic Education. The management of the colleges should consider establishing dedicated technical support teams that provide 'on-demand assistance' to faculty and students. This support should include not only troubleshooting services but also regular updating the multimedia resources to adapt to the changes in the educational environment. Improving technical infrastructure will foster a more conducive learning environment and reduce resistance to multimedia use, ensuring smoother integration into teaching practices.

Given the significant association between RCAF and the four dependent variables, institutions need to implement comprehensive 'change management strategies'. These strategies can involve awareness programs, faculty engagement sessions, and gradual introduction of multimedia technologies to ease the transition. Providing a platform for faculty to share their concerns and receive feedback can also minimize resistance and promote a more collaborative approach toward technology adoption. Tailored interventions that address specific resistance factors could result in greater acceptance and motivation among educators.

The results related to IMTU suggest that colleges should enhance their professional development programs by offering more 'targeted and frequent training sessions'. These sessions should be practical, hands-on, and closely aligned with the specific multimedia tools available within the institution. To sustain motivation, it is essential to provide training that demonstrates clear pedagogical benefits, encouraging teachers to see how multimedia can enhance their teaching effectiveness. Moreover, integrating these training programs into routine professional development schedules will ensure continuous skill development and increase teacher confidence in using multimedia.

Despite the non-significant association found with LANE, it is still beneficial for colleges to maintain equitable access to multimedia resources across all departments. This involves regular audits of existing equipment, ensuring availability, and addressing disparities in resource distribution. While equipment access alone may not drive multimedia integration, it remains a foundational requirement. Institutions should also explore partnerships with technology providers to secure affordable access to the latest multimedia tools, ensuring that all faculty and students can engage effectively with digital resources.

6.2 Theoretical Implications of the Study

This study contributes to the existing theoretical frameworks by providing empirical evidence on the complex relationship between technical support, faculty resistance, training adequacy, and multimedia adoption in higher education. It reaffirms the applicability of the TAM in explaining how

perceived ease of use, influenced by technical support and training, affects multimedia adoption. The findings extend TAM's relevance by highlighting the critical role of technical support as a facilitator of multimedia integration, suggesting that perceived usefulness can be significantly enhanced through better support mechanisms and resources.

The study also adds depth to the UTAUT by demonstrating that institutional factors like access to multimedia resources, professional development, and faculty support are significant predictors of technology acceptance among educators. The significant associations found in the study align with UTAUT's emphasis on facilitating conditions and social influence, indicating that successful multimedia adoption requires a supportive institutional environment. This suggests that UTAUT can be effectively applied in educational contexts, particularly in emerging economies like Kuwait, where institutional support structures are evolving.

Moreover, the findings provide a nuanced understanding of Institutional Theory by revealing how organizational norms, culture, and resources influence the adoption process. The non-significant association of Limited Access to Necessary Equipment (LANE) with multimedia adoption challenges traditional views that emphasize equipment as a primary driver. Instead, the study suggests that broader institutional dynamics, such as professional development opportunities and change management, play a more central role. This reinforces Institutional Theory's perspective that systemic factors, rather than isolated resources, are critical in shaping technology adoption behaviors.

Thus, the study offers theoretical insights that can guide future research by emphasizing the need for an integrative approach that considers both individual and institutional factors. It calls for refining existing theories to accommodate variables like faculty resistance and training adequacy, which have proven to be pivotal in multimedia adoption. By doing so, this research broadens the theoretical discourse on educational technology adoption, offering a more comprehensive understanding of how systemic and individual factors interact in shaping educators' acceptance of multimedia tools.

7. Conclusion

This research explores the factors influencing multimedia adoption in Kuwait's Colleges of Basic Education and determines the significance of institutional and professional variables. By investigating on the impact of technical support, faculty resistance, training adequacy, and access to necessary equipment, the study emphasizes the need for a holistic approach to integrating multimedia tools in educational settings. The findings contribute to understanding how tailored interventions can enhance access to resources, improve teacher efficacy, and expand professional development, ultimately supporting the national agenda for digital transformation in Kuwait's education sector.

The research employed a quantitative methodology, using survey strategy to collect data from educators across various Colleges of Basic Education in Kuwait. The analysis was conducted using ANOVA to examine the associations between the enablers and outcome variables of research interest. This methodological approach enabled a systematic exploration of how different factors influence multimedia adoption and provided robust empirical evidence to support or refute the proposed hypotheses.

The results revealed statistically significant associations between technical support, faculty resistance, and training adequacy with the dependent variables, suggesting these are pivotal factors in multimedia adoption. In contrast, no significant relationship was found between access to necessary equipment and multimedia adoption. These findings suggest that while foundational resources like equipment are important, systemic factors such as training and technical support play a more crucial role in enabling effective multimedia integration. This evidence highlights the need for targeted interventions to address resistance and improve training programs to foster a culture of innovation among educators.

The implications of this study are both theoretical and practical. Theoretically, it reinforces existing models of technology acceptance and institutional theory calling for an integrative approach that considers both individual and organizational dynamics. Practically, the study emphasizes the importance of institutional support, adequate training, and change management strategies to enhance multimedia adoption. By addressing these factors, the colleges of basic education can create a more supportive environment for technology integration, aligning with national educational reform objectives.

The main limitation of this research is the use of a cross-sectional design that restricts the ability to infer causality between variables. Additionally, the sample ($n = 252$) was limited to Colleges of Basic Education in Kuwait, which may affect the generalizability of the findings to other higher education institutions or countries.

In conclusion, this study offers valuable insights into the barriers and facilitators of multimedia adoption in Kuwaiti higher education. By shedding light on the roles of technical support, training, and institutional dynamics, it provides a foundation for more effective policy and strategic interventions. Addressing the highlighted factors can significantly enhance multimedia integration, thereby improving the quality of education and supporting the broader goal of digital transformation in Kuwait.

8. Limitations

The main limitation of this study is its cross-sectional design, which may affect the generalizability of the results. Furthermore, convenience sampling may also limit the reliability of the findings. Therefore, future researchers may aim to conduct longitudinal research considering the same variables of interest. The study is based primarily on TAM, and future researchers may also consider other theories that could bear on the outcome variable.

9. Suggestions

Future research could employ a longitudinal approach and expand the study to different educational contexts to verify the findings and explore other influential variables, including faculty motivation to technology acceptance, digital skill improvement, and faculty attitude toward change.

10. Co-Author Contribution

This is a single-authored paper, and hence the entire work has been carried out by the author herself.

11. Declaration of AI-Generated Content

The author used ChatGPT (Open AI) and Grammarly to assist with language editing and improving the clarity of the manuscript. The author reviewed and edited the output and takes full responsibility for the content of the publication.

12. Acknowledgement

The authors gratefully acknowledge the Public Authority for Applied Education and Training (PAET), Kuwait for granting permission to conduct this research.

13. References

- Ajayi, F. A., & Udeh, C. A. (2024). Review of workforce upskilling initiatives for emerging technologies in IT. *International Journal of Management & Entrepreneurship Research*, 6(4), 1119-1137. <https://doi.org/10.51594/ijmer.v6i4.1003>
- Abuhassna, H. (2025). Adoption factors, pedagogical approaches, challenges, and implications of open educational resources in higher education: A systematic review. *Asian Journal of University Education*, 21(3). <https://doi.org/10.24191/ajue.v21i3.57>
- Ahmad, S., Mohd Noor, A. S., Alwan, A. A., Gulzar, Y., Khan, W. Z., & Reegu, F. A. (2023). eLearning acceptance and adoption challenges in Higher Education. *Sustainability*, 15(7), 6190. <https://doi.org/10.3390/su15076190>
- Akram, H., Abdelrady, A. H., Al-Adwan, A. S., & Ramzan, M. (2022). Teachers' perceptions of technology integration in teaching-learning practices: A systematic review. *Frontiers in psychology*, 13, 920317. <https://doi.org/10.3389/fpsyg.2022.920317>

- Saad , A., Al Bloushi, B., & Al Bloushi, L. (2024). The double-edged sword: Analyzing the influence of technology on English language learning in Kuwait higher education institutions (HEIs). *International Journal of Middle Eastern Research*, 3(1), 15-23. <https://doi.org/10.32996/ijmer.2024.3.1.3>
- Al-Fadhli, S. (2008). Students' Perceptions of E-learning in Arab Society: Kuwait University as a case study. *E-Learning and Digital media*, 5(4), 418-428. <https://doi.org/10.2304/elea.2008.5.4.418>
- Alieto, E., Abequibel-Encarnacion, B., Estigoy, E., Balasa, K., Eijansantos, A., & Torres-Toukoumidis, A. (2024). Teaching inside a digital classroom: A quantitative analysis of attitude, technological competence and access among teachers across subject disciplines. *Heliyon*, 10(2), 72-89. <https://doi.org/10.1016/j.heliyon.2024.e24282>
- Aljazzaf, Z. (2020). Factors influencing the use of multimedia technologies in teaching English language in Kuwait. *International Journal of Emerging Technologies in Learning (iJET)*, 15(5), 212-234. <https://doi.org/10.3991/ijet.v15i05.12277>
- Alnimran, F. M., & Alhalafawy, W. S. (2024). Qualitative exploration of the opportunities and challenges of online training according to the behavioral intention variables of the most trained teachers during the COVID-19 pandemic. *Journal of Infrastructure, Policy and Development*, 8(8), 4837. <https://doi.org/10.24294/jipd.v8i8.4837>
- Alsaffar, R. D. (2025). The Role of AI-Driven Adaptive Multimedia Systems on Personalized Learning Paths. *Asian Journal of University Education*, 21(2), 380-402. <https://doi.org/10.24191/ajue.v21i1.26>
- Alsaffar, R. D., Alfayly, A., & Ali, N. (2022). Extended technology acceptance model for multimedia-based learning in higher education. *International Journal of Information and Education Technology*, 12(12), 1300–1310. <https://doi.org/10.18178/ijiet.2022.12.12.1754>
- Azad, A. K. (2024). Challenges faced by teachers to use multimedia in classroom and students' perception from it: a case study on a selected college in Bangladesh. *Journal of Management and Business Education*, 7(1), 54-69. <https://doi.org/10.35564/jmbe.2024.0004>
- Bonett, D. G., & Wright, T. A. (2015). Cronbach's alpha reliability: Interval estimation, hypothesis testing, and sample size planning. *Journal of organizational behavior*, 36(1), 3-15. <https://doi.org/10.1002/job.1960>
- Burch, P. (2007). Educational policy and practice from the perspective of institutional theory: Crafting a wider lens. *Educational researcher*, 36(2), 84-95. <https://doi.org/10.3102/0013189X07299792>
- Chenhui, L., Narayanan, G., & Md Noor, H. (2024). University-related factors in technology integration: a quantitative study in East Coast of China. *Asian Journal of University Education (AJUE)*, 20(2), 357-368. <https://doi.org/10.24191/ajue.v20i2.27009>
- Christensen, R., & Knezek, G. (2001). Instruments for assessing the impact of technology in education. *Computers in the Schools*, 18(2-3), 5-25. https://doi.org/10.1300/J025v18n02_02
- Cinite, I., Duxbury, L. E., & Higgins, C. (2009). Measurement of perceived organizational readiness for change in the public sector. *British Journal of Management*, 20(2), 265-277. <https://doi.org/10.1111/j.1467-8551.2008.00582.x>
- Clark, R. C., & Mayer, R. E. (2023). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. NY: John Wiley & sons.
- Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS quarterly*, 189-211. <https://doi.org/10.2307/249688>
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340. <https://doi.org/10.2307/249008>
- Demir, S. (2022). Comparison of normality tests in terms of sample sizes under different skewness and Kurtosis coefficients. *International Journal of Assessment Tools in Education*, 9(2), 397-409. <https://doi.org/10.21449/ijate.1101295>
- Dmello, V. J., Frank, D., Bidi, S. B., & Rajendran, A. (2024). Unlocking the enigma of online learning: How learning styles shape adoption intention?. *E-Learning and Digital Media*, 20427530241257651. <https://doi.org/10.1177/20427530241257651>
- Doll, W. J., & Torkzadeh, G. (1988). The measurement of end-user computing satisfaction. *MIS quarterly*, 259-274. <https://doi.org/10.2307/248851>

- Eisenberger, R., Huntington, R., Hutchison, S., & Sowa, D. (1986). Perceived organizational support. *Journal of Applied psychology, 71*(3), 500. <https://psycnet.apa.org/doi/10.1037/0021-9010.71.3.500>
- Fisher, M. M., & Baird, D. E. (2020). Humanizing user experience design strategies with NEW technologies: AR, VR, MR, ZOOM, ALLY and AI to support student engagement and retention in higher education. In E. Sengupta, P. Blessinger, & M. Makhanya (Eds.), *International perspectives on the role of technology in humanizing higher education* (pp. 105–129). Emerald Publishing Limited. <https://doi.org/10.1108/S2055-364120200000033007>
- Gaytan, J. (2009). Analyzing online education through the lens of institutional theory and practice: The need for research-based and validated frameworks for planning, designing, delivering, and assessing online instruction. *Delta Pi Epsilon Journal, 51*(2), 62-75. Retrieved February 14, 2023, from <https://www.learntechlib.org/p/68455/>
- Hamlaoui, S. (2021). Teachers' resistance to educational change and innovations in the Middle East and North Africa: A case study of Tunisian universities. *Re-Configurations, 171*. https://doi.org/10.1007/978-3-658-31160-5_11
- Hennessy, S., Haßler, B., & Hofmann, R. (2015). Challenges and opportunities for teacher professional development in interactive use of technology in African schools. *Technology, pedagogy and education, 24*(5), 1-28. <https://doi.org/10.1080/1475939X.2015.1092466>
- Hunduma, C. M., & Mekuria, Y. S. (2023). Constraints Hindering ICT Integration in Ethiopian Public Secondary Schools: A Literature Review. *Online Submission, 10*(2), 691-702. <https://doi.org/10.15379/ijmst.v10i2.1271>
- Igbaria, M., & Iivari, J. (1995). The effects of self-efficacy on computer usage. *Omega, 23*(6), 587-605. [https://doi.org/10.1016/0305-0483\(95\)00035-6](https://doi.org/10.1016/0305-0483(95)00035-6)
- Jain, P., & Babbar, P. (2024). Multimedia education for inclusive development: Exploring NCERT's open-access initiatives in India's school education system. *Indian Journal of Educational Technology, 6*(1), 341–349. <https://journals.ncert.gov.in/IJET/article/view/482>
- Jan, P. T., Lu, H. P., & Chou, T. C. (2012). The adoption of e-learning: An institutional theory perspective. *Turkish Online Journal of Educational Technology-TOJET, 11*(3), 326-343. Retrieved June 15, 2022, from <https://www.tojet.net/articles/v11i3/11331.pdf>
- Jjagwe, R., Kirabira, J. B., Mukasa, N., & Amany, L. (2024). The drivers and barriers influencing the commercialization of innovations at research and innovation institutions in Uganda: a systemic, infrastructural, and financial approach. *Journal of Innovation and Entrepreneurship, 13*(1), 1-37. <https://doi.org/10.1186/s13731-024-00435-y>
- Muslim, M., Chang, U., & Rifat, A., Khan, M., Jabeen, F., (2025). Teaching ESL in Rural Sindh: Investigating Challenges of Technological Integration in the English Language Classrooms in Sindh, Pakistan. *Al-Qirtas, 3*(2), 89-108. <https://doi.org/10.71281/jals.v3i1.226>
- Laferrière, T., Hamel, C., & Searson, M. (2013). Barriers to successful implementation of technology integration in educational settings: A case study. *Journal of Computer Assisted Learning, 29*(5), 463-473. <https://doi.org/10.1111/jcal.12034>
- Lin, C., Syed Aris, S. R., & Rahmat, M. K. (2024). Influencing factors of preschool teachers' intention to accept and use mobile learning in early childhood science education: implications on teacher education/Lin Chen, Sharipah Ruzaina Syed Aris and Mohd Khairezan Rahmat. *Asian Journal of University Education (AJUE), 20*(3), 645-662. <https://doi.org/10.24191/ajue.v20i3.27849>
- Maryam, S. (2024). Strategies of Implementation of Education Technology in Madrasah. *International Journal of Teaching and Learning, 2*(6), 1466-1477. Retrieved on May 14, 2022 from: <https://injoqast.net/index.php/INJOTEL/article/view/1198>
- Maurer, T. J., & Tarulli, B. A. (1994). Investigation of perceived environment, perceived outcome, and person variables in relationship to voluntary development activity by employees. *Journal of applied psychology, 79*(1), 3. <https://doi.org/10.1037/0021-9010.79.1.3>
- Morgado, E., Rodrigues, J. B., & Silva, L. L. (2024). Rethinking teacher training from an inclusive and community dialogical perspective. *Journal of Education and E-Learning Research, 11*(1), 219-228. <https://doi.org/10.20448/jeelr.v11i1.5430>
- Mumtaz, S. (2000). Factors affecting teachers' use of information and communications technology: a review of the literature. *Journal of information technology for teacher education, 9*(3), 319-342. <https://doi.org/10.1080/14759390000200096>

- Noe, R. A., & Wilk, S. L. (1993). Investigation of the factors that influence employees' participation in development activities. *Journal of applied psychology*, 78(2), 291. <https://psycnet.apa.org/doi/10.1037/0021-9010.78.2.291>
- Oreg, S. (2003). Resistance to change: Developing an individual differences measure. *Journal of applied psychology*, 88(4), 680. <https://psycnet.apa.org/doi/10.1037/0021-9010.88.4.680>
- Ottesen, A., Thom, D., Bhagat, R., & Mourdaa, R. (2023). Learning from the Future of Kuwait: Scenarios as a Learning Tool to Build Consensus for Actions Needed to Realize Vision 2035. *Sustainability*, 15(9), 7054. <https://doi.org/10.3390/su15097054>
- Phulpoto, S. A. J., Oad, L., & Imran, M. (2024). Enhancing Teacher Performance in E-Learning: Addressing Barriers and Promoting Sustainable Education in Public Universities of Pakistan. *Pakistan Languages and Humanities Review*, 8(1), 418-429. [https://doi.org/10.47205/plhr.2024\(8-1\)38](https://doi.org/10.47205/plhr.2024(8-1)38)
- Pramono, S. E., Wijaya, A., Melati, I. S., Sahudin, Z., & Abdullah, H. (2021). COVID-driven innovation in higher education: Analysing the collaboration of leadership and digital technology during the pandemic in UiTM Malaysia and UNNES Indonesia. *Asian Journal of University Education*, 17(2), 1–15. <https://doi.org/10.24191/ajue.v17i2.13393>
- Selwyn, N. (2009, July). The digital native—myth and reality. In *Aslib proceedings* (Vol. 61, No. 4, pp. 364-379). Emerald Group Publishing Limited. <https://doi.org/10.1108/00012530910973776>
- Stringer, L. R., Lee, K. M., Sturm, S., & Giacaman, N. (2024). The impact of professional learning and development on primary and intermediate teachers' digital technologies knowledge and efficacy beliefs. *The Australian Educational Researcher*, 1-27. <https://doi.org/10.1007/s13384-024-00716-1>
- Tang, X., Zainal, S. R. B. M., & Li, Q. (2023). Multimedia use and its impact on the effectiveness of educators: a technology acceptance model perspective. *Humanities and Social Sciences Communications*, 10(1), 1-11. <https://doi.org/10.1057/s41599-023-02458-4>
- Teo, T. (2011). Factors influencing teachers' intention to use technology: Model development and test. *Computers & Education*, 57(4), 2432-2440. <https://doi.org/10.1016/j.compedu.2011.06.008>
- Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and teacher education*, 17(7), 783-805. [https://doi.org/10.1016/S0742-051X\(01\)00036-1](https://doi.org/10.1016/S0742-051X(01)00036-1)
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478. <https://doi.org/10.2307/30036540>
- Zhao, Y., & Frank, K. A. (2003). Factors affecting technology uses in schools: An ecological perspective. *American educational research journal*, 40(4), 807-840. <https://doi.org/10.3102/00028312040004807>