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E-learning patterns and their relationship to effective digital teaching skills

Saleh Hammad[1]
Anan Abu Mariam[2]
Hatem Shlool[3]
Khalaf Diabat[4]
Mohammad Mutawe[5]


(✉ Corresponding Author)

[1,3,5]*Department of Physical and Health Education, Faculty of Educational Sciences, Al-Ahliyya Amman University, Jordan.*
[1]*Email: s.hammad@ammanu.edu.jo*
[3]*Email: h.shlool@ammanu.edu.jo*
[5]*Email: m.mutawe@ammanu.edu.jo*
[2]*Department of Special Education, Faculty of Educational Sciences, Al-Ahliyya Amman University, Jordan.*
[2]*Email: a.abumariam@ammanu.edu.jo*
[4]*Department of Teaching and Supervision, Sport Sciences College, University of Jordan, Jordan.*
[4]*Email: Khalaf.diabat@yahoo.com*

Abstract

This study investigates the relationship between e-learning patterns and effective digital teaching skills among faculty members in the College of Educational Sciences at Al-Ahliyya Amman University, as perceived by students. The research assessed the extent to which faculty implement synchronous and asynchronous e-learning strategies and apply digital teaching practices in planning, implementation, and assessment. A quantitative descriptive survey was employed, and data were collected from 238 undergraduate students during the 2023–2024 academic year. A validated questionnaire measured students' perceptions of faculty members' digital teaching performance and use of e-learning modalities. Data analysis was conducted using SPSS version 27, including descriptive statistics, internal consistency analysis (Cronbach's alpha), and Pearson correlation. Results showed that both synchronous and asynchronous e-learning were used at a moderate level, with a slight preference for synchronous methods. Similarly, digital teaching skills—particularly in planning, management, implementation, and assessment—were also moderate. A strong positive correlation ($r = 0.901$, $p < 0.05$) was found between e-learning adoption and digital teaching proficiency. The study highlights the need for professional development programs and institutional support to enhance faculty readiness for technology-integrated teaching and improve the quality of digital education.

Keywords: Asynchronous learning, Digital teaching skills, E-learning patterns, Faculty development, Higher education, Synchronous learning, Technology-integrated teaching.

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Contents

Contribution of this paper to the literature

This study contributes in the existing literature by examining the link between e-learning patterns and digital teaching skills in Arab higher education. The paper's primary contribution is finding that strong digital pedagogy enhances e-learning adoption. This study documents a significant positive correlation, offering evidence for institutional training and policy development.

1. Introduction

Technological advancements have transformed communication systems, enhancing teaching and learning by overcoming time and space barriers (Chang, Panjaburee, Lin, Lai, & Hwang, 2022). Education has evolved from traditional models to smart, interactive, and digital environments using computers and information systems (Bou Jnah, 2020). Developments in optimization and digital signal processing have further improved the performance of digital learning platforms (Abualigah et al., 2025).

E-learning is an integrated system that utilizes tools like the internet, multimedia, and smart applications to deliver education effectively (Ouadoud, Rida, & Chafiq, 2021). It promotes creativity, flexibility, and interaction beyond rote learning (Gernand, 2016; Qazi et al., 2021) offering continuous access to learning materials (Alhammadi, 2021). Artificial intelligence and recommendation systems support personalized learning (Shambour, Abualhaj, & Abu-Shareha, 2024) while wearable technologies have demonstrated effectiveness in promoting active learning and well-being (Hammad & Saqr, 2024).

E-learning patterns include synchronous learning real-time interaction and immediate feedback (Angelone, Warner, & Zydney, 2020; Boumarafi, 2010) and asynchronous learning, which allows students to access content anytime (Puspitasari, 2021). Teachers play a central role requiring skills in leadership, planning, and problem-solving (Al-Hashemi & Al-Atiyah, 2009; Sianipar, Hasugian, Sairwona, Zega, & Ritonga, 2021) and must continuously develop their competencies (Hammad, Alnawayseh, Alshaar, Hammad, & Djemai, 2024). However, they face challenges like selecting appropriate resources and managing time effectively (Almalki, Alqabbani, & Alnahdi, 2021), which can be supported through personalized recommendation systems and community engagement (Shambour et al., 2024).

Effective teaching occurs when instructional methods lead to positive changes in student performance (Abbas et al., 2020; Munna & Kalam, 2021). It involves interaction, practical assessment (Wang, Han, Cong, Zhu, & Liu, 2025) and integrating scientific knowledge into curricula (Olatunde-Aiyedun, 2024). In physical education, teaching quality improves through digital tools, classroom management, and up-to-date content (Aljarousha, 2023) supported by targeted interventions such as assessing coaches' knowledge of training modalities (Hammad, Alnawayseh, Alshaar, Hammad, & Djemai, 2024) and promoting physical activity through wearable devices (Hammad & Saqr, 2024).

The widespread adoption of e-learning has revealed variability in how faculty members apply synchronous and asynchronous methods (Aljarousha, 2023; Kamal, 2022; Khasawneh & Ahmad, 2023). This variability may influence their ability to deliver effective digital teaching. Therefore, due to the variability in faculty application of e-learning methods and the central role of teachers in digital learning, this study explores the relationship between e-learning patterns and effective digital teaching skills among faculty members at the College of Educational Sciences at Al-Ahliyya Amman University, as perceived by students.

2. Methods

2.1. Participants

A total of 238 students (87 males and 151 females) from the College of Educational Sciences at Al-Ahliyya Amman University participated in this study during the academic year 2023–2024. Participants were selected using a random sampling technique from a population of over 400 students. The sample included students from all academic years and with varied GPA levels. The demographic characteristics of the sample are presented in Table 1.

Table 1. Demographic characteristics of the sample (n=238).

Variables	Category	Frequency	Percentage
Gender	Male	87	36.6
	Female	151	63.4
Cumulative GPA	Good	52	22
	Very good	121	50
	Excellent	65	28
Academic year	First	55	23
	Second	56	23
	Third	64	27
	Fourth	65	27

2.2. Study Design

This study employed a descriptive correlational survey design to investigate the relationship between e-learning patterns (synchronous and asynchronous) and effective digital teaching skills (planning, implementation, assessment) as perceived by students. The research instrument was developed based on relevant literature (e.g., Kamal (2022)) and validated by a panel of three experts in educational technology and teaching methods.

2.3. Research Instrument

The survey instrument consisted of 39 items divided into five main domains: synchronous e-learning, asynchronous e-learning, digital planning and classroom management, implementation and digital teaching tools,

and digital assessment. Responses were rated on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Content validity was ensured through expert review, and internal consistency reliability was confirmed with Cronbach's alpha coefficients ranging from 0.720 to 0.949 across the domains. (see Table 2).

Table 2. Reliability coefficients (Cronbach's alpha) for E-learning patterns and effective digital teaching skills (n=238).

Variables	Domains	Number of items	Cronbach's alpha
E-learning patterns	Synchronous E-learning	7	0.865
	Asynchronous E-learning	6	0.720
	Total E-learning patterns	13	0.808
Effective digital teaching skills	Digital planning and classroom management skills	9	0.890
	Digital implementation and knowledge of instructional media and activities	8	0.873
	Digital assessment skills	9	0.897
	Total effective digital teaching skills	26	0.949

2.4. Data Analysis

Data were analyzed using SPSS software (Version 27, IBM, USA). Descriptive statistics (means and standard deviations) were used to assess the levels of e-learning pattern use and teaching skills. Cronbach's alpha was calculated to determine reliability. Pearson's correlation coefficient was employed to examine the strength and direction of the relationship between e-learning patterns and effective digital teaching skills. Statistical significance was set at $p \leq 0.05$.

3. Results

The study aimed to examine the relationship between e-learning patterns and effective digital teaching skills among faculty members in the College of Educational Sciences at Al-Ahliyya Amman University, as perceived by students. A random sample of 238 students was selected, and data were analyzed using SPSS version 27.

Table 3. Level of faculty members' use of E-learning patterns in the college of educational sciences at Al-Ahliyya Amman university, as perceived by students (n=238).

Rank	E-learning patterns	Mean	Standard deviation	Level of use
1	Synchronous E-learning	3.29	0.75	Moderate
2	Asynchronous E-learning	3.23	0.85	Moderate
	Total E-learning patterns	3.26	0.74	Moderate

Note: Classification of mean values: 1-2.33: Low; 2.34-3.67: Medium; 3.68-5.00: High.

3.1. Faculty Members' Use of E-learning Patterns

Table 3 shows that the overall mean for e-learning patterns was 3.26, indicating a moderate level of use. Synchronous e-learning had the highest mean (3.29), while asynchronous e-learning had the lowest mean (3.23); both classified as moderate.

Table 4. Level of faculty members' utilization of effective digital teaching skills in the college of educational sciences at Al-Ahliyya Amman university, as perceived by students (N=238).

Rank	Effective digital teaching skills	Mean	Standard deviation	Level of use
1	Digital planning and classroom management	3.35	1.02	Moderate
2	Implementation, knowledge of digital teaching tools and activities	3.34	1.00	Moderate
3	Digital assessment	3.23	1.00	Moderate
	Total effective digital teaching skills	3.31	0.91	Moderate

Note: Classification of mean values: 1-2.33: Low; 2.34-3.67: Medium; 3.68-5.00: High.

3.2. Synchronous E-Learning Pattern

Table 4 shows that the overall mean for faculty members' utilization of effective digital teaching skills was 3.31, indicating a moderate level of use. The highest mean was observed for "Digital planning and classroom management" (M = 3.35), while the lowest mean was for "Digital assessment" (M = 3.23); both of which were classified as moderate.

Table 5. Relationship between E-learning patterns and effective digital teaching skills among faculty members in the college of educational sciences at Al-Ahliyya Amman university (N=238).

Variables	Correlation coefficient	Nature of relationship	Strength of relationship	Statistical significance	Result
E-learning patterns and effective digital teaching skills	0.901	Positive	Strong	0.000	Statistically significant

Table 5 shows that the correlation between e-learning patterns and effective digital teaching skills. The correlation coefficient of 0.901 indicates a strong, positive relationship between the two variables. This suggests that as effective digital teaching skills increase, so does the use of e-learning patterns. Conversely, a decrease in effective digital teaching skills is associated with a decrease in e-learning pattern usage. The relationship is statistically significant at the $p < 0.05$ level, indicating that the observed correlation is unlikely to be due to chance.

4. Discussion

The purpose of this study was to investigate the connection between e-learning patterns and effective digital teaching skills for faculty members in the College of Educational Sciences at Al-Ahliyya Amman University, as perceived by students. The study found that both synchronous and asynchronous e-learning patterns are at a

moderate level, with synchronous patterns being a slight favorite mode. This both synchronous and asynchronous pattern is not unusual in the Arab world educational institution, where there are levels of digital infrastructure and digital technical support to choose from. The slight favorite of students toward synchronous learning reflects students in wanting immediate and direct interaction with the instructor as the mode of learning to enhance interaction and participation. The study also found that faculty members' use of digital teaching skills (Digital planning and classroom management, Implementation knowledge of digital teaching tools and activities, Digital assessment) was also moderate level. Similarly, the study also found a positive correlation that was strong and statistically significant between e-learning patterns and effective digital teaching skills.

The moderate use of a combination of synchronous and asynchronous e-learning modes (M = 3.26) aligns with the literature that has discussed higher education institutions still being in a transition phase when integrating digital education tools (Rakhyoot, 2015) transitioning requires strong institutional support, which means technical support, training, and increasing digital culture within the university. Compared to other countries including some European countries that have been slower to adopt e-learning, Arab universities still have to accelerate their digital transition steps to allow for educational quality and continuity, regarding digital tools. The combination of synchronous e-learning (M = 3.29), with channels for communication close to real-time compared to asynchronous e-learning (M = 3.23), also reflects the students' need to connect with instructors and promote immediacy and engagement in a course (Garrison & Kanuka, 2004; Ma, Han, Yang, & Cheng, 2015). Synchronous formats have been shown to promote increased participation with collaborative and dynamic learning spaces, while asynchronous formats allow flexibility (Anderson, 2008). Both synchronous and asynchronous learning modes have certain advantages and disadvantages; synchronous formats support immediate dialogue and group dialogue, whereas asynchronous learning allows for flexibility and content access regardless of time or variable access based on students' complex schedules.

Even with the benefits of asynchronous learning—like providing learners with the ability to review the content at any time—students appeared to desire instructor presence and real-time feedback similar to that in earlier studies Aguti, Walters, and Wills (2014) and Means, Toyama, Murphy, Bakia, and Jones (2009). The implications of these studies reflect a case for blended learning, that is, combining synchronous and asynchronous to increase engagement while giving learners flexibility (Garrison & Vaughan, 2008). A blended approach gives the best of both worlds where learners can enjoy live interaction as well as flexibility to schedule their learning time. This can open up opportunities for self-paced learning, building self-regulated learning skills, and creating accountability for their learning.

Regarding digital teaching capabilities, the overall moderate level of use (M = 3.31) was evenly distributed across all domains and is consistent with already established research demonstrating the new as well as continual integration of digital pedagogy within higher education (Bates, 2015; Selwyn, 2014). Digital planning and classroom management received the highest marks (M = 3.35) and reflected the emphasis instructors aimed to make on critical thinking and learner-focused learning (Thai, De Wever, & Valcke, 2020). The relatively low scores pertaining to planning components indicate some persistent issues associated with appropriate digital infrastructures (Bond, Marín, Dolch, Bedenlier, & Zawacki-Richter, 2018). Digital planning skills also rely upon a clear understanding of the educationally adopted technological tools and their enactment for instructional design, which is still developing among some faculty members. Managing virtual classrooms also requires new skills and competencies that do not exist in a conventional classroom setting when controlling the digitally constructed learning environment, and managing learner interactions and activities.

The dimension of implementation and the use of digital tools (M = 3.34) similarly shows a gap between the role of a teaching presence in online spaces as highlighted by Anderson and Dron (2011). However, the moderate ratings for accommodating learners' individual differences suggests a more inclusive digital practice (Ally, 2004). Digital Forms of assessment, although important, had the lowest mean (M = 3.23) reflecting also the research that indicates the many challenges involved in designing effective digital assessments with timely, formative, feedback (Heitink, Van der Kleij, Veldkamp, Schildkamp, & Kippers, 2016; Nicol & Macfarlane-Dick, 2006). This reinforces the need to investigate digital assessment practices that consider students' different levels and diversity, while providing ongoing feedback to student learning, that involved new features in intelligent tools and data analytics, to improve quality and responsiveness in digital assessments.

The most important finding from this study was the positive, statistically significant and strong correlation between faculty members use of e-learning patterns and their digital teaching skills ($r = 0.901$, $p < 0.05$). This finding demonstrates the relationship between technology adoption and pedagogic competency. To use technology in teaching, Bates (2015) argues that digital competence is more than just being technically proficient; one also has to adapt in their pedagogy and redesign courses in a technology-rich environment. Faculty with stronger digital teaching skills demonstrated higher levels of diversity in their e-learning approaches, which increased the educational quality further (Ally, 2004; Bond et al., 2018). This finding emphasizes that faculty digital skill development is a key factor in whether or not an e-learning strategy will be successful. As there are only so many hours in a day, it is important to acknowledge that technical knowing will not lead to success unless innovative teaching designs are emboldened in addressing local and global challenges within the digital world.

This finding also reinforces the need for ongoing professional development. The training programs related to digital pedagogy are particularly useful in preparing faculty to successfully address the challenges that arise from online teaching environments (Al-Freih, 2022). Kirkwood and Price (2014) indicated that without systemic support to assist teachers in employing educational technologies within their practice, digital technology may be disregarded or misapplied, instead of being fully engaged with as intended. Building a feedback and reflection culture, as Nicol and Macfarlane-Dick (2006) encourage, can create an adaptable and responsive teaching approach while instructing in digital contexts. Professional development can take many forms, such as group workshops, online training, or one-on-one mentoring that is focused on using e-learning platforms, designing interactive content, and managing virtual classrooms. In addition, it is often beneficial to facilitate peer and teachers' exchange through working groups, symposiums, community of practice or training sessions during development program.

To sum up, the findings illustrate the potential opportunities and challenges associated with the integration of e-learning and digital teaching skills. Although the use of e-learning was moderate, when the two variables were

correlated, there was a statistically significant relationship to support further development of faculty members' digital development in ways that advance and promote their ability to adopt e-learning strategies. Institutions such as Al-Ahliyya Amman University should be encouraged to maximize investments in developing the areas of digital infrastructure and training of faculty members in the interest of expanding a higher development of e-learning that is equitable, advanced and inclusive of, but in a multi-faceted and flexible approach, educational digital innovation and support for both students and faculty, which must take into consideration differences in individuals, cultures and society in the design and implementation of e-learning strategies.

Universities should explore their institutional policies alignment with their digital learning ambitions. Having policies to foster digital innovation, e-learning infrastructure budgets, and rewards for faculty participation in training could lead to an environment that supported sustained steps toward digital transformation. Successful digital education is said to rely not only on individual faculty actions but on supportive organizational systems (Bond et al., 2018). Policies could include explicit definitions of digital performance evaluation, rewards, and incentives, as well as the provision of a range of technology infrastructure such as high-speed internet, personal computing devices, and ongoing technical support.

The Community of Inquiry (CoI) framework may be another one way to think about these results. The CoI framework focuses on cognitive presence, social presence, and teaching presence as essential components of a productive online learning experience (Anderson & Dron, 2011). Faculty members with strong digital teaching capabilities are able to establish all three presences, thus creating a more constructive e-learning space. Using this framework incorporated into course design may facilitate building digital courses that will support a balance between knowledge building, social presence, and teacher presence to create a meaningful and engaging experience for students.

This study is relevant for academic leaders and policymakers in practice. Colleges and universities are now required to develop plans that embed digital skills development into faculty assessment, promotion, and curriculum. This is important so that digital teaching can be a central component of institutional effectiveness, not just an addition that can be discarded. Developing plans means rethinking hiring and promotion policies that included digital skills, and updating curricula to include current technology and labour market demands.

Future research could investigate how motivation, institutional culture, and access to technology affect how faculty engage in e-learning patterns. Perhaps longitudinal studies may uncover how digital teaching has evolved, especially in such rapidly changing educational contexts. Additionally, studies may explore the psychological and social components influencing how individuals may adopt technology such as reluctance for change, administrative support and direction, or whether one's peers are engaging with technology. That perspective allows for a fuller picture of what digital transformation looks like in higher education.

4.1. Practice Implications

This study provides an original contribution to the field of digital education by investigating the relationship between e-learning patterns (synchronous and asynchronous) and effective digital teaching skills among faculty members, as perceived by students in the College of Educational Sciences at Al-Ahliyya Amman University. Unlike previous research that often examined these variables in isolation or from the educators' perspective, this study uniquely adopts a student-centered approach to evaluate faculty performance. Additionally, the integration of multiple domains of digital teaching competencies—planning, implementation, and assessment—within the context of e-learning patterns offers a comprehensive analytical framework. The strong correlation identified between the two variables emphasizes the importance of aligning pedagogical practices with technological tools, making this study relevant for institutional development, faculty training, and future research on blended and online learning in Arab higher education contexts. Universities can leverage these findings to formulate comprehensive strategies that include training students in digital tool use, provide continuous technical support, and foster an interactive, dynamic learning environment that supports both autonomous and collaborative learning.

5. Conclusion

This research explored the connection between e-learning patterns and effective digital teaching skills of faculty members in the College of Educational Sciences at Al-Ahliyya Amman University. The findings indicated a moderate e-learning pattern of synchronous and asynchronous narrated video, with faculty members exhibiting a slight preference for synchronous e-learning patterns due to their interactive aspect. Many faculty may accustomed to this pattern of online teaching. Nonetheless, aspects of digital teaching skills - planning, implementation, and assessment - were also identified as being utilized with moderate skill levels. The key finding of this study presented a strong positive correlation between e-learning patterns and digital teaching skills, indicating pedagogical competencies are a key factor through which digital learning can be improved. The current study points to a need for ongoing professional development focused on digital competence, specifically focusing on constructing planning processes, classroom management, and assessment processes. The findings suggest that improving digital teaching skills of faculty members could positively influence their ability to engage and promote effective e-learning patterns. Institutions of higher learning should invest in training interventions and digital infrastructure to build a more significant capacity to promote effective online learning opportunities and experience. Future research can discuss additional research considering specific training and interventions to improve specific aspects of digital teaching competence, which can further improve the effective use of digital education in higher educational settings.

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