Eurasian Journal of Educational Research 104 (2023) 222-242

Eurasian Journal of Educational Research
www.ejer.com.tr

Examining The Mediating Role of Technology Acceptance in The Relationship Between Learning Styles and Blend Learning Among Iraqi University Graduates

Rabaa Mmazhair[1], Haady Abdilnibi Altememy[2], Hayder Ali Hussein[3], Ameera Fares Hamed[4], Hedab Rasoul Sharif[5], Aalaa Yaseen Hassan[6], Ihsan Abdali Naif[7], Nazar Abdulghffar Al-Sammarraie[8], Mohamed Amer Alseidi[9]

ARTICLE INFO

Article History:
Received: 18 December 2022
Received in revised form: 26 February 2023
Accepted: 06 April 2023
DOI: 10.14689/ejer.2023.104.013

Keywords
learning styles, technology acceptance, blended learning, Iraq

ABSTRACT

Objective: The primary objective of the present study is to investigate the influence of learning styles on the blended learning experiences of Iraqi university graduates. Additionally, the present study has investigated the mediating influence of technology acceptability on the association between learning styles and blended learning. University alumni from Iraq. **Methodology:** The present study utilizes Structural Equation Modelling with Partial Least Squares (SEM-PLS) as a quantitative methodology to investigate the associations between variables. The main aim of this study is to investigate hypothesized relationships among distinct subpopulations within the sample. To uphold the integrity and inclusivity of the sample, a randomized selection technique was employed to distribute a total of 470 questionnaires to participants. A total of 343 replies were considered valid, for a response rate of 73%. **Results:** The findings of the research suggest that the Information Technology Unit (ITU) plays a crucial role in facilitating the relationship between learning styles and Blended Learning Readiness (BLR). This implies that the utilization of BLR is mostly influenced by students' intention to utilize this instructional strategy, rather than being primarily governed by the learning processes they employ. **Implications:** This study will provide valuable insights for policymakers and researchers seeking to gain a comprehensive grasp of the complexities surrounding learning styles, technological acceptability, and the implementation of blended learning methodologies.

[1] English Department, college of education/ Al-Farahidi University/Baghdad Iraq. Email: mizherrabaa4@gmail.com, ORCID: https://orcid.org/0000-0001-7583-1835
[2] College of Islamic Sciences/ The Islamic university in Najaf, Iraq. Email: haady.altememy@gmail.com, ORCID: https://orcid.org/0000-0002-8718-9277
[3] Al-Manara College for Medical Sciences/ (Maysan)/Iraq. Email: hayderali@uomanara.edu.iq, ORCID: https://orcid.org/0000-0003-0940-0628
[4] English Department, Al-Noor University College, Nineveh, Iraq. Email: ameera.fares@alnoor.edu.iq, ORCID: https://orcid.org/0000-0002-6402-4357
[5] College of Nursing/ National University of Science and Technology, Dhi Qar, Iraq. Email: hadab.r.sh@nust.edu.iq, ORCID: https://orcid.org/0000-0003-3895-4101
[6] Department of education/ Al-Nisour University College/ Baghdad/ Iraq. Email: alaa.y.english@nuc.edu.iq, ORCID: https://orcid.org/0000-0002-9970-0458
[7] Department of Media/Mazaya University College/ Iraq. Email: alnife2008@yahoo.com, ORCID: https://orcid.org/0009-0002-4263-7993
[8] College of Arts, Department of Media/ Al-Esraa University, Baghdad/ Iraq. Email: nazar@esraa.edu.iq, ORCID: https://orcid.org/0000-0001-7426-8454
[9] Al-Hadi University College, Baghdad,10011, Iraq. Email: dr.mohamed.alseidi@huc.edu.iq, ORCID: https://orcid.org/0000-0002-2485-9755

University alumni from Iraq. **Novelty:** The study is a pioneer in the fields of blended learning, technological acceptability, and learning styles of university graduates from Iraq.

1.0. Background

Blended learning (BLR) environments strive to optimize the benefits of both conventional face-to-face classroom instruction and online education by integrating parts of each instructional technique. According to Mahaye (2020), the pedagogical approach known as BLR involves the integration of traditional in-person teaching methods with interactive online learning. Veerasamy and Nabila (2020) propose that blended learning (BLR) encompasses the benefits of personalized contact and motivation that are inherent in face-to-face training, while also including the cost savings, time efficiency, and convenience associated with e-learning. BLR additionally provides a setting that is particularly favorable for promoting student engagement and pleasure.

Ustun and Tracey (2020) have extensively examined the concept of the blended learning approach (BLR) within the academic literature. They define BLR as an instructional technique that incorporates several delivery modes, aiming to optimize learning results while simultaneously reducing program costs. Ustun and Tracey (2020) underscored the significance of three key elements: suitable personal learning technologies, awareness of appropriate personal learning styles, and facilitating the timely acquisition of relevant skills. Additionally, they emphasize the utilization of effective individual learning technologies as a means to enhance academic outcomes. According to Shishigu (2022), BLR refers to a collection of pedagogical practices aimed at effectively overcoming the obstacles associated with personalized learning and development. The authors additionally posited that BLR might be conceptualized as an amalgamation of online and face-to-face instructional modalities. BLR, also known as blended learning, is an educational approach that integrates digital resources with traditional face-to-face instruction.

The integration of face-to-face training and digital tools has the potential to yield optimal outcomes for pupils. Although traditional classrooms provide important chances for social connection within the educational process, e-learning environments possess unique advantages in terms of adaptation and efficiency that are not commonly observed in these conventional settings (Al Rawashdeh et al., 2021). In the present article, the acronym "BLR" refers to the integration of traditional face-to-face lectures with digital resources. However, it is crucial to consider that inside the academic realm, the term "BLR" carries additional implications and definitions. When establishing a blended learning environment, it is crucial to strike a balance between online learning and conventional classroom approaches. According to Border et al. (2021), pupils can derive advantages from the amalgamation of traits seen in both environments. In an attempt to elucidate the phenomenon, Gaffas (2023) posited that the caliber of online materials and the proficiency of instructors are pivotal elements in fostering a thriving blended learning environment, as well as in attaining equilibrium between in-person and electronic learning modalities. BLR

environments exhibit the amalgamation of beneficial components derived from conventional in-person education with online learning (Ntim, Opoku-Manu, & Kwarteng, 2021). As a result, an approach has been developed that incorporates components of traditional in-person teaching and online learning.

In contemporary times, there has been an increasing recognition among educators and scholars regarding the need of acknowledging and appreciating the varied learning techniques that individual students possess within the educational milieu (Fuentes, Zelaya, & Madsen, 2021). The recognition of some educational styles as more effective for distinct student populations has long been established within the field of education (Khalil et al., 2020). The findings of previous studies indicate that the academic performance of pupils is significantly influenced by their different learning styles. To enhance the educational setting in the classroom, it is imperative for educators to familiarize themselves with the preferred learning styles of their students (Ferreira, Martinsone, & Talić, 2020). The following statement provides a definition of "learning style" that has been utilized by multiple authors. There is a range of preferences among individuals when it comes to utilizing different learning methodologies. Chen and Tsai (2021) found that a considerable proportion of students have a clear preference for a specific teaching approach. However, there are cases in which students may choose alternative approaches depending on the subject matter or the structure of the assignment.

The concept of a student's "learning style" can be defined as their unique combination of traits that impact their aptitude for learning, their level of contentment within the educational setting, and their level of engagement in the classroom community (Loeng, 2020). The process through which individuals acquire and assimilate new knowledge is frequently referred to as their "learning styles". It is possible for individuals to demonstrate varying learning styles. Walters-Williams (2022) asserts, as documented on page 31, that the cognitive approach in question is widely regarded as the preferred modality for reasoning, cognitive functioning, and understanding. The concept of "learning style" refers to an individual's preferred method of engaging in educational activities and addressing cognitive challenges. A multitude of research inquiries have been undertaken to explore the significance of students' favored learning styles in the context of general educational settings (Cao, 2022). A restricted number of research inquiries have been conducted to explore the perspectives of students in relation to learning styles and the BLR environment. The predominant focus of academic research on different educational techniques is primarily centered on the evaluation of student performance, the assessment of student views regarding traditional classroom environments, and the measurement of student engagement levels during the learning process. The Learning Style Inventory, created by Kolb (1986), is extensively utilized in several investigations and is largely regarded as one of the most frequently employed tools within its classification (Deng, Benckendorff, & Gao, 2022).

The widespread impact of the Internet and other contemporary technology has led to significant transformations in the educational system. The utilization of the Internet for the purpose of distance learning has led to a substantial surge in the prevalence of online education. In their 2010 study, Wu, Tennyson, and Hsia discovered that engagement in online education yields significant advantages in terms of adaptability and convenience.

Lassoued, Alhendawi, and Bashitialshaaer (2020) emphasize the need to address the challenges associated with the utilization of online instructional methods. They contend that it is crucial to acknowledge the limitations inherent in the domain of online education. The limitations encompassed the absence of a conducive classroom environment, students' limited exposure to e-learning, the difficulty of self-directed learning, and inadequate avenues for student-student and student-instructor interaction, all of which contribute to impeding the progress of online education. Salta et al. (2022) assert that the conventional classroom model continues to be extensively employed, mostly driven by factors such as physical space constraints, the geographical positioning of the educational institution, and the limited time resources at hand. In order to address these challenges and fully capitalize on the potential of online education, there has been a notable increase in the adoption of the BLR pedagogical method. The concept of blended learning (BLR), as described by Abu Talib, Bettayeb, and Omer (2021), is the deliberate combination of traditional in-person classroom teaching with digital learning opportunities. Prifti (2022) has provided evidence supporting the notion that the adoption of BLR has resulted in favorable outcomes in terms of student involvement and academic performance. This discovery substantiates the claims put forth by the writers. Learning management systems (LMSs) are extensively utilized in educational institutions worldwide to supplement traditional classroom environments and support student independence and the integration of social constructivist teaching methods. There are several Learning Management Systems (LMSs) that can be cited as examples, including Blackboard, WebCT, and Moodle. The study has endeavored to reconcile the two disparities. Firstly, this study is one of the first attempts to investigate the influence of learning styles on the blended learning readiness (BLR) of university students in Iraq. Furthermore, this study has addressed a notable void in the existing body of literature by investigating the mediating influence of technology acceptability on the association between learning styles and the BLR.

2.0. Hypothesis Development

As per the definition provided by the Oxford English Dictionary, the term "blend" denotes the action of combining one substance with another component in a manner that results in their amalgamation. The primary emphasis of the BL concept lies in the integration of advantageous elements from conventional face-to-face instructional settings and contemporary online learning environments (Müller & Mildenberger, 2021). Blended learning (BL) can be conceptualized as an amalgamation of various instructional delivery approaches aimed at optimizing both knowledge acquisition and cost-effectiveness. Blended learning (BL) is a pedagogical approach that prioritizes the optimization of academic accomplishment by utilizing suitable technology to align with individual learning preferences. This approach aims to facilitate the effective transfer of relevant knowledge to the intended recipients at the most opportune moments (Shamsuddin & Kaur, 2020). BLR, also known as blended learning, allows instructors to integrate a wide range of educational approaches, encompassing traditional in-person classroom activities, online courses, and self-directed study (Sarkar, Sharma, & Raheja, 2021). The term indicates that the purpose is not to substitute the conventional in-person connection between the instructor and the student, but rather to enhance it by including elements of collaboration, technical progress, and the human factor. Blended learning at the university level and in

Numerous institutions of higher learning have incorporated BL into their academic curricula, offering students a wide range of educational experiences that integrate both traditional face-to-face instruction and online learning modalities (Rapanta et al., 2021). The advent of digital technology, including the Internet, email, laptops, and smartphones, has led to substantial transformations in the realm of tertiary education in recent times. The incorporation of online resources in educational settings facilitates enhanced communication and expanded possibilities for collaborative activities. The extent to which in-person lectures have been substituted by online materials differs between different educational institutions and among individual professors (Triemstra et al., 2021). There is no universally applicable regulation that prescribes the specific range of code percentage, either minimum or maximum, that is required to be composed utilizing web components.

The concept of learning styles pertains to the many manners in which learners perceive, comprehend, and conceptualise knowledge (Syauqi, Munadi, & Triyono, 2020).The achievement of optimal learning outcomes is contingent upon instructional practices that recognise and validate the existence of multiple learning styles. Cronje (2020) asserts that optimal learning outcomes are achieved when educational methodologies acknowledge and affirm the existence of varied learning modalities. The present discourse aims to engage in a discussion on the given topic. The use of blended learning (BL) is frequently utilized in educational programs that cater to students who are geographically distant and hence unable to participate in conventional in-person classroom instruction (Renganayagalu, Mallam, & Hernes, 2022). Higher education institutions can maintain their stringent standards and ensure the continuation of their accreditation by applying BL (an abbreviation for a specific programme, policy, or practice). Meanwhile, students benefit from the increased flexibility in their academic schedules. There has been a significant increase in the use of blended learning (BL) by higher education institutions, with estimates suggesting that around 80 to 90 per cent of courses will transition to a hybrid format in the near future (Guppy et al., 2022). The term "pedagogical approach" pertains to the specific instructional method or tactic utilized within educational environments. The academic performance of a student is influenced not just by their innate intellect but also by their individual approach to the acquisition of knowledge (Estrada et al., 2021). According to Chen, Han, and Wright (2020), it is commonly recognized that there is no solitary teaching technique that can universally achieve effectiveness for all students, considering their diverse characteristics and learning demands. The person posited the idea that by modifying or customizing instructional methodologies to suit the distinct attributes of students, they might achieve learning outcomes with more efficacy and efficiency.

Shamsuddin and Kaur (2020) define learning styles as the process through which individuals create and inherit unique and consistent methods of acquiring knowledge, abilities, or attitudes through study or experiential learning. Allal-Chérif, Lombardo, and Jaotombo (2022) expanded upon and provided a more precise definition of learning style, characterizing it as the integration of a learner's cognitive, emotional, and psychological characteristics. These characteristics collectively function as a unified indicator of the learner's interpretation of their learning environment, as well as their interactions and reactions to their surroundings. Lwande, Muchemi, and Oboko (2021) conducted a study that centered on individual learning and posited that an individual's learning style pertains

to their inclination and ability to engage with particular attributes that they favour throughout the cognitive processing of information. In a subsequent study, Uka (2023) introduced the notion of a learning style as the preferred approach that an individual employs to perceive and process certain information, comprising both cognitive and affective dimensions of the subject matter being learned. In another study, Allal-Chérif et al. (2022) and Muñoz et al. (2022) posited the existence of discrete learning styles among individuals, implying that each individual possesses a unique methodology for acquiring knowledge. The proponents further asserted that by acquiring knowledge about different learning styles, educators can improve their capacity to identify and address the learning challenges faced by their students. They ultimately posited that the adoption of this approach is anticipated to augment students' motivation and facilitate more efficacious learning outcomes. Hence, the present study This paper explores the existing learning styles and introduces the concept of BLR.

The research findings suggest that the integration of blended learning (BL) was accompanied by a multitude of problems. The issues involved a range of aspects, including students, educators, and elements associated with the system. According to the findings of Sakina, Kulsum, and Uyun (2020), a significant obstacle to the successful implementation of BLR is the limited engagement of students. The participation of persons in BL is contingent upon various elements, including the degree of self-regulation and openness exhibited by students, their deficiencies in time management abilities, and the heterogeneity of their backgrounds. According to Shamsuddin and Kaur (2020), the impact of learning styles plays a crucial role in the synchronous online delivery of engineering graphics curricula. However, the current body of scholarly literature pertaining to this subject is constrained in scope. Additionally, the research conducted by Gao, Jiang, and Tang (2020) demonstrated that the participation of students in blended learning and remote (BLR) activities is contingent upon their unique learning styles. The researchers have shown a positive correlation between student involvement and the utilization of BLR activities that are congruent with their chosen learning modalities. Goedhart et al. (2019) argue that in order to optimize educational outcomes, it is imperative to develop varied learning environments that are specifically designed to accommodate various learning styles. This assertion was stated in relation to the imperative of utilizing varied educational settings in order to attain the most favorable results. The adoption of multimedia-based instructional approaches has become increasingly prevalent as a result of the widespread availability and use of digital technologies. Unfortunately, a subset of pupils encounter difficulties in efficiently harnessing educational resources, and their distinct learning modalities exert a substantial influence on their scholastic achievements. Therefore, it is important to do additional research on the impact of various learning styles on the blended learning (BL) environment, particularly within the Malaysian setting. The learning style models put forth by Rogowsky, Calhoun, and Tallal (2020) delineate discrete approaches to learning that have been posited as potential means to augment people's understanding of proficiencies. The assessment of learning preferences among adult learners frequently entails the application of three widely utilized models of learning styles. The study involved an examination of Kolb's Learning Style within the wider framework of this research.

Learning styles are not fixed traits but rather represent an individual's flexible approach to engaging with educational experiences. The observed occurrence gives rise to the possibility that various learning styles may exhibit enhanced efficacy in diverse situations. Therefore, it is necessary to conduct thorough investigations on learning styles in diverse contexts (Costa et al., 2020). The advent of internet-based technology has effectively eliminated geographical constraints and time limits. The recognition of the increasing prevalence of online and blended learning in modern educational institutions is of utmost importance [40]. Within the domain of scholarly discourse, a multitude of recent investigations have made valuable contributions to the existing body of literature by exploring the inquiry of whether students in a web-based or blended learning environment demonstrate a noticeable preference for a specific learning modality (Gao et al., 2020; Hu et al., 2021; Sakina et al., 2020). Nevertheless, the outcomes of these examinations have produced inconsistent results, underscoring the need for additional research and examination.

The flexibility and personalized nature of online education empower students to take ownership of their own learning. Thus far, researchers have achieved significant progress in the identification and prediction of learning styles in the realm of online education (Allal-Chérif et al., 2022; Lwande et al., 2021). The aforementioned contributions are clearly apparent in the current corpus of academic literature. An exemplary research study investigated the varied online learning styles demonstrated by students enrolled in virtual courses and identified a noteworthy association between students' favored learning ways and their degree of engagement within these educational contexts. The findings of this study indicate a significant correlation between the extent of students' involvement in educational environments and their preferred approaches to learning. The results of extensive research investigating the favored learning methods of students involved in interactive e-learning reveal that online lessons have exhibited favorable impacts on students' overall academic achievements (El-Sabagh, 2021).

Blended courses, which involve a combination of online and face-to-face training, have gained popularity due to their adaptable characteristics. Blended courses are characterized by the integration of both online and traditional classroom training (Anthony, 2019). A number of research investigations have investigated the learning styles of students in this specific context, focusing on various important factors such the integration of online and face-to-face components (Khanal, 2023), instructional strategies utilized, and the curriculum's organization. Researchers conducted a study to investigate the preferred learning methods of K-12 students in a hybrid classroom setting. The study employed the VAK model, which incorporates four modalities: Visual, Auditory, Reading/Writing, and Kinesthetic. The primary objective of this research was to further understanding of the influence of students' unique qualities and choices on their academic achievement [56]. A recent study provided a comprehensive analysis of the benefits linked to visual and auditory learning modalities, while also offering insights into the constraints of the kinesthetic learning style within the context of BLR [57]. The kinesthetic learning style is characterized by the active involvement of individuals in the acquisition of knowledge.

H1: Learning styles has positive and significant impact on the BLR among the Iraqi university students**.**

As stated by Tian et al. (2023), one important factor to take into account when examining and understanding user responses to systems is the psychological characteristics of users, namely their learning styles. In their study, Naszai, Kurjan, and Maughan (2021) have conducted an analysis of various learning style models, revealing a considerable quantity of such models, with an estimated count of up to seventy-one, as reported in the extant scholarly literature. Skulmowski and Xu (2021) assert that the examination of students' desire to employ learning technologies from this specific perspective remains nascent. The existing body of literature encompasses a diverse array of learning style models, with the total count of models extending to seventy-one. Nevertheless, specific ideas pertaining to learning styles have surfaced as the dominant framework in empirical investigations. The present topic encompasses many learning style theories proposed by Dunn (1974), Kolb (1981), Fleming and Mills (1992), Kim and Asbury (2020), and Pei et al. (2023).

Active learners tend to display a predilection for collaborative study settings and actively participate in learning activities. Conversely, reflective learners tend to adopt a more introspective and analytical approach, often opting for solitary study (Huang et al., 2020). The two groups of learners can be differentiated based on their ability to comprehend and evaluate information. The cognitive processes of perception, which include the abilities of sensing and intuition, have a significant impact on learners' inclinations and strategies when it comes to gaining knowledge. Sensory learners typically display a preference for straightforward material and demonstrate a proclivity for imitating the problem-solving approaches employed by their instructors. (Palanisamy & Nor, 2021). On the other hand, individuals with a propensity for intuitive learning demonstrate a predilection for complex subject matter and depend on their distinct insights to navigate the process of acquiring knowledge. Both groups of learners employ their sensory faculties to gather information and participate in decision-making processes. One of the factors under consideration is commonly known as "input," which entails evaluating an individual's favored method of acquiring information, either through visual or verbal channels. There is a subset of students who demonstrate a heightened level of responsiveness to their educational encounters when they are exposed to visual aids, such as movies, presentations, photographs, and charts, among others. Individuals that demonstrate a predilection for verbal learning typically achieve optimal comprehension by engaging with written texts and auditory presentations that provide detailed explanations of the mechanics and processes underlying distinct events. The cognitive capacity to comprehend information in either a sequential or global fashion. Sequential learners are those that exhibit a cognitive approach characterized by the systematic analysis and comprehension of information in a methodical, step-by-step way (Hao et al., 2023). On the other hand, individuals with a global learning style tend to employ a cognitive strategy wherein they first comprehend the overarching concept or structure prior to engaging with the precise particulars. Both groups of learners play a crucial role in attaining favorable learning results.

Several researchers, including Dunn (1974), Allioui (2019), and Kolb (1986), have posited that an individual's favored modality for knowledge acquisition plays a crucial role in shaping their academic achievement. The theory of learning styles suggests that in order to achieve the best learning results, it is crucial for educators and learners to have congruent

preferences in terms of teaching and learning methods. The idea postulates that by the use of various learning styles, students can be effectively engaged and motivated to reach their maximum capabilities. Numerous studies have been undertaken to investigate the adaptation of educational hypermedia systems (EHSs) in order to accommodate the requirements of students with varying learning styles (Allioui, 2019; van Bakel, 2021). However, it is important to note that the hypothesis of multiple learning styles still presents numerous limitations that require additional investigation. The conceptualization of 'learning styles' exhibits a lack of clarity and precision. In the words of Allioui (2019), the term "learning style" pertains to an individual's innate abilities and inclinations in the process of acquiring and integrating information. Within this particular context, it is evident that there exist notable connections between the ideas of cognitive style and learning strategy. The educational implications of learning styles are subject to widespread skepticism, which can be attributed to many variables. Multiple variables contribute to the complexity of understanding learning styles, such as the potential for learning styles to be flexible and adaptable, the lack of reliable measurement instruments, the presence of genetic factors influencing learning styles, and the limited availability of compelling empirical evidence (Palanisamy & Nor, 2021).

In the design phase of this study project, the incorporation of participants' individual preferences was not taken into account in the creation of the BLR and e-learning environment. A singular instructional methodology was utilized. This discovery implies that the learning tactics utilized by specific students were ineffective. The methodology employed in our study enables the discernment of individual learners' views, therefore enabling an investigation into the potential ramifications linked to different learning styles, even in instances when these styles have been neglected (Tambak et al., 2022). While there is a recognized correlation between e-learning and learning styles theory (LST), previous studies on the Technology Acceptance Model (TAM) have not explored the connection between LST and perceived usefulness (PU), perceived ease of use (PS), and intention to use (ITU). Despite the presence of a correlation between LST (learner satisfaction) and e-learning. Nevertheless, the learning styles hypothesis does not assign considerable importance to this correlation. Moreover, the authors Hebebci and Ertuğrul (2022) emphasize the importance of learning styles as a determinant of problem-solving abilities. Based on the aforementioned circumstances, we formulated the hypothesis that an individual's favorite modality of learning would reliably predict their performance on the PU, PS, and ITU tests.

Numerous studies have also been dedicated to examining the influence of academic discipline within a blended learning and remote (BLR) environment (Al-Maroof et al., 2021). The recognition of the influence of academic disciplines and the learning environment on students' learning styles is well acknowledged. The present study aimed to undertake a thorough investigation of the four primary learning styles demonstrated by individuals engaged in online courses, with a particular focus on the most effective learning tactics utilized by college students within a computer-based educational setting. The framework incorporates various learning methods, namely visual, sensory, global, and sequential. According to the findings of the study conducted by the authors [11], it has been observed that students who are engaged in a liberal arts education exhibit a higher

susceptibility to experiencing anxiety when exposed to remote teaching. This can be attributed primarily to disparities in their learning approaches in comparison to students pursuing different academic disciplines (Kim & Asbury, 2020). Analogous efforts were made to investigate the disciplinary learning preferences of distance education students by analyzing the usage records of CMS tools and conducting course assessments. As noted by Magulod Jr (2019), the findings of the study revealed notable disparities in students' tool preferences among various academic subjects. However, a thorough investigation utilizing chi-square statistics and based on the Community of Inquiry (CoI) presences framework found no statistically significant correlations between the learning preferences of students in fields categorized as soft-pure and hard-pure and the CoI presences. The research proposed that students who are exposed to a blended learning and teaching environment, which combines traditional and online instructional approaches, likely to demonstrate a predilection for the kinesthetic learning style. However, it is imperative to recognize that the academic realm significantly influences the BLR (Beyond the Learning Resource) experience, particularly for students engaged in demanding academic areas (Pei et al., 2023).

H2: Learning styles positively and significantly affect PU among the Iraqi university students.
H3: Learning styles positively and significantly affect PS among the Iraqi university students.
H4: Learning styles positively and significantly affect ITU among the Iraqi university students.
H5: PU is in positive and significant impact on the BLR among the Iraqi university students**.**
H6: PS is in positive and significant impact on the BLR among the Iraqi university students**.**
H7: ITU is in positive and significant impact on the BLR among the Iraqi university students**.**
H8: PU mediates the relationship between learning styles and the BLR among the Iraqi university students.
H9: PS mediates the relationship between learning styles and the BLR among the Iraqi university students.
H10: ITU mediates the relationship between learning styles and the BLR among the Iraqi university students.

3.0. Methodology

The present study employs a quantitative methodology to examine the interconnections among variables, specifically utilizing Structural Equation Modelling with Partial Least Squares (SEM-PLS). The objective of this study is to examine particular relationships and associations within the target population. A total of 470 questionnaires were provided to study participants who were selected by random sampling techniques in order to get a precise and impartial sample.

A total of 343 participants, with a response rate of 73%, contributed valid data for analysis. The survey's selected participants demonstrated a notable level of active engagement, as shown by a significant proportion of responses. The utilization of random sampling is a crucial element within the research design as it serves to mitigate the potential for selection bias and ensures equitable opportunities for inclusion among all individuals within the target population of the study. By employing random sample techniques, researchers are able to enhance the level of confidence in generalizing their findings to the entire population.

The utilization of SEM-PLS in conjunction with random sampling techniques yields a robust and effective approach for examining and understanding the interconnections among the variables selected for sampling (Mandhani, Nayak, & Parida, 2020). The results obtained from this research endeavor will make a substantial contribution to the existing knowledge within the discipline. Furthermore, these findings may have ramifications that extend beyond theoretical advancements, potentially impacting practical applications as well.

4.0. Results and Discussion

The implementation of the Structural Equation Modeling-Partial Least Squares (SEM-PLS) statistical approach is deemed suitable for this research endeavor owing to the relatively limited sample size and the presence of non-normal data distributions. The adoption of this approach enables researchers to effectively simulate underlying constructions and intricate associations among variables, rendering it a very adaptable technique for data analysis. The initial stage in employing Structural Equation Modeling-Partial Least Squares (SEM-PLS) involves the development of a model for assessing the data. In this section, the researchers delineate the associations between the explicit manifestations and the concealed foundational frameworks. A reliability and validity examination of the measurement model is performed in order to ascertain the extent to which the indicators accurately represent the underlying constructs. The measuring model utilized in this work is depicted in Figure 1.

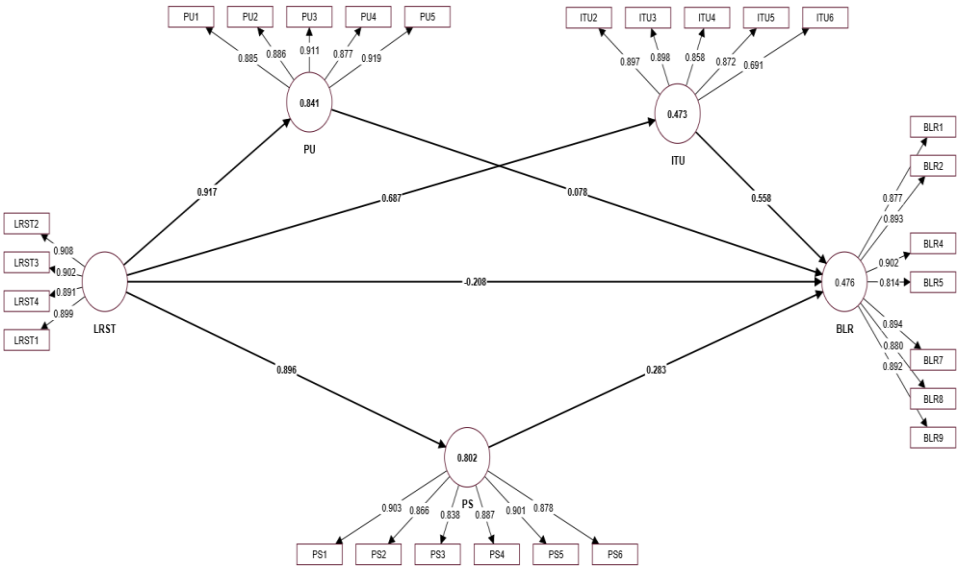

Figure 1: *Measurement Model*

The table presented below, labelled as Table 1, displays the external framework of the current investigation. Items with an outer loading value below 0.60 were excluded from the analysis. The findings suggest that the reliability of the indicator is high.

Table 1

Outer Loadings

	BLR	ITU	LRST	PS	PU
BLR1	0.877				
BLR2	0.893				
BLR4	0.902				
BLR5	0.814				
BLR7	0.894				
BLR8	0.880				
BLR9	0.892				
ITU2		0.897			
ITU3		0.898			
ITU4		0.858			
ITU5		0.872			
ITU6		0.695			
LRST1			0.899		
LRST2			0.908		
LRST3			0.902		
LRST4			0.891		
PS1				0.903	
PS2				0.866	
PS3				0.838	
PS4				0.887	
PS5				0.901	
PS6				0.878	
PU1					0.885
PU2					0.886
PU3					0.911
PU4					0.877
PU5					0.919

In order to assess the dependability of a framework, researchers commonly employ measures such as Cronbach's alpha, composite reliability, and average variance extracted (AVE). The findings suggest that the levels of Cronbach's alpha, composite reliability, and average variance extracted (AVE) are all above the established threshold values.

Table 2

Reliability analysis

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	(AVE)
BLR	0.951	0.954	0.960	0.773
ITU	0.899	0.898	0.926	0.717
LRST	0.922	0.922	0.945	0.810
PS	0.941	0.942	0.953	0.773
PU	0.938	0.939	0.953	0.802

The discriminant validity results are presented in Table 3 below. The diagonal elements exhibit higher magnitudes compared to the lower elements, so validating the model.

Table 3

Discriminant Validity

	BLR	ITU	LRST	PS	PU
BLR	0.879				
ITU	0.673	0.847			
LRST	0.500	0.687	0.900		
PS	0.571	0.720	0.896	0.879	
PU	0.545	0.704	0.817	0.835	0.896

The following area of inquiry pertains to the examination of the structural model, which aims to explore the interconnections among latent constructs. Researchers employ hypothesis testing to ascertain the reliability and statistical significance of these associations. The statistical significance of the data can be evaluated by the utilization of bootstrapping or other resampling procedures. The picture 2 below illustrates the structural model employed in the present investigation.

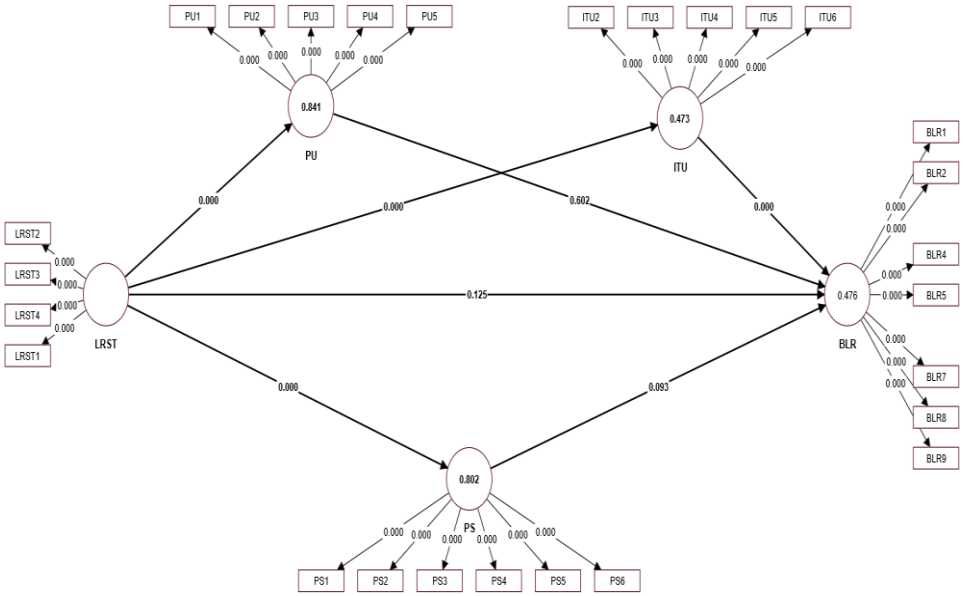

Figure 2. *Structural Model*

The present study used a bootstrapping approach to investigate the direct and indirect associations between learning strategies, technology adoption and blended learning readiness (BLR) within the context of Iraqi schools. The findings are presented in Table 4, revealing that with the exception of perceived support (PS) and perceived usefulness (PU), all other components, including learning techniques and intention to use (ITU), demonstrate substantial influence on BLR.

The blended learning method (BLR) has gained significant attention in educational settings due to its believed ability to improve academic outcomes and promote student engagement (Vij & Singh, 2023). BLR combines traditional face-to-face teaching with online learning components. The results of this investigation are presented in Table 4, demonstrating a noticeable increase in the utilization of BLR in recent years. To promote the creation of ideal learning environments for blended learning and ensure its effectiveness, educators and policymakers need to acquire a thorough understanding of the various aspects that contribute to the efficacy of this instructional strategy. The findings additionally offer valuable insights into students' perspectives on learning activities and their degree of involvement with course material. According to Tong, Uyen, and Ngan (2022), the recognition of efficacious approaches in blended learning research (BLR) empowers educators to better facilitate the development of improved study behaviors among their students. In order to achieve a more comprehensive understanding of the findings of the study, it is important to conduct a more extensive analysis of the many learning techniques that were investigated. This analysis aims to discover the specific approaches that exerted the greatest impact on student's academic progress. Educators have the capacity to augment the effectiveness of blended learning and optimize its outcomes by incorporating and modifying these tactics within the educational environment.

However, it is crucial to recognize that, contrary to initial hypotheses, neither the PS nor PU variables produced statistically significant results. The notion of "perceived usefulness" in relation to students refers to their subjective assessments of the worth and benefits connected with the BLR approach. In contrast, the concept of "perceived support" refers to the extent to which students perceive the presence of assistance and resources that can facilitate their learning endeavors. The conclusions of the study may have been influenced by various sources of bias, including the sample size used, the methodological technique applied, and the specific contextual elements present during the investigation.

Table 4

Direct Relationships

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Outcome
ITU -> BLR	0.558	0.558	0.105	5.295	0.000	Accepted
LRST -> BLR	0.500	0.503	0.073	6.840	0.000	Accepted
LRST -> ITU	0.687	0.690	0.062	4.077	0.000	Accepted
LRST -> PS	0.896	0.896	0.019	6.583	0.000	Accepted
LRST -> PU	0.917	0.917	0.013	7.191	0.000	Accepted
PS -> BLR	0.283	0.280	0.169	1.678	0.093	Rejected
PU -> BLR	0.078	0.093	0.149	0.521	0.602	Rejected

Table 5 presents the demonstration of the mediating function of technology acceptability in the association between learning techniques and BLR. The findings suggest that the association between learning techniques and blended learning is mediated only by the intention to use (ITU).

In essence, the extent to which students use various instructional styles directly influences their inclination to adopt blended instruction as a pedagogical tactic. The amount of commitment to the implementation of the BLR plan is a critical factor in shaping the degree of engagement and involvement within the BLR context. The significance of this study resides in its implication that the promotion of targeted learning strategies among students can have a beneficial effect on their willingness to adopt BLR as a viable alternative. Educators and curriculum designers can strengthen their capacity to facilitate students' willingness to participate in blended learning and remote (BLR) instruction by acquiring a thorough understanding of the mediating role played by students' intent to utilize this pedagogical strategy. Nevertheless, it could come as a surprise to find that PS and PU hold relatively marginal importance. The term "perceived support" refers to the extent to which students believe they have the chance to receive assistance and use available resources. On the other hand, the concept of "perceived usefulness" refers to the degree to which students maintain the conviction that the BLR strategy offers benefits. The possible impact of other factors on the results is plausible, including the size of the sample used in the study, the research methods employed, and the geographical environment in which the research was conducted.

Table 5

Mediating effect

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	
LRST -> PU -> BLR	0.071	0.085	0.137	0.520	0.603	Rejected
LRST -> ITU -> BLR	0.383	0.384	0.081	4.732	0.000	Accepted
LRST -> PS -> BLR	0.254	0.251	0.152	1.672	0.095	Rejected

5.0. Conclusion and Policy Implications

The findings of the study provide unique and innovative insights into the factors that influence BLR, as well as the function of intention to use (ITU) in relation to different learning methodologies and BLR. The study's results suggest a correlation between students' favored learning methodologies and their inclination to employ a blended learning and remote (BLR) strategy. This suggests that the adoption of BLR is indirectly influenced by learning methodologies. The findings of this analysis indicate that there is no statistically significant relationship between BLR and either personalized instruction or personalized learning. The above-mentioned results highlight the need of encouraging the development of efficient study habits among students, as a means to improve their openness to using BLR methods. Acquiring a thorough comprehension of the significance of intention to use, which functions as a mediating variable between attitudes and the adoption of blended learning resources (BLR), would assist educators in formulating effective interventions and support systems for their students.

Educational policymakers must prioritize the provision of comprehensive support to students in order to facilitate their acquisition and implementation of effective study practices. By providing educators and students with guidance and resources regarding the utilization and benefits of varied learning methodologies, it is feasible to effectively influence the willingness of educators and students to participate in blended learning and remote education. The pedagogical technique known as BLR encompasses the integration of various diverse learning strategies.

The development of students' digital literacy is of utmost importance for educational stakeholders, considering the significant role that technology plays in BLR. The extent to which students are familiar with and comfortable with various forms of technology will significantly impact their willingness to engage in blended learning and their capacity to properly utilize the online components of such educational programs. The provision of support for teachers plays a significant role in facilitating their ability to adjust instructional approaches in order to accommodate blended learning and its associated challenges. One prospective approach to improving blended learning and remote (BLR) experiences for students is the deployment of resources toward faculty development initiatives. These programs aim to educate instructors on the most effective ways to integrate online and in-person instructional approaches.

References

Abu Talib, M., Bettayeb, A. M., & Omer, R. I. (2021). Analytical study on the impact of technology in higher education during the age of COVID-19: Systematic literature review. *Education and Information Technologies, 26*(6), 1-28. https://doi.org/10.1007/s10639-021-10507-1

Al-Maroof, R., Al-Qaysi, N., Salloum, S. A., & Al-Emran, M. (2021). Blended learning acceptance: A systematic review of information systems models. *Technology, Knowledge and Learning, 27*, 1-36. https://doi.org/10.1007/s10758-021-09519-0

Al Rawashdeh, A. Z., Mohammed, E. Y., Al Arab, A. R., Alara, M., & Al-Rawashdeh, B. (2021). Advantages and disadvantages of using e-learning in university education: Analyzing students' perspectives. *Electronic journal of e-Learning, 19*(3), 107-117. https://doi.org/10.34190/ejel.19.3.2168

Allal-Chérif, O., Lombardo, E., & Jaotombo, F. (2022). Serious games for managers: Creating cognitive, financial, technological, social, and emotional value in in-service training. *Journal of Business Research, 146*, 166-175. https://doi.org/10.1016/j.jbusres.2022.03.083

Allioui, Y. E. (2019). Advanced prediction of learner's profile based on Felder-Silverman learning styles using web usage mining approach and fuzzy c-means algorithm. *International Journal of Computer Aided Engineering and Technology, 11*(4-5), 495-512. https://doi.org/10.1504/IJCAET.2019.100447

Anthony, E. (2019). (Blended) learning: How traditional best teaching practices impact blended elementary classrooms. *Journal of Online Learning Research, 5*(1), 25-48.

Border, S., Woodward, C., Kurn, O., Birchall, C., Laurayne, H., Anbu, D., Taylor, C., & Hall, S. (2021). Working in creative partnership with students to co-produce neuroanatomy e-learning resources in a new era of blended learning. *Anatomical Sciences Education, 14*(4), 417-425. https://doi.org/10.1002/ase.2090

Cao, X. (2022). Adoption of M-Learning in Business English Course and Its Relationship to Learning Style Preferences: An Empirical Investigation. *Frontiers in Psychology, 13*, 881866. https://doi.org/10.3389/fpsyg.2022.881866

Chen, C.-H., & Tsai, C.-C. (2021). In-service teachers' conceptions of mobile technology-integrated instruction: Tendency towards student-centered learning. *Computers & Education, 170*, 104224. https://doi.org/10.1016/j.compedu.2021.104224

Chen, H., Han, J., & Wright, D. (2020). An investigation of lecturers' teaching through English medium of instruction—A case of higher education in China. *Sustainability, 12*(10), 4046. https://doi.org/10.3390/su12104046

Costa, R. D., Souza, G. F., Valentim, R. A., & Castro, T. B. (2020). The theory of learning styles applied to distance learning. *Cognitive Systems Research, 64*, 134-145. https://doi.org/10.1016/j.cogsys.2020.08.004

Cronje, J. (2020). Towards a new definition of blended learning. *Electronic journal of e-Learning, 18*(2), 114-121. https://doi.org/10.34190/EJEL.20.18.2.001

Deng, R., Benckendorff, P., & Gao, Y. (2022). Limited usefulness of learning style instruments in advancing teaching and learning. *The International Journal of Management Education, 20*(3), 100686. https://doi.org/10.1016/j.ijme.2022.100686

Dunn, J. C. (1974). Well-separated clusters and optimal fuzzy partitions. *Journal of cybernetics, 4*(1), 95-104. https://doi.org/10.1080/01969727408546059

El-Sabagh, H. A. (2021). Adaptive e-learning environment based on learning styles and its impact on development students' engagement. *International Journal of Educational Technology in Higher Education, 18*(1), 1-24. https://doi.org/10.1186/s41239-021-00289-4

Estrada, M., Monferrer, D., Rodríguez, A., & Moliner, M. Á. (2021). Does emotional intelligence influence academic performance? The role of compassion and engagement in education for sustainable development. *Sustainability, 13*(4), 1721. https://doi.org/10.3390/su13041721

Ferreira, M., Martinsone, B., & Talić, S. (2020). Promoting sustainable social emotional learning at school through relationship-centered learning environment, teaching methods and formative assessment. *Journal of Teacher Education for Sustainability, 22*(1), 21-36. https://doi.org/10.2478/jtes-2020-0003

Fleming, N. D., & Mills, C. (1992). Not another inventory, rather a catalyst for reflection. *To improve the academy, 11*(1), 137-155. https://doi.org/10.1002/j.2334-4822.1992.tb00213.x

Fuentes, M. A., Zelaya, D. G., & Madsen, J. W. (2021). Rethinking the course syllabus: Considerations for promoting equity, diversity, and inclusion. *Teaching of Psychology, 48*(1), 69-79. https://doi.org/10.1177/0098628320959979

Gaffas, Z. M. (2023). Students' perceptions of e-learning ESP course in virtual and blended learning modes. *Education and Information Technologies*, 1-30. https://doi.org/10.1007/s10639-023-11579-x

Gao, B. W., Jiang, J., & Tang, Y. (2020). The effect of blended learning platform and engagement on students' satisfaction——the case from the tourism management teaching. *Journal of Hospitality, Leisure, Sport & Tourism Education, 27*, 100272. https://doi.org/10.1016/j.jhlste.2020.100272

Goedhart, N. S., Blignaut-van Westrhenen, N., Moser, C., & Zweekhorst, M. B. (2019). The flipped classroom: supporting a diverse group of students in their learning. *Learning Environments Research, 22*, 297-310. https://doi.org/10.1007/s10984-019-09281-2

Guppy, N., Verpoorten, D., Boud, D., Lin, L., Tai, J., & Bartolic, S. (2022). The post-COVID-19 future of digital learning in higher education: Views from educators, students, and other professionals in six countries. *British Journal of Educational Technology, 53*(6), 1750-1765. https://doi.org/10.1111/bjet.13212

Hao, X., Xu, Z., Guo, M., Hu, Y., & Geng, F. (2023). The effect of embedded structures on cognitive load for novice learners during block-based code comprehension. *International Journal of STEM Education, 10*(1), 1-16. https://doi.org/10.1186/s40594-023-00432-9

Hebebci, M. T., & Ertuğrul, U. (2022). The Effects of Integrated STEM Education Practices on Problem Solving Skills, Scientific Creativity, and Critical Thinking Dispositions. *Participatory Educational Research, 9*(6), 358-379. https://doi.org/10.17275/per.22.143.9.6

Hu, J., Peng, Y., Chen, X., & Yu, H. (2021). Differentiating the learning styles of college students in different disciplines in a college English blended learning setting. *PLoS One, 16*(5), e0251545. https://doi.org/10.1371/journal.pone.0251545

Huang, C. L., Luo, Y. F., Yang, S. C., Lu, C. M., & Chen, A.-S. (2020). Influence of students' learning style, sense of presence, and cognitive load on learning outcomes in an immersive virtual reality learning environment. *Journal of Educational Computing Research, 58*(3), 596-615. https://doi.org/10.1177/0735633119867422

Khalil, R., Mansour, A. E., Fadda, W. A., Almisnid, K., Aldamegh, M., Al-Nafeesah, A., Alkhalifah, A., & Al-Wutayd, O. (2020). The sudden transition to synchronized online learning during the COVID-19 pandemic in Saudi Arabia: a qualitative study exploring medical students' perspectives. *BMC medical education, 20*, 1-10. https://doi.org/10.1186/s12909-020-02208-z

Khanal, J. (2023). Shifting identities: an examination of student perceptions and experiences in face-to-face and online learning in Nepal. *Education and Information Technologies*, 1-29. https://doi.org/10.1007/s10639-023-12020-z

Kim, L. E., & Asbury, K. (2020). 'Like a rug had been pulled from under you': The impact of COVID-19 on teachers in England during the first six weeks of the UK lockdown. *British Journal of Educational Psychology, 90*(4), 1062-1083. https://doi.org/10.1111/bjep.12381

Kolb, D. (1986). *The critique of pure modernity: Hegel, Heidegger, and after*. University of Chicago Press. https://doi.org/10.2307/2107865

Kolb, D. A. (1981). Experiential learning theory and the learning style inventory: A reply to Freedman and Stumpf. *Academy of management review, 6*(2), 289-296. https://doi.org/10.5465/amr.1981.4287844

Lassoued, Z., Alhendawi, M., & Bashitialshaaer, R. (2020). An exploratory study of the obstacles for achieving quality in distance learning during the COVID-19 pandemic. *Education sciences, 10*(9), 232. https://doi.org/10.3390/educsci10090232

Loeng, S. (2020). Self-directed learning: A core concept in adult education. *Education Research International, 2020*, 1-12. https://doi.org/10.1155/2020/3816132

Lwande, C., Muchemi, L., & Oboko, R. (2021). Identifying learning styles and cognitive traits in a learning management system. *Heliyon, 7*(8). https://doi.org/10.1016/j.heliyon.2021.e07701

Magulod Jr, G. C. (2019). Learning styles, study habits and academic performance of Filipino University students in applied science courses: Implications for instruction. *JOTSE: Journal of Technology and Science Education, 9*(2), 184-198. http://hdl.handle.net/2117/134350

Mahaye, N. E. (2020). The impact of COVID-19 pandemic on education: navigating forward the pedagogy of blended learning. *Research online, 5*, 4-9. https://www.researchgate.net/profile/Mahaye-Ngogi-Emmanuel/publication/340899662

Mandhani, J., Nayak, J. K., & Parida, M. (2020). Interrelationships among service quality factors of Metro Rail Transit System: An integrated Bayesian networks and PLS-SEM approach. *Transportation Research Part A: Policy and Practice, 140*, 320-336. https://doi.org/10.1016/j.tra.2020.08.014

Müller, C., & Mildenberger, T. (2021). Facilitating flexible learning by replacing classroom time with an online learning environment: A systematic review of blended learning in higher education. *Educational Research Review, 34*, 100394. https://doi.org/10.1016/j.edurev.2021.100394

Muñoz, J. L. R., Ojeda, F. M., Jurado, D. L. A., Peña, P. F. P., Carranza, C. P. M., Berríos, H. Q., Molina, S. U., Farfan, A. R. M., Arias-Gonzáles, J. L., & Vasquez-Pauca, M. J. (2022). Systematic review of adaptive learning technology for learning in higher education. *Eurasian Journal of Educational Research, 98*(98), 221-233. http://dx.doi.org/10.14689/ejer.2022.98.014

Naszai, M., Kurjan, A., & Maughan, T. S. (2021). The prognostic utility of pre-treatment neutrophil-to-lymphocyte-ratio (NLR) in colorectal cancer: A systematic review and meta-analysis. *Cancer Medicine, 10*(17), 5983-5997. https://doi.org/10.1002/cam4.4143

Ntim, S., Opoku-Manu, M., & Kwarteng, A. A.-A. (2021). Post COVID-19 and the potential of blended learning in higher institutions: exploring students and lecturers perspectives on learning outcomes in blended learning. *European Journal of Education and Pedagogy, 2*(6), 49-59. https://doi.org/10.24018/ejedu.2021.2.6.162

Palanisamy, S., & Nor, N. B. M. (2021). Effectiveness of Mayer's Problem Solving Model With Visual Representation Teaching Strategy in Enhancing Year Four Pupils'mathematical Problem Solving Ability. *MOJES: Malaysian Online Journal of Educational Sciences, 9*(2), 41-52. https://mjlis.um.edu.my/index.php/MOJES/article/view/29378

Pei, L., Poortman, C., Schildkamp, K., & Benes, N. (2023). Teachers' and students' perceptions of a sense of community in blended education. *Education and Information Technologies*, 1-39. https://doi.org/10.1007/s10639-023-11853-y

Prifti, R. (2022). Self–efficacy and student satisfaction in the context of blended learning courses. *Open Learning: The Journal of Open, Distance and e-Learning, 37*(2), 111-125. https://doi.org/10.1080/02680513.2020.1755642

Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2021). Balancing technology, pedagogy and the new normal: Post-pandemic challenges for higher education. *Postdigital Science and Education, 3*(3), 715-742. https://doi.org/10.1007/s42438-021-00249-1

Renganayagalu, S., Mallam, S., & Hernes, M. (2022). Maritime education and training in the COVID-19 era and beyond. *TransNav: International Journal on Marine Navigation and Safety of Sea Transportation, 16*(1), 59-69. https://doi.org/10.12716/1001.16.01.06

Rogowsky, B. A., Calhoun, B. M., & Tallal, P. (2020). Providing instruction based on students' learning style preferences does not improve learning. *Frontiers in Psychology, 11*, 164. https://doi.org/10.3389/fpsyg.2020.00164

Sakina, R., Kulsum, E. M., & Uyun, A. S. (2020). Integrating technologies in the new normal: A study of blended learning. *International Journal of Quantitative Research and Modeling, 1*(4), 181-193. https://doi.org/10.46336/ijqrm.v1i4.81

Salta, K., Paschalidou, K., Tsetseri, M., & Koulougliotis, D. (2022). Shift from a traditional to a distance learning environment during the COVID-19 pandemic: University students' engagement and interactions. *Science & Education, 31*(1), 93-122. https://doi.org/10.1007/s11191-021-00234-x

Sarkar, S., Sharma, S., & Raheja, S. (2021). Implementation of blended learning approach for improving anatomy lectures of phase i MBBS students–learner satisfaction survey. *Advances in Medical Education and Practice, 12*, 413-420. https://doi.org/10.2147/amep.s301634

Shamsuddin, N., & Kaur, J. (2020). Students' Learning Style and Its Effect on Blended Learning, Does It Matter? *International Journal of Evaluation and Research in Education, 9*(1), 195-202. http://ijere.iaescore.com/index.php/IJERE/article/view/20422

Shishigu, A. (2022). Supplemental Blended Learning Model as an Approach Towards the Enhancement of Competency Based Education: An Experience from a Pedagogical Intervention. *Journal of Educational Technology Systems, 51*(2), 202-214. https://doi.org/10.1177/00472395221118365

Skulmowski, A., & Xu, K. M. (2021). Understanding cognitive load in digital and online learning: A new perspective on extraneous cognitive load. *Educational psychology review, 31*(171), 1-26. https://doi.org/10.1007/s10648-021-09624-7

Syauqi, K., Munadi, S., & Triyono, M. B. (2020). Students' Perceptions toward Vocational Education on Online Learning during the COVID-19 Pandemic. *International Journal of Evaluation and Research in Education, 9*(4), 881-886. https://doi.org/10.11591/ijere.v9i4.20766

Tambak, S., Ahmad, M. Y., Sukenti, D., & Siregar, E. (2022). Faith, Identity Processes and Science-Based Project Learning Methods for Madrasah Teachers. *AL-ISHLAH: Jurnal Pendidikan, 14*(1), 203-216. https://doi.org/10.35445/alishlah.v14i1.1184

Tian, Y., Tong, C., Lee, L.-H., Mogavi, R. H., Liao, Y., & Zhou, P. (2023). Last Week with ChatGPT: A Weibo Study on Social Perspective regarding ChatGPT for Education and Beyond. *arXiv preprint arXiv:2306.04325*. https://doi.org/10.48550/arXiv.2306.04325

Tong, D. H., Uyen, B. P., & Ngan, L. K. (2022). The effectiveness of blended learning on students' academic achievement, self-study skills and learning attitudes: A quasi-experiment study in teaching the conventions for coordinates in the plane. *Heliyon, 8*(12). https://doi.org/10.1016/j.heliyon.2022.e12657

Triemstra, J. D., Haas, M. R., Bhavsar-Burke, I., Gottlieb-Smith, R., Wolff, M., Shelgikar, A. V., Samala, R. V., Ruff, A. L., Kuo, K., & Tam, M. (2021). Impact of the COVID-19 pandemic on the clinical learning environment: addressing identified gaps and seizing opportunities. *Academic Medicine, 96*(9), 1276. https://doi.org/10.1097%2FACM.0000000000004013

Uka, A. (2023). Creativity in Education: Fostering Creativity in the Classroom Using Creative Teaching Methods Violeta Xhomara1. *Journal of Educational Sciences, 26*(2), 1-21. https://doi.org/10.5281/zenodo.8068813

Ustun, A. B., & Tracey, M. W. (2020). An effective way of designing blended learning: A three phase design-based research approach. *Education and Information Technologies, 25*(3), 1529-1552. https://doi.org/10.1007/s10639-019-09999-9

van Bakel, W. (2021). *Navigating Exams: Identifying Test-Taking Navigation Behaviour* (Master's thesis, Utrecht University). https://studenttheses.uu.nl/handle/20.500.12932/39625

Veerasamy, S. M. D. R., & Nabila, T. C. (2020). Blended learning in higher education: a critical review. *The Online Journal of Distance Education and e-Learning, 8*(1), 18-24. https://tojdel.net/journals/tojdel/articles/v08i01/v08i01-03.pdf

Vij, S., & Singh, P. (2023). Opportunities Associated with Online/Blended Teaching Learning in the Era of Digital Education. In *Digital Transformation in Education: Emerging Markets and Opportunities* (pp. 136-154). https://doi.org/10.2174/9789815124750123010012

Walters-Williams, J. (2022). H-CUP: Increasing higher order thinking skills levels through a framework based on cognitive apprenticeship, universal design and project based learning. *Creative Education, 13*(9), 2878-2902. https://doi.org/10.4236/ce.2022.139181