Implementing e-learning environment at universities in Bosnia and Herzegovina

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ABSTRACT

The ubiquity of e-learning has necessitated research into its application and effectiveness. This study scrutinizes the factors influencing e-learning adoption in Bosnia and Herzegovina, specifically within the higher education sector. To determine these influential factors, the study surveyed professors from both private and public universities via emails, achieving 220 responses from over 1,500 sent. The collected data was analyzed using SmartPLS, and regression modeling was used to determine the significant relationships among the factors. The findings highlighted seven key elements, including e-learning policies, institutional readiness, quality e-learning systems, course design quality, awareness of benefits, interactive discussions, and motivation. Furthermore, the research unveiled six substantial gaps in the current e-learning structure: resource insufficiency, lack of e-learning skills, ineffective course design, inadequate knowledge of benefits, low motivation, and a lack of student-centered learning. It has been concluded that these seven factors, and their intricate relationships, significantly impact the successful adoption and effectiveness of e-learning tools within universities. The research offers practical guidance for universities aiming to implement or enhance e-learning practices, emphasizing areas requiring increased attention and resources. It underscores the importance of not only the technical infrastructure but also the quality of course design, the role of awareness and motivation, and the necessity of a student-centered approach.

Contribution/Originality: This research provides unique insights into e-learning in Bosnia and Herzegovina by identifying key factors influencing its effectiveness and highlighting gaps in the current infrastructure. It extends knowledge by focusing on an under-researched region and using advanced analytical techniques. Moreover, the practical recommendations it offers for enhancing e-learning in universities underscore its significant contribution to the field.

1. INTRODUCTION

The modern university has seen a significant transformation in the 21st Century, which is largely attributed to the emergence of e-learning. It was an imperative for the higher education institution to understand the change and organize institution in relation to transitioning to new learning era. This shift requires from university to make many decisions regarding all stakeholders involved but also to adapt and incorporate technology into their existing teaching mechanisms. Effective use of technology in classrooms calls for investments in online platforms, digital resources, and faculty training. Over time, both teachers and students have increasingly adopted this initiative,

which now supplements traditional in-person learning (Arabasz, Boggs, & Baker, 2003). Online support often includes Learning Management Systems (LMS) such as Moodle (Rice, 2011) as well as Web 2.0 technologies (Anderson, 2007) which facilitate providing summative feedback to students (Snart, 2010).

According to Kirkpartick (1994) and Snart (2010), access to online materials and tracking academic achievement can enhance the quality of research, education, and overall university performance. Additionally, blended learning proves beneficial for some students, particularly working professionals and part-time learners, as it allows them to juggle both work and education (Becirovic & Dervic, 2023).

This research was conducted in Bosnia and Herzegovina, according to the 2016 census, which has a population of around 3.5 million. Located in southeastern Europe on the Balkan Peninsula, the country has experienced a drastic increase in the number of universities since 2000, a trend that is common among post-communist Eastern European countries (Galbraith, 2003). Universities in Bosnia and Herzegovina are not included in the Academic Ranking of World Universities (Memisevic, Pasalic, Mujkanovic, & Memisevic, 2019). The ranking uses strict criteria for evaluating universities, including the number of Nobel Prize and Fields Medal winners among alumni and staff, highly cited researchers, papers published in top journals like Nature and Science, and the overall academic performance of the institution (ARWU, 2020). To improve their visibility, universities in Bosnia and Herzegovina must take their own initiatives. One such initiative is for academic staff to create profiles in relevant online communities, such as Google Scholar, to enhance the reputation of their institution.

Webometrics independently rank universities in Bosnia and Herzegovina base on their website as an indicator of performance. They recognize 48 higher educational institutions in B&H (Bosnia and Herzegovina), with 27 of those considered to be universities (Webometricx, 2020). The number of universities may vary based on different sources, 22 (Guru, 2020) or 17 (Edarabia, 2020). Out of these, 8 are public and the rest are private. This research has focused on top public and private university in the country. The University of Sarajevo is the largest and leading university in Bosnia and Herzegovina, located in the capital city of Sarajevo. It is a public non-profit organization that offers three levels of studies in various fields. According to various rankings, it is recognized as the best university in Bosnia and Herzegovina, with a ranking of 1001 in the Quacquarelli Symonds (QS) World University Rankings (Guru, 2020) and 725 in the Round University Ranking Agency (Webometricx, 2020). The university has a large academic staff of 1,500 to 1,999 and a student population of 25,000 to 29,999 (UniRank, 2020).

Burch is considered to be the best private university in Bosnia and Herzegovina according to sources such as Edurank (2020) Sarajevo Times and Edarabia (2020). It was founded in 2008 in Sarajevo with the goal of rethinking the modern university model and addressing the current unemployment crisis. Burch is recognized as an entrepreneurial university and a top degree for getting hired by companies such as "Walter BIM Solution", "eMedia Patch", "Infobip", and "Freund Elektronika doo." Burch has both domestic and international accreditations, including the British Accreditation Council, Agencija za Razvoj Visokog Obrazovanja i Osiguranje Kvaliteta, and Accreditation Service for International Schools, Colleges and Universities. The university has 1000 to 1400 students and 60 to 80 academic staff (IBU, 2020).

This research is essential as e-learning technologies, despite their integration in universities, have not been fully leveraged. The study aims to illuminate what constitutes an effective e-learning environment in Bosnian and Herzegovinian universities. Considering the broad use of e-learning in universities, fostering and sustaining it becomes imperative to improve experiences for both staff and students. Although some research has been conducted on e-learning in Bosnia and Herzegovina (Becirovic & Dervic, 2023; Nurovic & Poturak, 2023; Puška, Puška, Dragić, Maksimović, & Osmanović, 2021), a notable gap in the literature persists. This underscores the pressing need for further investigation in this area to better understand the unique challenges and opportunities associated with e-learning in Bosnian and Herzegovinian universities.

2. LITERATURE REVIEW

E-learning has emerged as an efficient mechanism for the dissemination of information and propagation of knowledge. Its foundation rests on multiple applications and operations such as internet services, computing systems, online technologies, social media platforms, and innovative teaching technologies (Anderson, 2007). The strategies of e-learning distribution usually fall under two categories: synchronous or asynchronous (Clark & Mayer, 2003). These methodologies employ tools such as web-based technologies, dynamic multimedia, instructional games or simulations, and social networks. Occasionally, educator-guided group activities blend both synchronous and asynchronous modes of learning. E-learning integrates advanced educational technologies, pedagogical design techniques and strategies, and uses social networks to amplify social aspects of culture, relationships, and learning (Anderson, 2007).

A rising number of higher education institutions (Sharpe, Benfield, Roberts, & Francis, 2006) have embraced e-learning, especially as a conduit for open and remote education (Rosenberg, 2006; Snart, 2010). Mayes and De Freitas (2005) perceive e-learning as an instrumental tool for efficient evaluation of learning outcomes and a cost-effective strategy to connect with learners from remote locations. The benefits of e-learning tools in enhancing the teaching potential of educators and the learning journey of students are apparent, thereby offering a superior alternative to conventional, in-person education (Rosenberg, 2006; Snart, 2010).

2.1. Benefits of E-Learning

There is significant evidence that the perception of benefits by both learners and instructors can greatly impact the effectiveness of e-learning (Minton, 2000; Omoda-Onyait & Lubega, 2011). E-learning offers numerous benefits, such as flexible learning times, self-paced study, communication between learners and instructors through emails and platforms, and improved retention (Rosenberg, 2006; Snart, 2010). Additionally, e-learning expands the pool of people who can pursue education, as mature professionals can better balance work and education through online learning.

The impact of e-learning can be evaluated by assessing its effectiveness in meeting the needs of both students and universities (Gagné, Wager, Golas, & Keller, 2005; Kirkpartick, 1994). As stated in Ozkan and Koseler (2009) empirical research on the effectiveness of LMS as an e-learning platform within higher education and validated their framework by measuring students' perceived satisfaction using six dimensions: service quality, system quality, content quality, learner perspective, instructor attitude, and support issues. It is crucial to understand the benefits of e-learning in order to create an effective e-learning environment, as has been emphasized.

2.2. E-learning Readiness

In an effort to implement e-learning in a Higher Education Institution, it is crucial to understand the institution's readiness for the technology (Aydın & Tasci, 2005). Aydın and Tasci (2005) developed an e-learning readiness instrument that evaluated four variables – technology, innovation, people, and self-development – against three factors – resources, skills, and attitudes. Researchers argued that all variables must be considered during the assessment due to variations among organizations. Some organizations may have adequate resources but lack skills, while others may have resources and skills but lack the right attitude. In both cases, failure is inevitable without detailed planning and processes for e-learning implementation. Otherwise, the organization may experience cost overruns and produce unappealing e-learning content, leading to failure in the long run (Minton, 2000). The same author proposed seven questions that organizations should answer in the planning stage:

1. Are you aware of the impact e-learning might have on your organization?
2. Does your organization's training strategy incorporate e-learning?
3. Is there sufficient leadership backing for e-learning within your organization?
4. Does your organization have the necessary support systems to ensure long-term adoption of e-learning?

5. Is your technological infrastructure proficient in consistently and effectively delivering e-learning?
6. Are learners within your organization ready for remote learning experiences?
7. Have you established a plan for managing the transition from traditional learning to e-learning within your organization?

Minton (2000) asserts that by answering these questions effectively, an organization can efficiently identify and allocate its e-learning resources.

Omoda-Onyait and Lubega (2011) developed an e-learning readiness assessment model, consisting of five factors: awareness, culture, technology, pedagogy, and content. It is crucial to note that simply having a strong technological infrastructure is not enough to guarantee the success of e-learning. Universities must also focus on raising awareness among students and staff, as well as providing performance training to reduce the fear of change associated with new technology. Ossiannilsson (2012) has established a connection between an institution's readiness for e-learning and the quality of course design. Czerniewicz and Brown (2009) emphasized that e-learning policy plays a crucial role in the successful adoption of e-learning. The policy serves as a formal structure, outlining the aims, resources, and values distributed within the organization. To put it simply, e-learning must be a part of the university's learning system. From a managerial perspective, culture refers to the beliefs, understandings, and behaviors of individuals aimed at achieving specific goals in the organization. From an educational perspective, culture encompasses beliefs, attitudes, and societal norms surrounding learning, or in the context of e-learning, attitudes and beliefs about what e-learning technologies can do for the organization (Edmonds, 2001).

2.3. Quality of E-Learning Systems

Various e-learning systems are being implemented across universities, providing a range of comparable functionalities such as managing and delivering learning content, administering users, and overseeing the system. Gagné et al. (2005) noted that all these elements have a bearing on e-learning outcomes. This structure was further developed by Khan (2010), who outlined eight crucial aspects for building an effective e-learning system: pedagogical strategies, technological tools, interface design, evaluation mechanisms, managerial aspects, institutional context, resource backing, and ethical considerations.

Additional components that constitute a well-functioning e-learning system were also emphasized, including a user-friendly portal, efficient user management, both synchronous and asynchronous collaborative tools, event coordination features (like calendars, scheduling, and reminders), learning content and management systems, and evaluation tools (including tests, scores, feedback, and surveys). For the successful implementation of e-learning, it is vital that these aspects are collectively endorsed and adopted across the organization.

DeLone and McLean (2003) and Hassanzadeh, Kanaani, and Elahi (2012) discovered that the quality of the system and the information it provides substantially influence learner satisfaction. Ozkan and Koseler (2009) found that system quality boosts the efficacy of the LMS, and content quality enhances its value, contributing to student satisfaction.

To set course quality standards, Wright (2004) suggested specific criteria for educators. These guidelines encompass aspects such as course material accessibility, structured course content, usage of suitable language, efficient course content layout, alignment of course goals and learning objectives, appropriateness of course content level, effective teaching and learning methods, accessibility of learning resources, and evaluation of students (Gagné et al., 2005; Ozkan & Koseler, 2009; Wright, 2004).

Further Puška et al. (2021) Metacognitive strategies variable directly affects the students' satisfaction when using e-learning, while students' self-efficacy and goal setting variables indirectly affect the student's satisfaction, along with the environment structuring and social dimensions.

2.4. Interactivity Discussion

Rice (2011) pointed out that e-learning provides opportunities for interaction between students and lecturers through established discussion forums. Rajasingham (2011) added that to facilitate deeper learning, the latest technology and communication methods should be utilized.

It is important to note that while e-learning provides many benefits, there are also challenges that universities face. One such challenge is ensuring the quality and credibility of online course content. This can be done by establishing quality standards for e-learning and regularly monitoring and evaluating course content (Rice, 2011). Additionally, technical issues such as software compatibility, internet connectivity, and accessibility for students with disabilities can also be a challenge for universities (Snart, 2010). To overcome these challenges, universities need to invest in the latest technology, provide technical support to students, and offer training to faculty and staff on the effective use of e-learning technology (Rosenberg, 2006).

2.5. Model

E-learning holds the potential to revolutionize the delivery of education and has established itself as a crucial aspect of the educational sphere. For universities to be successful in their e-learning endeavors, they must take into account the various factors that influence e-learning, including technology, pedagogy, content, culture, and policy. By addressing these considerations, universities can furnish students with a superior e-learning experience that equips them for the future. Based on these considerations, a model for facilitating effective e-learning at universities was created, and five (05) hypotheses were derived from it. Figure 1 presents a schematic representation of the model for promoting efficient e-learning in universities.
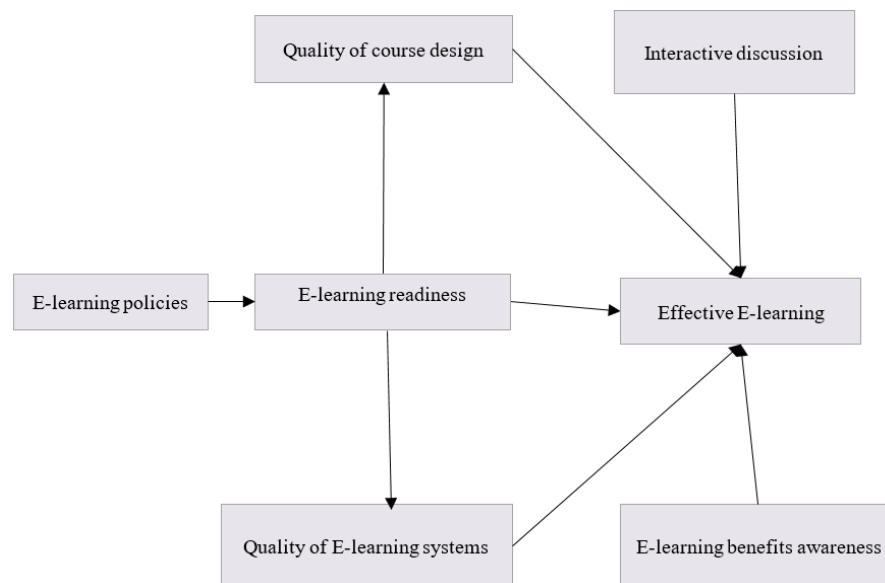

Figure 1. Model facilitating effective E-learning at universities

H1: Improvement of Quality of Course Design will positively affect/improve effective e-learning.

H2: University E-learning readiness will positively affect/improve effective e-learning.

H3: University Quality of E-learning System will positively affect/improve effective e-learning.

H4: E-learning Benefits Awareness directly affect e-learning.

H5: Interactive discussion directly affect e-learning.

H6: E-learning Policies directly affect E-Learning Readiness.

3. METHODOLOGY

The model was evaluated using questionnaires consisting of 7 variables: E-learning Readiness (5 items), Quality of E-learning Systems (6 items), Quality of Course Design (4 questions), E-learning Awareness Benefits (6 items), Interactive Discussions (4 items), E-learning Policies (3 items), and 6 demographic-related questions. The questions were retrieved from Aguti (2015) and adapted from Moreno, Cavazotte, and Alves (2017). The questionnaire was translated into Bosnian and validity was ensured through a translation process involving an expert and a third party.

Pilot tests were conducted with 30 surveys distributed to academic staff at two leading educational institutions in Bosnia and Herzegovina. Over 1,500 emails were sent and 220 responses were received and used in the study. Data has been analyzed using SmartPLS.

4. RESULTS

The study had 220 participants from two institutions: 90% (200) from the University of Sarajevo and 10% (20) from the International Burch University. The participants were 51.8% (114) males and 48.2% (106) females. The participants held various positions, with 21.4% being full professors and the majority (26.8%) being assistant professors.

The age range of participants was diverse, with 50% being 41 years or older, and 98.2% having intermediate to experienced levels of online teaching.

Table 1 displays the demographic details of the respondents involved in the study.

Table 1. Respondent demographic data.

Variable	Variable's categories	Percentage %
Gender	Male	51.8% (114)
	Female	48.2% (106)
Current designation	Full professor	21.4% (47)
	Associate professor	26.8% (59)
	Assistant professor	25% (55)
	Senior teaching assistant	15% (33)
	Teaching assistant	10.9% (24)
	Lecturer	0.9% (2)
Age	21-30	15% (33)
	31-40	35% (77)
	41-50	25% (55)
	51 or older	25% (55)
Institution	International Burch University	10% (20)
	University of Sarajevo	90% (200)
Your experience in online teaching	Novice	1.8% (4)
	Intermediate	46.4% (102)
	Experienced	51.8% (114)

4.1. Construct Reliability and Validity

The study conducted reliability and validity tests to measure the internal consistency of seven factors. The results were evaluated using the correlation of items within each factor, corrected item-to-total correlations and Cronbach's alpha values.

The findings show that all the Cronbach alpha values are above 0.70, indicating a high correlation and interchangeability between the factors. The validity test also shows that all variables are above 0.50.

Table 2 showcases the reliability and validity measures of the constructs used in the research.

Table 2. Construct reliability and validity.

Domain	Cronbach's alpha	rho_A	Composite reliability	Average variance extracted (AVE)
E-learning benefits awareness	0.753	0.763	0.808	0.591
E-learning policies	0.774	0.779	0.820	0.604
E-learning readiness	0.845	0.845	0.890	0.620
Effective e-learning	0.843	0.844	0.895	0.680
Interactive discussion	0.722	0.734	0.833	0.626
Quality of course design	0.781	0.783	0.825	0.612
Quality of e-learning systems	0.713	0.719	0.866	0.540

4.2. Discriminant Validity

Discriminant validity evaluates the degree to which unrelated concepts or measurements remain distinct. A baseline value of 0.350 is recommended for a sample size of 220. The outcomes of the tests revealed that the values for Composite Reliability exceeded 0.7, Average Variance Extracted surpassed 0.5, and both Maximum Shared Squared Variance and Average Shared Squared Variance were lower than the Average Variance Extracted, indicating a reliable discriminant and convergent validity. All loaded values surpassed the 0.50 mark, thus affirming sufficient discriminant validity and absence of any unforeseen cross-loading.

Table 3 demonstrates the measurements for both discriminant and convergent validity used in the research.

Table 3. Discriminant and convergent validity.

Domain	E-learning benefits awareness	E-learning policies	E-learning readiness	Effective E-learning	Interactive discussion	Quality of course design	Quality of E-learning systems
E-learning benefits awareness	0.769						
E-learning policies	0.285	0.777					
E-learning readiness	0.401	0.238	0.787				
Effective E-learning	0.642	0.136	0.408	0.824			
Interactive discussion	0.386	0.163	0.221	0.550	0.791		
Quality of course design	0.473	0.238	0.420	0.558	0.392	0.782	
Quality of E-learning systems	0.400	0.214	0.292	0.426	0.362	0.402	0.735

An Exploratory Factor Analysis (EFA) was performed to assess the correlation between variables. Promax rotation was utilized due to the large sample size of 220 participants and the presence of multiple correlated factors. To ensure reliable results, five items were dropped as they showed poor loading. These items were related to e-learning Benefits Awareness (2/6 and 3/6), and Quality of e-learning System (4/5 and 5/5). The scale had never been applied in Bosnia and Herzegovina, so it was necessary to clear any potential issues with cross and weak loadings. The results showed that all the commonalities for each variable were significantly high, with values above 0.300.

Table 4 illustrates the results of the principal component analysis, the extraction method employed in this study. A regression analysis was also performed as shown in Table 5. Regression displays the results indicating which hypotheses were statistically significant and which were rejected. Based on the findings in the Table 5, we can see that there are several statistically significant relationships between various aspects of e-learning and the effectiveness of e-learning. The variable E-learning Benefits Awareness shows a positive and statistically significant relationship with Effective E-Learning, with a coefficient of 0.372 and a t-value of 5.632, indicating that higher levels of awareness of the benefits of e-learning are associated with greater effectiveness in e-learning. The variable

E-learning Policies also has a positive and statistically significant relationship with E-learning Readiness, with a coefficient of 0.238 and a t-value of 3.938.

In the subsequent analysis, the connection between E-learning Readiness and Effective E-Learning does not demonstrate statistical significance. The resulting p-value for this correlation is 0.098, exceeding the conventional threshold for statistical significance, thus leading us to refrain from affirming a substantial correlation between e-learning readiness and effective e-learning.

Table 4. Extraction method: Principal component analysis.

Field	E-learning benefits awareness	E-learning policies	E-learning readiness	Effective E-learning	Interactive discussion	Quality of course design	Quality of E-learning systems
E-learning benefits awareness 1	0.836						
E-learning benefits awareness 4	0.684						
E-learning benefits awareness 5	0.855						
E-learning policies 2		0.772					
E-learning policies 3		0.825					
E-learning policies 1		0.731					
E-learning readiness 1			0.776				
E-learning readiness 2			0.853				
E-learning readiness 3			0.814				
E-learning readiness 4			0.712				
E-learning readiness 5			0.774				
Effective e-learning 1				0.795			
Effective e-learning 2				0.850			
Effective e-learning 3				0.827			
Effective e-learning 4				0.825			
Interactive discussion 1					0.844		
Interactive discussion 2					0.811		
Interactive discussion 3					0.714		
Quality of course design 1						0.729	
Quality of course design 2						0.839	
Quality of course design 3						0.775	
Quality of e-learning systems 1							0.643
Quality of e-learning systems 2							0.891
Quality of e-learning systems 3							0.794

Table 5. Regression.

Domain	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
E-learning benefits awareness -> Effective E-learning	0.372	0.377	0.066	5.632	0.000
E-learning policies -> E-learning readiness	0.238	0.255	0.060	3.938	0.000
E-learning readiness -> Effective E-learning	0.091	0.086	0.055	1.656	0.098
E-learning readiness -> Quality of course design	0.420	0.428	0.057	7.400	0.000
E-learning readiness -> Quality of E-learning systems	0.292	0.295	0.060	4.845	0.000
Interactive discussion -> Effective E-learning	0.281	0.276	0.055	5.072	0.000
Quality of course design -> Effective E-learning	0.208	0.207	0.052	4.010	0.000
Quality of E-learning Systems -> Effective E-learning	0.066	0.069	0.065	1.018	0.309

E-learning Readiness reveals a positive and statistically significant bond with the Quality of Course Design and Quality of E-learning Systems, with coefficients amounting to 0.420 and 0.292 respectively. The corresponding t-values being 7.400 and 4.845 also indicate a significant correlation. This illustrates that an increase in e-learning readiness corresponds to an enhancement in the quality of course design and e-learning systems.

The effect of Interactive Discussion on Effective E-Learning correlation in Table 5 indicates a statistically significant positive link between interactive discussion and effective e-learning. The regression coefficient stands at 0.281, indicating a positive correlation with effective e-learning. A t-statistic of 5.072 suggests a statistically significant relation and the p-value of 0.000, being less than the conventional threshold, supports the dismissal of the null hypothesis, concluding a significant link between interactive discussion and effective e-learning.

Quality of Course Design and its impact on Effective E-Learning correlation in Table 5 reveals a statistically significant positive link. The regression coefficient, 0.208, suggests that enhancements in course design quality positively influence the efficacy of e-learning. A t-statistic of 4.010, which is relatively high, asserts the statistical significance of the relationship. The p-value, 0.000, being less than the conventional level, suggests the null hypothesis can be dismissed and the positive correlation between course design quality and e-learning effectiveness is statistically significant.

Quality of E-learning Systems influence on Effective E-Learning correlation in Table 5 does not reveal a statistically significant relationship. The regression coefficient is 0.066, suggesting a small positive association. The t-statistic, 1.018, is relatively low, and the p-value, 0.309, exceeds the conventional statistical significance level, suggesting the absence of a statistically significant relationship between the quality of e-learning systems and effective e-learning. This implies that the data does not sufficiently support the hypothesis that the quality of e-learning systems significantly influences e-learning effectiveness.

E-learning Policies directly affect E-Learning Readiness, as indicated by the data presented in the Table 5. The regression coefficient of 0.238, with a sample mean of 0.255, suggests that improvements in e-learning policies are positively associated with an increase in e-learning readiness. The t-statistic of 3.938, which is relatively high, asserts the statistical significance of this relationship. The p-value of 0.000, being less than the conventional significance level, suggests that the null hypothesis can be dismissed and the positive correlation between e-learning policies and e-learning readiness is statistically significant. This implies that effective e-learning policies are a critical factor in preparing an environment conducive to successful e-learning implementation.

5. DISCUSSION

The study aimed to identify the factors that impact the effective use of e-learning. The results showed a positive correlation between E-learning Policies and E-learning Readiness, meaning that well-established e-learning policies lead to a higher level of institutional readiness for e-learning implementation and sustainability. According to Czerniewicz and Brown (2009) e-learning policy statements reflect the senior leadership's commitment and priorities towards e-learning.

Hence, institutions should integrate e-learning policies into their overall policies and involve staff members by clearly defining their roles and responsibilities. E-learning policy plays a critical role in successful e-learning implementation within organizations. Institutions must ensure that their e-learning policies are well-prepared to support and sustain e-learning. The study results indicate that a lack of well-implemented e-learning policies is the reason behind the low engagement of academics with e-learning platforms. Conversely, the research highlights that e-learning policies are crucial for successful e-learning outcomes. The policies help ensure consistency in course design, implementation, and framework execution (Czerniewicz & Brown, 2009). Additionally, adequate support from both management and IT departments is crucial in maintaining the adoption of e-learning (Aydın & Tasci, 2005).

The findings of this study strongly indicate the importance of e-learning readiness in improving the quality of course design and the effectiveness of e-learning systems. This implies that the willingness of an institution to back their academic staff in designing and developing courses significantly influences both the design quality and system effectiveness. Yet, the data unveils that solely the quality of course design plays a noteworthy part in promoting effective e-learning, while the influence of e-learning readiness and the quality of e-learning systems is insignificant. This seems inconsistent with previous research suggesting that these three factors positively contribute to effective e-learning (Ossiannilsson, 2012). Such disparity underscores the necessity for universities to bolster institutional readiness, given that it indirectly, via course design quality, contributes to effective e-learning.

Past studies have found that acknowledging the advantages of e-learning and implementing interactive discussion methods significantly boost the success of e-learning (Swan, 2002). These methodologies, encompassing live chats, discussion forums, group assignments, and face-to-face meetings, furnish students with the opportunity for active engagement and deeper connection with the subject matter. Existing literature endorses the positive link between interactive discussions and effective e-learning. The outcomes of this study further corroborate this significant relationship. Hence, it becomes imperative for universities to prioritize and encourage these interactive discussion methods, owing to their considerable influence on the success of e-learning.

This study confirms the positive correlation between e-learning benefits awareness and its effectiveness. E-learning Benefits Awareness plays a crucial role in educating staff and students on new e-learning technologies and highlighting the advantages of e-learning (Omoda-Onyait & Lubega, 2011) which directly contributes to the success of e-learning.

Overall, the results of this research have successfully answered the research hypotheses related to the factors that contribute to effective e-learning within universities and the relationships among these variables. It was found that all seven factors, which were derived from a comprehensive review of theories and models, are crucial for promoting effective e-learning. Additionally, the results confirmed significant relationships among these variables, offering insights into what factors play a role in enhancing e-learning in Bosnia and Herzegovina.

The study found six major gaps in the current e-learning infrastructure in universities, according to participant feedback and university infrastructure analysis. These gaps include a shortage of technology resources, lack of e-learning skills, ineffective e-course design, insufficient knowledge of the benefits of e-learning, a lack of motivation to use e-learning systems, and insufficient focus on student-centered learning. Finances play a crucial role in overcoming these gaps. A university's ability to effectively implement e-learning is dependent on its financial resources for financing e-learning activities (Omoda-Onyait & Lubega, 2011).

Technological resources, such as computing and internet access, are crucial for the long-term sustainability of e-learning, but their acquisition is contingent on financial support. Inefficient e-learning results from a lack of worker and student ability to use e-learning programs, which can be overcome through proper training. Increased awareness of the benefits of e-learning leads to more effective use. The study found that most staff members were not using e-learning in their daily routines, due to a lack of understanding of its benefits.

Studies conducted in developing countries (Anderson, 2007) and Ssekakubo, Suleman, and Marsden (2011) also found a shortage of ICT infrastructure and support for e-learning, as well as a lack of funding and expertise among staff and students. While resources may be available for e-learning implementation, a lack of appropriate skills can still lead to its failure (Aydın & Tasci, 2005).

In conclusion, the research goal of identifying factors necessary for effective e-learning in universities was achieved. The examination of necessary factors found that all seven factors discussed are important.

6. CONCLUSION

E-learning has revolutionized the way knowledge is acquired and disseminated in the higher education sector, providing students and staff with the ability to share information through various e-learning platforms. However,

the sustainability and effectiveness of e-learning is not solely dependent on the technical infrastructure. Other factors play a significant role in determining its adoption within universities. This study aimed to identify and explore these influencing factors.

Despite the availability of modern e-learning platforms in some institutions, universities still face various challenges, such as limited technological resources, insufficient e-learning skills among staff and students, a lack of e-course design techniques, low awareness of the benefits of e-learning, and a lack of motivation to use e-learning systems. Furthermore, financial constraints often play a role in the sustainability of e-learning.

Effective e-learning is crucial for maximizing, utilizing, and sustaining its use within universities. However, there are several assumptions about the adoption and sustainability of e-learning that have yet to be proven. The focus of previous research has largely been on the adoption and acceptance of e-learning technologies, but this study shifted the attention towards promoting its sustainability and effectiveness.

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