Online Forum Interactions and Knowledge Co-construction in Higher Education: A Quantitative Analysis of Moroccan Universities

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Abstract:

This study examines the dynamics of online pedagogical forums in Moroccan higher education, addressing a significant gap in research regarding the processes of knowledge construction and instructor facilitation in these virtual spaces. The research tested two hypotheses: (H1) that instructors primarily conceptualize and implement forums as tools for collaborative knowledge construction rather than information dissemination, and (H2) that the depth and quality of knowledge co-construction positively correlates with social presence. Through an integrated theoretical framework combining social constructivism, the Community of Inquiry model, and Transactional Distance Theory, the study employed a quantitative approach, collecting data from 327 instructors across six major Moroccan universities through a bilingual web-based survey. Exploratory factor analysis identified four primary factors explaining 60.50% of the variance: Perceived Benefits of Online Interactions, Social Presence and Student Engagement, Instructional Strategies and Facilitation, and Challenges in Online Learning. The findings provided substantial support for both hypotheses, with 83.2% of instructors endorsing forums' role in collaborative knowledge construction and a strong positive correlation between perceived benefits and social presence ($r = .62$, $p < .01$). Analysis of variance revealed significant experience-related differences in both perceived benefits [$F(3, 323) = 4.32$, $p = .006$] and instructional strategies [$F(3, 323) = 3.58$, $p = .015$], with more experienced instructors demonstrating higher scores. However, significant challenges emerged, including low rates of perceived trust (37.9%) and limited multimedia integration (24.5%). These findings have important implications for Moroccan higher education policy, particularly regarding professional development programs and technological infrastructure support. The study contributes to understanding how social presence and knowledge construction manifest in diverse educational contexts while highlighting specific areas requiring development in Moroccan institutions transitioning toward comprehensive digital education strategies.

Keywords: online pedagogical forums, knowledge co-construction, social presence, Community of Inquiry, Moroccan higher education, e-learning

Introduction:

The integration of digital technologies in higher education has precipitated a fundamental transformation in pedagogical practices, particularly in how knowledge is constructed, shared, and validated within educational contexts (Anderson et al., 2001; Garrison & Arbaugh, 2007). This evolution represents one of the most significant paradigm shifts in contemporary academia, fundamentally altering traditional approaches to teaching and learning. Within this evolving landscape, online pedagogical forums have emerged as critical components of virtual

learning environments, serving as primary platforms for asynchronous discussion and collaboration among students and instructors (Andresen, 2009).

The significance of studying online interactions in pedagogical forums cannot be overstated, as these virtual spaces have become central to the e-learning experience in higher education. Drawing on social constructivist theories of learning (Vygotsky, 1978), researchers have established that the collaborative discourse facilitated by these forums plays a crucial role in deepening understanding and fostering critical thinking skills (Garrison et al., 2001). Additionally, these forums contribute significantly to the development of learning communities in e-learning contexts, with research demonstrating that the sense of community fostered through online interactions is a key factor in student persistence and satisfaction in distance education (Rovai, 2002).

In the Moroccan context, the trajectory of e-learning integration in higher education has been marked by systematic policy development and implementation of various technological initiatives. The National Charter for Education and Training (1999) marked the beginning of Morocco's strategic efforts to promote ICT integration in education, with Lever 10 specifically emphasizing the crucial role of educational technology in teaching systems and methods. This initial framework was followed by several significant initiatives, including the Moroccan Virtual Campus (2004), which led to the creation of University Resource Centers across all Moroccan universities, designed to support ICT integration in higher education through training faculty members and providing technological tools for educational practices.

The Génie Sup Program (2008) aimed to generalize the use of information and communication technologies in higher education, focusing on developing digital literacy among university stakeholders and promoting ICT integration in teaching, research, and institutional governance. The Injaz Operation (2009), launched as part of the Morocco Digital 2013 plan, provided substantial support by subsidizing up to 70% of laptop computer and internet subscription costs for engineering students, master's degree students, and doctoral candidates.

Subsequent initiatives included the successive "Morocco Digital 2013" and "Morocco Digital 2020" plans, which aimed to position the country within the digital economy and actively reduce the digital divide. These initiatives set ambitious targets, including enabling 50% of administrative procedures to be completed online and connecting 20% of small and medium-sized Moroccan enterprises to digital networks. The Strategic Vision for School Reform (2015-2030) further emphasized ICT integration, outlining recommendations for developing national

programs for educational technologies, establishing digital resource centers, and promoting distance learning.

Most recently, the "Pacte ESRI 2030" (Higher Education, Scientific Research and Innovation Pact 2030) represents a cornerstone of these modernization efforts, supported by legislative frameworks such as Framework Law No. 51.17 on the education, training, and scientific research system.

However, while research on e-learning and online interactions in Moroccan higher education is growing, it remains limited in scope and depth. Studies have primarily focused on implementation challenges (El Mhouti et al., 2018), student perceptions (Ouajdouni et al., 2021), and academic performance impact (Malaki & Kroum, 2022). There exists a notable gap in research specifically addressing the dynamics of online pedagogical forums within the Moroccan higher education context, particularly regarding the processes of knowledge construction and the role of instructor facilitation in these virtual spaces.

This study aims to address these gaps through a comprehensive quantitative examination of instructor perspectives on online pedagogical forums at several Moroccan universities. The research is guided by two primary hypotheses:

H1: Instructors in e-learning courses in Moroccan universities primarily conceptualize and implement forums as tools for facilitating collaborative knowledge construction among learners, rather than for information dissemination or individual assessment.

H2: The depth and quality of knowledge co-construction in online forums will be positively correlated with the level of social presence established among participants.

These hypotheses emerge from the theoretical intersection of social constructivism (Vygotsky, 1978), the Community of Inquiry framework (Garrison et al., 2000), and Transactional Distance Theory (Moore, 1993). This integrated theoretical framework provides a robust foundation for examining how knowledge is collaboratively constructed in online learning environments while considering the unique challenges of mediated communication.

The significance of this research extends beyond the immediate context of Moroccan higher education. By examining the dynamics of online forum interactions within a specific cultural and institutional setting, this study contributes to the broader understanding of how social presence and knowledge construction manifest in diverse educational contexts. Furthermore, the findings have practical implications for the design and implementation of e-

learning programs, particularly in institutions transitioning towards more comprehensive digital education strategies.

Theoretical Foundations of the Research

The theoretical framework underpinning this study integrates three primary theoretical perspectives that provide complementary insights into the nature of online learning and the processes of knowledge construction in digital environments. This integration offers a comprehensive lens through which to examine the complex dynamics of online pedagogical forums.

Social Constructivism as a Foundational Theory

Social constructivism, rooted in the work of Vygotsky (1978), serves as the primary theoretical pillar for this research. This perspective emphasizes that knowledge is constructed through social interaction and collaborative meaning-making, rather than through passive reception of information. In the context of online forums, social constructivism illuminates how learners actively build understanding through dialogue, shared experiences, and collective meaning-making processes. As Palincsar (1998) notes, social constructivism highlights "the interdependence of social and individual processes in the co-construction of knowledge" (p. 345), a principle particularly relevant to understanding the dynamics of asynchronous learning environments.

The Community of Inquiry Framework

Building upon social constructivist principles, the Community of Inquiry (CoI) framework developed by Garrison et al. (2000) provides a structured approach for analyzing the quality of online educational experiences. This model identifies three interdependent elements essential for successful online learning: cognitive presence, social presence, and teaching presence. As Garrison and Arbaugh (2007) articulate, "The framework assumes that learning occurs within the Community through the interaction of three core elements" (p. 158).

Cognitive presence, defined as "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse" (Garrison et al., 2001, p. 11), represents the core element related to knowledge construction. Social presence encompasses the ability of participants to project themselves socially and emotionally as 'real' people in the virtual environment. Teaching presence involves the design, facilitation, and direction of cognitive and social processes toward meaningful educational outcomes.

The CoI framework is particularly valuable for this study as it provides specific indicators and categories for analyzing how these three presences manifest in online forum interactions. The framework's emphasis on the interplay between social and cognitive elements aligns well with our research hypotheses regarding the relationship between social presence and knowledge construction.

Transactional Distance Theory

Complementing these perspectives, Transactional Distance Theory (TDT), proposed by Moore (1993), addresses the psychological and communication space that exists between learners and instructors in distance education settings. Moore and Kearsley (2011) explain that "the interplay of these variables determines the extent of transactional distance" (p. 209). The theory identifies three key variables that influence this distance:

1. Dialogue, which refers to the quality of communication and interaction between participants.

2. Structure, which encompasses the flexibility or rigidity of the educational program's design.

3. Learner autonomy, which relates to the degree of self-direction exercised by learners.

TDT provides valuable insights into how the design and facilitation of online forums can influence the perceived distance between participants and, consequently, the quality of learning interactions. This theoretical perspective is particularly relevant to understanding how instructors conceptualize and implement forum activities to promote meaningful dialogue and reduce transactional distance.

Integration of Theoretical Perspectives

The integration of these three theoretical frameworks provides a comprehensive foundation for examining online forum interactions in higher education. Social constructivism offers the fundamental principle that knowledge is socially constructed, the CoI framework provides specific indicators for analyzing the quality of online educational experiences, and TDT contributes understanding of how course design and dialogue influence the effectiveness of distance education.

This integrated theoretical framework guides our investigation of how instructors conceptualize and implement online forums (H1) and the relationship between social presence

and knowledge construction (H2). The framework suggests that effective online learning requires attention to both the social and cognitive dimensions of interaction, mediated by appropriate instructional design and facilitation strategies.

Moreover, this theoretical synthesis acknowledges the complex nature of online learning environments, where multiple factors interact to influence the quality of educational experiences. It provides a structured approach for examining how instructors navigate these complexities while attempting to create effective online learning communities.

Methodology

Research Design

This study employed a quantitative research design to examine instructor perspectives on online interactions in e-learning environments across multiple Moroccan universities. The choice of a quantitative approach aligns with the study's objectives of testing specific hypotheses about instructors' conceptualization of online forums and the relationship between social presence and knowledge construction. This methodological choice reflects what Johnson and Onwuegbuzie (2004) describe as the need to identify patterns and relationships through statistical analysis while maintaining objectivity and generalizability.

Sampling Strategy and Participants

The study employed a purposive sampling technique to recruit instructors involved in e-learning courses across multiple prominent Moroccan universities. The questionnaire was distributed to instructors at Mohammed First University in Oujda, Mohammed V University in Rabat, Cadi Ayyad University in Marrakech, Ibn Tofail University in Kenitra, Sidi Mohamed Ben Abdellah University in Fez, and Hassan II University in Casablanca. This multi-institutional approach was adopted to mitigate potential biases associated with single-institution studies and to capture a broader spectrum of e-learning practices across the country (Tight, 2012).

The sampling process resulted in a final sample of 327 instructors, representing a diverse cross-section of academic disciplines and institutional affiliations. The sample demonstrated balanced gender representation, with 52.9% female and 47.1% male participants. Academic disciplines were distributed across three main categories: Literature & Human Sciences (40.1%), Economics & Law (25.1%), and Science, Technology & Health (34.9%).

In terms of teaching experience, the majority of participants (63.6%) had more than 10 years of experience, with 22.0% having more than 20 years, 19.9% having 15-20 years, and 21.7% having 10-15 years of experience. The remaining participants were distributed between those with 5-10 years (22.6%) and less than 5 years (13.8%) of teaching experience. Regarding e-learning experience specifically, 41.9% had 3-6 years of experience, 20.8% had 6-9 years, 19.0% had more than 9 years, and 18.3% had less than 3 years of experience.

This sample size is considered adequate for the planned statistical analyses, including comparative analyses and correlation analysis (Comrey & Lee, 1992; Tabachnick & Fidell, 2019). The large sample enhances the statistical power of the analyses, allowing for more precise parameter estimates and increasing the likelihood of detecting significant effects.

Instrument Development and Structure

The survey instrument was developed based on an extensive review of literature and aligned with the theoretical frameworks underpinning this study. The questionnaire consisted of 35 items organized into seven sections:

1. Demographic Information: Collecting data on gender, teaching experience, e-learning experience, and academic discipline.
2. E-Learning Experience and Attitudes: Assessing participants' general orientations toward e-learning and online interactions.
3. Instructional Design and Facilitation Strategies: Examining the frequency and types of strategies used to facilitate online interactions.
4. Perceived Benefits of Online Interactions: Measuring instructors' perceptions of the advantages and outcomes of online forum use.
5. Social Presence in Online Learning: Evaluating perceptions of how effectively students establish social presence in online forums.
6. Perceptions of Student Learning Through Online Interactions: Assessing views on the relationship between online interactions and learning outcomes.
7. Challenges in Facilitating Online Interactions: Identifying the difficulties encountered in managing online forum activities.

Each section utilized a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) to facilitate quantitative analysis. The instrument was validated through pilot testing with a small group of instructors to ensure clarity, relevance, and comprehensiveness.

Data Collection and Analysis Procedures

The study employed a web-based survey methodology, with data collection conducted during the 2022-2023 academic year. To ensure maximum accessibility and response quality in the Moroccan higher education context, the survey was administered in both French and Arabic. The data analysis was conducted using IBM SPSS Statistics 27, encompassing several key analytical procedures. The analysis began with descriptive statistics to examine the demographic characteristics of the sample and the distribution of responses across questionnaire items.

An exploratory factor analysis was then conducted using principal axis factoring with promax rotation, which identified the underlying structure of the questionnaire items. The reliability of the identified scales was assessed through Cronbach's alpha coefficients. Comparative analyses were performed to examine potential differences in responses based on gender, teaching experience, e-learning experience, and academic discipline. Finally, correlation analysis was conducted to investigate the relationships among the identified factors, with particular attention to the associations between social presence and knowledge construction measures.

This analytical framework aligned directly with the study's research hypotheses while maintaining methodological rigor throughout the analysis process.

Results

Exploratory Factor Analysis Results:

The exploratory factor analysis yielded four primary factors that collectively explained 60.50% of the total variance in the questionnaire items. Table 1 presents these factors with their respective eigenvalues and variance contributions.

Factor	Eigenvalue	% of Variance	Cumulative %
1. Perceived Benefits of Online Interactions	8.12	28.97	28.97
2. Social Presence and Student	3.64	13.00	41.97
3. Instructional Strategies and Facilitation	2.95	10.53	52.50
4. Challenges in Online Learning	2.24	8.00	60.50

Table 1: Factor Analysis Results

Reliability Analysis:

Scale	Number of Items	Cronbach's Alpha
E-Learning Experience and Attitudes	5	0.87
Instructional Strategies and Practices	5	0.79
Perceived Benefits of Online Interactions	5	0.91
Social Presence in Online Learning	5	0.84
Perceptions of Student Learning and Knowledge Construction	5	0.88
Challenges in Online Interactions	5	0.82

Table 2: Cronbach's Alpha Reliability Coefficients

The analysis demonstrated strong internal consistency across all scales. Cronbach's alpha coefficients ranged from 0.79 to 0.91, with the highest reliability observed for the Perceived Benefits of Online Interactions scale ($\alpha = 0.91$), followed by Perceptions of Student Learning and Knowledge Construction ($\alpha = 0.88$), and E-Learning Experience and Attitudes ($\alpha = 0.87$).

E-Learning Experience and Attitudes:

Analysis of instructors' attitudes revealed predominantly positive orientations toward online learning. A significant majority (83.2%) of instructors agreed or strongly agreed that online interactions are crucial for effective e-learning. Table 3 presents the detailed distribution of responses.

Item	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
E-learning effectiveness	8.6	13.8	15.3	41.6	20.8
Confidence in facilitation	8.0	14.1	13.1	44.3	20.5
Importance of online interactions	3.1	4.0	9.8	41.0	42.2

Value of asynchronous discussions	3.4	4.9	13.1	44.6	33.9
Value of synchronous discussions	4.0	7.6	18.3	39.8	30.3

Table 3: E-Learning Experience and Attitudes percentage of responses

Instructional Strategies Implementation:

The frequency analysis of instructional strategies revealed varying levels of implementation. Table 4 presents these findings.

Strategy	Never	Rarely	Sometimes	Often	Always
Clear guidelines provision	1.8	6.1	16.2	41.0	34.9
Thought-provoking prompts	1.8	7.6	22.3	43.4	24.8
Active moderation	4.6	15.0	27.5	37.6	15.3
Peer interaction encouragement	1.2	5.5	23.5	46.2	23.5
Multimedia integration	23.9	23.2	28.4	19.9	4.6

Table 4:Frequency of Instructional Strategies Implementation (Percentage of Responses)

Correlation Analysis

The analysis revealed significant correlations among the four identified factors. Table 4 presents the correlation matrix.

Factor	1	2	3	4
1. Perceived Benefits	1.00			
2. Social Presence and Student Engagement	.62**	1.00		
3. Instructional Strategies and Facilitation	.47**	.41**	1.00	
4. Challenges in Online Learning	.38**	.35**	.25**	1.00

Table 5: Correlations Among Primary Factors

Note: **$p < .01$

The strongest correlation was observed between Perceived Benefits and Social Presence and Student Engagement (r = .62, p < .01), supporting the hypothesized relationship between these constructs. Moderate correlations were found between Instructional Strategies and both Perceived Benefits (r = .47, p < .01) and Social Presence (r = .41, p < .01).

Comparative Analyses:

E-Learning Experience Differences:

One-way ANOVA revealed significant differences based on e-learning experience in both perceived benefits [F(3, 323) = 4.32, p = .006] and instructional strategies [F(3, 323) = 3.58, p = .015]. Table 6 presents the mean scores across experience levels.

Experience Level	Perceived Benefits	Instructional Strategies
< 3 years	3.71 (0.83)	3.82 (0.76)
3-6 years	3.79 (0.78)	3.90 (0.73)
6-9 years	3.87 (0.74)	3.96 (0.69)
> 9 years	4.08 (0.71)	4.12 (0.67)

Table 6: Mean Factor Scores by E-Learning Experience

Post-hoc Tukey HSD tests indicated that instructors with more than 9 years of e-learning experience had significantly higher scores on the Perceived Benefits factor compared to those with less than 3 years (p = .003) and 3-6 years of experience (p = .044).

Academic Discipline Differences:

Analysis of variance showed no significant differences among academic disciplines:

Factor	Literature & Human Sciences	Economics & Law	Science, Technology & Health	F	p
Perceived Benefits	3.86 (0.75)	3.80 (0.79)	3.83 (0.78)	0.17	.846
Social Presence	3.52 (0.88)	3.46 (0.91)	3.49 (0.90)	0.16	.852
Instructional Strategies	3.95 (0.70)	3.89 (0.74)	3.91 (0.73)	0.22	.802
Challenges	3.85 (0.81)	3.80 (0.84)	3.82 (0.83)	0.12	.887

Table 7: Mean Factor Scores by Academic Discipline

Gender Comparisons:

Independent samples t-tests revealed no significant differences between male and female instructors on any of the factors. Table 8 represents Mean Factor Scores by gender (standard deviations in parentheses)

Factor	Male (n = 154)	Female (n = 173)	t	p
Perceived Benefits	3.82 (0.79)	3.85 (0.76)	-0.35	.726
Social Presence	3.47 (0.91)	3.51 (0.88)	-0.40	.689
Instructional Strategies	3.90 (0.73)	3.93 (0.71)	-0.37	.711
Challenges	3.81 (0.84)	3.83 (0.81)	-0.22	.826

Table 8:Mean Factor Scores by Gender

Social Presence and Knowledge Construction:

Analysis of social presence indicators revealed that while 74.0% of instructors recognized its importance for learning quality, lower percentages were observed for specific aspects:

- 58.1% reported effective student personality projection

- 37.9% perceived strong trust among participants

- 44.1% reported successful relationship formation

Discussion

The findings of this study provide significant insights into how online pedagogical forums function within Moroccan higher education, particularly concerning instructors' perspectives and practices. This discussion examines the results in relation to our research hypotheses and theoretical framework.

Collaborative Knowledge Construction in Online Forums:

The results provide substantial support for our first hypothesis (H1), which posited that instructors primarily conceptualize and implement forums as tools for facilitating collaborative knowledge construction. The high percentage of instructors (83.2%) who view online interactions as crucial for effective e-learning, coupled with the strong endorsement (78.6%) of forums' role in facilitating collaborative knowledge construction, aligns with social constructivist principles (Vygotsky, 1978). This finding suggests a significant shift in Moroccan higher education towards more constructivist approaches to online learning.

The implementation patterns of instructional strategies further support this hypothesis. The high rates of providing clear guidelines (75.9%), encouraging peer interaction (69.7%), and

using thought-provoking prompts (68.2%) demonstrate a deliberate effort to create what Garrison et al. (2001) term "cognitive presence" in online learning environments. However, the relatively low rate of multimedia integration (24.5%) indicates an area for potential development in instructional practice, particularly given the increasing importance of multimodal learning in online environments.

Social Presence and Knowledge Co-construction:

The strong positive correlation ($r = .62$, $p < .01$) between perceived benefits of online interactions and social presence provides robust support for our second hypothesis (H3). This finding aligns with the Community of Inquiry framework (Garrison et al., 2000), which emphasizes the interdependence of social and cognitive presence in online learning environments. However, the data reveals a complex picture regarding the implementation of social presence.

While instructors strongly recognize the importance of social presence (74.0%), the lower rates of perceived trust (37.9%) and successful relationship formation (44.1%) suggest significant challenges in fostering deep social connections in online environments. This disparity between recognition and implementation echoes previous findings by Tu and McIsaac (2002) regarding the challenges of establishing social presence in virtual learning spaces.

Experience-Related Variations:

A particularly noteworthy finding is the significant impact of e-learning experience on instructors' perspectives and practices. The analysis revealed that instructors with more than nine years of e-learning experience demonstrated significantly higher scores in both perceived benefits [$F(3, 323) = 4.32$, $p = .006$] and implementation of instructional strategies [$F(3, 323) = 3.58$, $p = .015$]. This finding suggests that experience plays a crucial role in developing effective online teaching practices and recognizing the benefits of online interactions.

The findings have several important implications. For institutional practice and policy in Moroccan higher education the implications concern three main aspects:

1. Professional Development: The significant impact of experience on teaching effectiveness suggests the need for comprehensive professional development programs focused on online pedagogy and forum facilitation.

2. Trust Building: The relatively low perception of trust among participants (37.9%) indicates a need for strategies specifically designed to enhance social presence and build community in online learning environments.

3. Technological Integration: The limited use of multimedia resources (24.5%) suggests the need for both technological infrastructure development and training in multimedia integration for online learning.

Regarding theoretical implications, these findings contribute to the theoretical understanding of online learning in several ways. First, they provide empirical support for the Community of Inquiry framework's emphasis on the interrelationship between social and cognitive presence in online learning environments. Second, they suggest that the development of effective online teaching practices may follow a trajectory that requires substantial experience, indicating a potential temporal dimension to the development of teaching presence that merits further investigation.

Conclusion

This study provides significant insights into the dynamics of online forum interactions in Moroccan higher education, contributing to our understanding of how instructors conceptualize and implement these digital learning spaces. The findings demonstrate strong support for both research hypotheses, indicating that instructors primarily view forums as tools for collaborative knowledge construction and revealing a significant relationship between social presence and the effectiveness of online interactions.

The results highlight several key conclusions. First, there is clear evidence of a shift toward constructivist approaches in Moroccan higher education, with instructors actively implementing strategies to support collaborative learning in online forums. Second, the strong correlation between social presence and perceived benefits of online interactions underscores the crucial role of social elements in effective online learning environments. Third, the significant impact of e-learning experience on instructors' perspectives and practices suggests the importance of sustained professional development in enhancing online teaching effectiveness.

However, the study also reveals important challenges that need to be addressed. The relatively low rates of perceived trust and relationship formation in online forums indicate difficulties in establishing deep social connections in virtual environments. Additionally, the

limited integration of multimedia resources suggests a need for enhanced technological infrastructure and training.

Nevertheless, several limitations should be considered when interpreting these findings. The study relied on self-reported data from instructors, which may not fully capture the complexity of online forum interactions. Additionally, the focus on instructor perspectives, while valuable, does not provide insight into student experiences and outcomes. Furthermore, the cross-sectional nature of the study limits our understanding of how online forum practices evolve over time.

Future research could address these limitations by Incorporating direct observation of online forum interactions to complement self-reported data. They could also include student perspectives and experiences in the analysis. Future work might as well consider conducting longitudinal studies to examine how online forum practices develop over time besides investigating the specific strategies that most effectively promote trust and relationship building in online learning environments within the Moroccan context

The findings of this study have important implications for practice and policy in Moroccan higher education. They suggest the need for sustained investment in professional development, technological infrastructure, and support systems for online learning. Moreover, they highlight the importance of developing strategies specifically designed to enhance social presence and build community in online learning environments.

These results contribute to both theoretical understanding and practical implementation of online learning in higher education, particularly in contexts undergoing digital transformation. By illuminating the complex interplay between social presence, instructional strategies, and learning outcomes in online forums, this study provides valuable insights for educators and administrators working to enhance the effectiveness of online education in Morocco and similar educational contexts.

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