



Digital Transformation in Moroccan Higher Education: Challenges and Opportunities at Mohammed V University in Rabat

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Abstract

This qualitative study explores the digital transformation in Moroccan higher education. It focuses on student experiences at Mohammed V University in Rabat. The research addresses how students perceive digital transformation's impact on learning experiences and academic engagement. It also examines the challenges and opportunities associated with adapting to e-learning platforms and digital tools. The study employs a phenomenological approach, using in-depth semi-structured interviews with 10 undergraduate students from the EFL program. Phenomenological thematic analysis was used to identify recurring patterns and themes in the data. Findings suggest that students perceive digital transformation as both enhancing and challenging their learning experiences. While many appreciate the flexibility and accessibility of digital resources, others report difficulties in maintaining motivation and engagement in online environments. Students also face technical issues and digital literacy gaps. The research contributes to the growing literature on digital transformation in higher education by offering insights from a Moroccan context. It highlights the need for tailored support systems and pedagogical approaches that address students' specific needs and experiences in digitally transformed learning environments. The findings have implications for university administrators and policymakers seeking to develop strategies for effective digital technology integration in higher education.

1. Introduction

The digital transformation of higher education has become a global phenomenon. It reshapes teaching, learning, communication, and institutional practices across universities worldwide. In Morocco, this transformation has gained particular significance, particularly following the COVID-19 pandemic outbreak. The pandemic accelerated the adoption of online and technology-enhanced learning across higher education institutions (Gopika & Rekha, 2023). The pandemic highlighted both the opportunities and the limitations of digital education. This has encouraged universities to rethink conventional instructional approaches and invest in more flexible and technology-supported learning environments.

As Moroccan universities continue to embrace educational digitalization, understanding the student perspective has become increasingly important. Students' perceptions can inform the effective implementation, evaluation, and continuous improvement of technology-enhanced learning initiatives. Moroccan universities have been at the forefront of this educational transformation. They have implemented various e-learning platforms and digital tools to improve teaching practices, expand access to educational resources, and enhance student engagement and learning outcomes (Oujadouni, 2024). However, the success of these

initiatives largely depends on how students perceive and interact with these technology-mediated learning environments (Ferouali & Ouhadi, 2023). Students' experiences, attitudes, and levels of digital readiness play a critical role in determining whether these technological innovations translate into meaningful educational improvements.

This study aims to explore undergraduate students' experiences at Mohammed V University as they navigate a technology-enhanced learning environment. It focuses on students' perceptions of how the integration of digital technologies influences their learning experiences and academic engagement. Furthermore, this research aims to identify the challenges students face in adapting to e-learning platforms and digital tools, including technological, pedagogical, and digital literacy-related barriers. It also examines the opportunities they perceive in this evolving educational context. By examining students' lived experiences, the study seeks to provide a deeper understanding of how digital technologies shape learning practices, participation, and interactions within Moroccan higher education.

The significance of this study lies in its potential to inform policy and enhance practice in Moroccan higher education. As universities continue to invest in digital infrastructure, learning management systems, and innovative pedagogical approaches. It becomes essential to ensure that these investments effectively respond to students' educational needs and expectations. Moreover, insights from the student perspective can guide the development of more effective and student-centered digital learning environments. This study contributes to the growing body of literature on technology integration and educational digitalization in higher education. It offers valuable insights from a Moroccan context, where empirical qualitative research on students' lived experiences remains relatively limited.

Research Problem

The rapid digital transformation of higher education in Morocco, accelerated by the COVID-19 pandemic, has led to the widespread integration of digital technologies into teaching and learning practices. While these technological innovations are intended to enhance learning accessibility, flexibility, and engagement, their effectiveness ultimately depends on how students experience, interpret, and adapt to digitally mediated learning environments. Universities such as Mohammed V University in Rabat have implemented various e-learning platforms and digital tools; however, there is limited research on students' lived experiences of these changes, particularly within the Moroccan higher education context. Existing studies have largely focused on technology adoption, institutional readiness, or the technical aspects of digitalization, leaving students' perceptions and experiences underexplored. As a result, there remains insufficient understanding of how digital technologies influence students' academic engagement, learning experiences, and adaptation to new educational practices. This knowledge gap hinders the development of evidence-based strategies for improving digital learning environments and ensuring that technological investments effectively support students' educational needs. Therefore, this study seeks to address this gap by exploring undergraduate students' experiences and perceptions of digital transformation at Mohammed V University, thereby contributing to a more student-centered understanding of digitalization in Moroccan higher education.

Research Objectives

The study explores undergraduate students' perceptions of the impact of digital transformation on their learning experiences and academic engagement at Mohammed V University in Rabat. It identifies the key challenges faced by students in adapting to e-learning platforms and digital tools in their higher education experience. It also examines the opportunities that students perceive and provides insights that can inform policy and practice for more effective implementation of digital transformation strategies in Moroccan higher education institutions.

Research Questions

Through a qualitative, phenomenological approach, this research addresses two primary questions.

1- How do undergraduate students at Mohammed V University perceive the digital transformation and its impact on their learning experiences and academic engagement?

2- How do undergraduate students experience and interpret the challenges and opportunities associated with e-learning platforms and digital tools at Mohammed V University?

To situate the study within the existing body of knowledge, the following section reviews the literature on digital transformation in higher education. Particular attention is given to students' experiences, the opportunities and challenges associated with technology integration, and its implications for teaching quality and academic engagement. This review provides the theoretical and empirical foundation for the present study and identifies the research gap that this study seeks to address within the Moroccan higher education context.

2. Literature Review

Digital transformation in higher education refers to the integration of digital technologies into all areas of educational institutions. Key components include the adoption of e-learning platforms, learning management systems, and emerging technologies such as artificial intelligence and virtual reality (Mansoori et al., 2023). This transformation aims to enhance teaching and learning experiences. It also improves administrative efficiency and prepares students for a digital future. However, challenges such as high implementation costs, resistance to change, and the need for continuous technological updates persist (Scholkmann, 2021). The growth of e-learning platforms and online courses has been significant, with Coursera reporting more than 20 million new learners in 2021 (Coursera, 2021). This surge was further accelerated by global events such as the COVID-19 pandemic, which forced many institutions to rapidly adopt remote learning solutions. Educators have adopted new pedagogical approaches that leverage digital tools for more interactive and engaging learning experiences. Student engagement in online environments has shown mixed results. Studies have highlighted both opportunities for engagement and difficulties in maintaining engagement in online learning environments (Bond, 2020; Hollister et al., 2022).

Learning Management Systems (LMS) have become integral to higher education. They facilitate course management, student-teacher interactions, and assessment processes. Artificial Intelligence is revolutionizing personalized learning. It analyzes individual learning patterns and adapts content delivery to meet specific student needs. AI-powered personalized learning can significantly improve student learning outcomes. Virtual and Augmented Reality technologies enhance learning experiences in different fields. They allow students to interact with complex concepts in three-dimensional space (Zhao et al., 2023). The adoption of digital technologies in Moroccan rapidly education is highly evolving. Most, if not all, institutions recognize the need for technological integration to remain competitive globally. Government initiatives and policies are increasingly supporting digitalization. They aim to modernize the education sector and prepare students for a digital future. Case studies of digital transformation at major Moroccan universities, such as Mohammed V University in Rabat, highlight the implementation of e-learning centers. They also highlight the adoption of platforms like Moodle for online courses and the development of comprehensive digital strategies (Kerrouch & Bouazizi, 2023).

Infrastructure and technological barriers remain significant challenges in Morocco. Access to reliable internet and digital devices may be limited, especially in rural areas. Faculty training and adaptation to new technologies are crucial. Ongoing professional development is needed to ensure the effective use of digital tools in teaching. Student readiness and access issues also need to be addressed to ensure equitable participation in digital learning environments. These challenges underscore the need for a holistic approach to digital transformation that considers both technological and human factors (Kohnke, 2016).

Digital transformation has shown positive effects on student engagement and performance. Studies report improvements in academic performance through AI-powered personalized learning (Owusu et al., 2024) (Jian, 2023). Assessment methods are evolving to incorporate digital tools that enable more frequent and varied forms of evaluation. However, this shift also raises concerns about academic integrity in online environments. The development of digital skills through technology-enhanced learning is increasingly important for future employability, preparing students for a rapidly evolving job market. Digital transformation in higher education holds the potential to better prepare graduates and enhance their competitiveness in the global job market and contribute to the country's economic development (Chanda et al., 2024) (Mohd Nong et al., 2024).

While significant research has been conducted on digital transformation in higher education globally, several gaps exist in the context of Moroccan universities that this study aims to address:

Limited focus on student perspectives: Most existing studies on digital transformation in Moroccan higher education have focused on institutional strategies and challenges (Mohammed Anouar et al., 2023). There is a lack of in-depth research on how students perceive and experience this digital shift, particularly regarding its impact on their learning experiences and academic engagement.

Lack of comprehensive analysis of challenges and opportunities: While some studies have identified general challenges in implementing digital transformation, there is a need for a more comprehensive understanding of the specific obstacles and opportunities faced by students in adapting to e-learning platforms and digital tools in the Moroccan context (Ouajdouni et al., 2021).

Insufficient attention to digital literacy and skills development: Current research does not adequately address how digital transformation impacts the development of digital skills among Moroccan students, which is crucial for their future employability (Mohd Nong et al., 2024).

By addressing these gaps, this study contributes to a more comprehensive understanding of digital transformation in Moroccan higher education. It provides valuable insights for policymakers, university administrators, and educators to enhance the effectiveness of digital learning initiatives.

3. Methodology

3.1 Research Design

The study adopts van Manen's (2007) hermeneutic phenomenological approach, which seeks to understand and interpret the meanings individuals assign to their lived experiences. This approach is particularly suitable for examining how undergraduate students experience and make sense of digital transformation in higher education. Rather than focusing solely on describing experiences, hermeneutic phenomenology aims to uncover the meanings embedded within participants' narratives and the ways in which individuals interpret their interactions with the world around them. To enhance the trustworthiness of the study, the researcher engaged in bracketing by continuously reflecting on personal assumptions and prior knowledge regarding digital learning throughout the research process. This approach enabled the study to move beyond simple descriptions of digital technology use and to explore the meanings students attached to their experiences. It provided a deeper understanding of digital transformation in Moroccan higher education.

3.2 Population

The study focuses on undergraduate students, between the ages of 19 and 24, enrolled at Mohammed V University in Rabat, Morocco. Mohammed V University provides a diverse academic environment with approximately 75,400 students across various disciplines. This population provided a rich context for exploring the experiences of students in digitally

transformed learning environments, particularly within the English as a Foreign Language (EFL) program.

3.2.1 Sample Size

The study involved 10 undergraduate EFL students enrolled in Semester 2 (S2) and Semester 6 (S6) at Mohammed V University. Participants were selected purposively based on their experience with the university's digital learning environment and their use of e-learning platforms and digital tools. The inclusion of students from both semesters was intended to capture perspectives from different stages of undergraduate study, allowing for a broader understanding of how students experience and adapt to technology-enhanced learning throughout their academic journey. The sample size was considered appropriate for phenomenological research, which prioritizes depth and richness of participants' lived experiences over statistical generalization (Creswell & Poth, 2017). Data collection continued until thematic saturation was reached, with no substantially new themes emerging from subsequent interviews. The final sample provided sufficient variation and depth to address the study's objectives.

3.2.2 Sampling Method

Purposive sampling was employed to select participants who could provide relevant insights into the study's exploration of students' experiences in digitally transformed learning environments. Participants were recruited from the EFL program at Mohammed V University through direct invitation and selected based on their enrollment in S2 or S6, experience with the university's e-learning platforms and digital learning tools, and willingness to participate in the study. Students with little or no exposure to digital learning technologies were excluded, as they could not adequately contribute to the investigation of the phenomenon under study. This sampling strategy ensured access to information-rich participants with firsthand experience of technology-enhanced learning. However, as with any purposive sampling approach, the possibility of selection bias cannot be entirely eliminated, since participation may have attracted students who were more engaged with or opinionated about digital learning. To mitigate this limitation, efforts were made to include participants with varied experiences and perspectives to enhance the credibility and richness of the data (Creswell & Poth, 2017).

3.3 Data Collection Methods

Semi-structured interviews were used as the primary data collection method. They enabled participants to describe their experiences and perceptions in detail. They also allowed the researcher to explore emerging issues relevant to the study objectives (Creswell & Poth, 2017). An interview guide was developed based on the research questions and relevant literature and was pilot-tested with one EFL student to assess the clarity and relevance of the questions. Following the pilot interview, minor adjustments were made to improve question sequencing and wording.

Interview Protocol

The interview guide consisted of five open-ended questions designed to explore students' experiences of digital transformation in higher education. The questions focused on the impact of digital transformation on learning experiences, the use of e-learning platforms and online resources, academic engagement and collaboration, challenges associated with digital tools, and the opportunities created by technology-enhanced learning. To obtain richer descriptions and clarify participants' responses, follow-up questions were used when necessary.

Translation Procedure

Participants were given the option of being interviewed in either English or Arabic to ensure that they could express their experiences comfortably and accurately. Interviews conducted in Arabic were translated into English by the researcher, who is proficient in both

languages. The translated transcripts were subsequently reviewed against the original recordings to ensure accuracy and preserve the intended meanings of participants' responses.

Ethical Considerations and Data Security

Prior to data collection, participants were informed of the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any stage without penalty. Informed consent was obtained before the interviews were conducted. All interviews were recorded with participants' permission using MP3 recording software, and the recordings and transcripts were stored securely to protect participants' confidentiality and ensure data security.

Data Analysis Preparation

Following data collection, the interviews were transcribed and translated into English when necessary. The transcripts were then reviewed repeatedly to ensure familiarity with the data before the coding and thematic analysis processes were undertaken.

Table 1. Interview Questions

#	Interview Question
1	Can you describe how digital transformation has impacted your learning experience at Mohammed V University?
2	What has been your experience with using e-learning platforms, virtual classrooms, or online resources?
3	How has digital transformation affected your ability to engage with your studies and collaborate with classmates?
4	What challenges have you encountered while using digital tools for learning?
5	What opportunities do you think digital transformation has provided for your education?

The interview guide provided a consistent framework across interviews while allowing participants to reflect openly on their experiences with digital learning tools and platforms.

3.4 Data Analysis

Data were analyzed using a phenomenological thematic approach informed by van Manen's (2007) hermeneutic phenomenology. The interview transcripts were read repeatedly to gain familiarity with participants' experiences and perspectives. Meaningful statements and experiential descriptions related to digital transformation were identified and coded. Similar codes were then grouped into broader themes that reflected common patterns across participants' narratives. Throughout the analysis, the researcher engaged in bracketing and reflexive note-taking to minimize the influence of personal assumptions and ensure that interpretations remained grounded in the participants' lived experiences. The final themes represented shared meanings that characterized students' experiences of digitally transformed learning environments.

4. Results

The analysis of the data revealed four interconnected themes that captured the complexities of digital transformation in higher education:

4.1 A Dual Edged Sword

Students' perceptions of digital transformation reflected contrasting opinions. "It is important in our life still it has two roles: one as an enabler and the other as a disruptor". All students appreciated the accessibility of online platforms (e.g. Moodle and Google Classroom ...) for accessing resources and submitting assignments. They praised the flexibility of these platforms, particularly after the Covid-19 outbreak. "I can revisit resources whenever I feel like... this is really amazing, it saves time and energy...". They were also satisfied with the changes digitalization brought to their personal and professional lives. They were excited to experience new developments. However, students mentioned some concerns related to internet reliability. "The university assumes everyone has equal access, but it is not true". Moreover, Students reported problems with the platforms they used. They stated that the platforms sometimes did not function smoothly. Some of them described their first experiences using Google Classroom and Rosetta, mentioning how difficult these platforms were initially to

access and use. This difficulty was mainly attributed to their lack of familiarity with the digital platforms. Thus, the findings indicate a need for institutional policies that address infrastructure limitations and inequalities in access.

4.2 Mismatched Tools and Needs

Students reported divergent experiences with e-learning platforms. They appreciated the support these platforms provided but also reported several limitations. “All my course materials are not in one place.” Not all professors used the platforms consistently, which led to confusion. Moreover, some students expressed a preference for WhatsApp over other digital tools and platforms for communication: “It is easier and faster.” This reflected a mismatch between platform design and users’ needs. Subject-specific limitations were also evident. Pre-recorded lectures proved inadequate for some aspects of EFL learning. “It is impossible to practice pronunciation effectively.” Even when using Rosetta, students reported technical problems, particularly when recording their responses for pronunciation checks. These experiences suggest that digital tools need to be adapted to disciplinary pedagogical needs to remain effective.

These findings also indicate that the effectiveness of digital transformation depends not only on the availability of technological tools but also on their suitability for specific learning purposes. Students’ preference for familiar communication tools and their difficulties with some institutional platforms suggest that technology adoption alone does not necessarily result in effective learning experiences. In the EFL context, this issue becomes particularly relevant because language learning requires interaction, immediate feedback, and opportunities to practice productive skills such as speaking and pronunciation. Digital platforms should therefore be selected and implemented according to both students’ needs and the pedagogical requirements of the discipline.

4.3 Reconfigured Connections

Digital transformation reshaped engagement in three main ways: engagement with course materials, instructor accessibility, and peer interaction. Students reported that access to course materials facilitated their engagement with course content. “I enjoy learning at my own pace, and I like the fact that I can schedule my learning time according to my availability.” Students also reported that the materials provided supported their learning and served as useful sources of knowledge. “All the materials provided are helping in one way or another.” Moreover, students reported improved access to their instructors and better communication with professors via email and Google Classroom. “Professors reply faster to emails.” These experiences indicate that digital tools facilitated formal academic support. However, students reported that the online environment reduced peer interaction and provided fewer opportunities for meaningful pair or group work. Even when assignments were completed in groups, students reported that cooperation was limited, as each student tended to complete their part individually before combining the different parts into a final product.

The findings also show that student engagement in digital environments involved different forms of interaction. Greater access to course materials and instructors did not necessarily lead to stronger interaction among students. While digital platforms supported individual engagement by allowing students to manage their learning more independently, participants reported fewer opportunities for meaningful peer collaboration online. This distinction is important because university learning involves not only access to information but also interaction and participation with others. These findings suggest that digital learning strategies should balance opportunities for learner autonomy with collaborative activities that encourage meaningful peer interaction and preserve the social dimension of the learning experience.

4.4 Balancing Convenience with Emotional Needs

Most students used the word “comfort” when talking about digital transformation. They associated it with financial convenience, particularly when learning took place without the need

to travel to university. Students also used the term to describe their growing familiarity with digital modes of learning. As they became more familiar with how digital tools worked, they reported feeling more comfortable using them.

“It wasn’t easy at the beginning when I first joined Google Classroom... I didn’t have a personal email... now I feel great comfort using these digital tools at university”

However, students reported that digitalization reduced student-teacher and student-student interaction and expressed a preference for face-to-face teaching and learning.

“I don’t feel comfortable; I prefer face-to-face learning in traditional classroom setting. Yes, digitalization has facilitated the learning process. It provides us with a lot of opportunities. Yet, we lack the comfort we are enjoying in traditional classes...”

Students emphasized that digitalization could not fully replace the role of professors, particularly in providing guidance and emotional support. They perceived these human dimensions as less available in digitally mediated learning environments.

5. Discussion

The findings of this study provide a meaningful perspective on digital transformation in Moroccan higher education. They highlight both its benefits and challenges. By synthesizing the themes identified, this discussion explores the implications of these results for students, educators, and policymakers.

The study underscores the dual nature of digital transformation as both an enabler and a disruptor. On the one hand, students appreciated the accessibility and flexibility offered by online platforms such as Moodle and Google Classroom. These tools allowed for efficient resource management and asynchronous learning, which were particularly beneficial in the participants’ learning experiences. Students’ ability to revisit materials at their convenience demonstrated how digitalization could support self-directed learning and reduce time constraints. However, consistent with Kohnke (2016), challenges related to infrastructure inequities and platform functionality cannot be overlooked. Limited internet access and technical issues with platforms created barriers to equitable participation. These findings emphasize the need for institutional policies that prioritize infrastructure development and address disparities in access to digital tools, a concern also highlighted by Kerrouch and Bouazizi (2023) in their analysis of Moroccan universities.

Table 2. Advantages and Disadvantages of Digital Transformation in Higher Education

Advantages	Disadvantages
Accessibility and Flexibility	Infrastructure Inequities
Students can access resources anytime and anywhere, enabling self-paced learning and reducing time constraints.	Limited internet access creates barriers to equitable participation.
Efficient Resource Management	Platform Functionality Issues
Online platforms like Google Classroom allow centralized access to educational materials and assignments.	Technical difficulties and unfamiliarity with digital platforms like Moodle hinder usability.
Enhanced Communication with Instructors	Reduced Peer Interaction
Digital tools improve communication with professors, fostering academic support through faster responses to emails.	Online environments limit opportunities for meaningful collaboration and group work among students.
Cost Savings	Emotional Discomfort
Reduced commuting and relocation expenses provide financial benefits to students.	Reduced human interaction leads to emotional discomfort and a lack of interpersonal engagement.
Development of Digital Skills	Mismatch Between Tools and Needs
Familiarity with digital tools enhances students' adaptability to technological advancements.	Platforms may not adequately address specific academic needs, such as EFL pronunciation practice, leading to inefficiencies.
Autonomy in Learning	Resistance to Change
Students can schedule their learning according to their availability, fostering independence.	Inconsistent platform use by instructors creates confusion among students.

E-learning platforms were perceived as effective in providing centralized resources and enabling communication. Yet, their design often failed to align with users' needs. Students expressed frustration over inconsistent use of platforms by professors, which led to confusion and inefficiencies. The preference for informal tools like WhatsApp over formal platforms highlighted a disconnection between institutional choices and user preferences. Furthermore, students reported subject-specific limitations, including difficulties in practicing EFL pronunciation through pre-recorded lectures or Rosetta software. This aligns with Zhao et al. (2023), who indicate that digital tools must be adapted to disciplinary pedagogies to maximize their effectiveness. This mismatch calls for a more tailored approach to platform design and implementation that considers the unique requirements of different academic disciplines.

Digital transformation has redefined engagement in higher education, as noted by Bond (2020) and Hollister et al. (2022). Access to digital resources enhanced students' ability to engage with course content on their own terms, fostering autonomy and personalized learning experiences. Communication with professors via email or online platforms strengthened academic support structures. However, the reduction in peer interaction was a notable drawback of digitalization. The lack of collaborative opportunities in online environments limited students' ability to engage in meaningful group work and develop interpersonal skills. These findings suggest that while digital tools can enhance individual learning experiences, they must also be designed to facilitate social learning and collaboration.

Students frequently associated digital transformation with comfort. Financial savings from reduced commuting costs, ease of accessing resources, and familiarity with digital tools over time contributed to this sense of convenience. However, emotional discomfort stemming from reduced human interaction remained a significant concern. Many students expressed a preference for face-to-face learning environments that offer guidance and emotional support from instructors. This finding aligns with Chanda et al. (2024) and Mohd Nong et al. (2024), who emphasize the importance of emotional support and guidance in educational settings. The results suggest that while digital tools can enhance efficiency, they cannot fully replace the human elements of teaching and learning.

Taken together, the four themes reveal that students experienced digital transformation as more than a change in the tools used for learning. From a phenomenological perspective, students attached different meanings to digitalization depending on how it shaped their access to knowledge, communication, participation, and interaction with instructors and peers. Flexibility and accessibility were associated with convenience and greater autonomy, whereas technical difficulties and reduced human interaction were associated with frustration and discomfort. These contrasting experiences highlight the importance of considering students' lived experiences when designing digital learning environments. In the Moroccan higher education context, effective digitalization therefore requires reliable infrastructure and appropriate platform design while also addressing the pedagogical and interpersonal dimensions of university learning.

6. Conclusion

The study can provides valuable insights into the complexities of digital transformation in Moroccan higher education. It reveals its multifaceted impact on students' learning experiences. To maximize the benefits of digital transformation while mitigating its drawbacks, several recommendations emerge from the findings:

- Policymakers should prioritize investments in reliable internet access and digital devices.
- Institutions should collaborate with educators and students to develop platforms that align with disciplinary needs and user preferences.
- Faculty training programs should focus on equipping educators with the skills needed to effectively integrate digital tools into their teaching practices.
- Combining online learning with face-to-face interactions can address emotional discomfort while leveraging the advantages of digitalization.

- Universities should involve students in decision-making processes related to digital transformation initiatives to ensure their perspectives are adequately represented.

By addressing these recommendations, Moroccan universities can create more inclusive and effective digital learning environments. The findings not only contribute to a better understanding of the current state of digital transformation in Moroccan higher education but also offer actionable insights for enhancing its implementation in similar higher education contexts.

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