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Conditional Optimism and Contextual Factors in Academic Staff Adoption of AR/VR for Student Assessment

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Abstract

The integration of augmented reality (AR) and virtual reality (VR) technologies is rapidly transforming educational environments, yet their application in student assessment remains underexplored, particularly within higher education. This study investigates the intentions and determinants influencing academic staff's adoption of AR and VR for student assessment in Turkish universities, drawing on the Theory of Planned Behavior (TPB) and supplementary technology acceptance frameworks. Employing a qualitative research design, semi-structured interviews were conducted with 30 academic staff members representing diverse disciplines and levels of experience. Thematic analysis revealed that attitudes, subjective norms, and perceived behavioral control are foundational predictors of adoption intention; however, their influence is substantially mediated by contextual factors such as institutional readiness, innovation climate, and a newly identified construct conditional optimism. Findings highlight the necessity of robust infrastructure, targeted professional development, and supportive organizational culture for successful AR/VR integration. The study proposes theoretical and practical insights for policymakers, institutional leaders, and technology developers. This research advances understanding of technology adoption in educational assessment and provides a roadmap for future studies and implementation strategies.

Keywords: Student assessment, higher education, augmented reality, virtual reality, technology adoption, conditional optimism.

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Introduction

The accelerating pace of technological innovation has profoundly transformed educational environments worldwide, with augmented reality (AR) and virtual reality (VR) technologies becoming increasingly prominent in classrooms, laboratories, and other learning settings (Lee et al., 2024). These immersive technologies hold significant promise for enhancing the quality and effectiveness of student assessment by enabling more interactive, authentic, and individualized evaluation processes (Akçayır & Akçayır, 2017; Radianti et al., 2020). Through multisensory experiences and dynamic feedback, AR and VR can enrich both formative and summative assessments, providing educators with powerful tools to better gauge student understanding and engagement (Moro et al., 2021; Vola et al., 2025).

While previous research has amply documented the pedagogical benefits of AR and VR technologies in teaching and learning reporting consistent improvements in student motivation, academic achievement, and classroom engagement (Amirbekova et al., 2024; Parmaxi & Demetriou, 2020) the predominant emphasis has been on their instructional rather than their evaluative applications. Most studies to date have explored how AR and VR facilitate knowledge transfer, foster active learning, or increase students' interest in curricular content, with relatively limited attention devoted to the transformative potential of these technologies in the domain of student assessment (Riyanti et al., 2022). In parallel, a significant portion of the literature has focused on technical challenges, such as hardware accessibility, user interface design, and implementation complexities (Schouten et al., 2025). While these issues are undeniably important, there remains a notable gap concerning the underlying factors that shape educators' willingness and intention to integrate AR and VR specifically for assessment purposes. Furthermore, although quantitative studies employing frameworks like the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) have identified several predictors of technology adoption including perceived usefulness, perceived ease of use, and social influence these models may not adequately account for the nuanced, context-dependent, and often qualitative aspects of behavioral intention in educational environments (Venkatesh et al., 2003; Davis, 1989). For instance, factors such as institutional culture, prior experience, perceived assessment validity, and the supportiveness of professional communities may exert significant but less easily quantifiable influences. As such, there is a pressing need for research approaches that move beyond surface-level determinants and seek to uncover the complex, situated motivations and perceived barriers educators face when considering the adoption of AR and VR for student evaluation.

The Theory of Planned Behavior (TPB) (Ajzen, 1991) offers a comprehensive theoretical lens for examining how attitudes, subjective norms, and perceived behavioral control affect individuals' intentions and behaviors. While TPB has been widely applied in studies of technology adoption, its use in understanding the adoption of AR and VR for student assessment remains limited especially within qualitative research designs that

allow for deeper exploration of stakeholders' experiences, beliefs, and challenges. Furthermore, the perspectives of pre-service teachers and academics are often overlooked, with prior studies focusing primarily on in-service teachers. This creates a significant gap in the literature, as the intentions and experiences of these distinct groups may vary substantially due to differences in training, institutional context, and exposure to emerging technologies.

Addressing these gaps, the present study employs a qualitative approach grounded in the TPB to investigate the intentions of academic staff to utilize AR and VR technologies in student assessment. By exploring attitudes toward AR and VR, perceived social pressures, and control beliefs across a diverse participant pool, this research seeks to provide a richer and more nuanced understanding of the contextual and motivational factors influencing the adoption of immersive technologies for evaluation purposes. Such an approach allows for the identification of both common and unique challenges faced by different stakeholder groups, thereby contributing to a more comprehensive picture of technology adoption in educational assessment.

Theoretically, this study contributes to the literature by extending the application of the TPB to the context of AR and VR adoption for educational assessment, addressing a domain that has been largely overlooked in previous research. By using a qualitative design, the study provides insights that move beyond the limitations of prior quantitative approaches, offering a deeper understanding of how attitudes, norms, and control beliefs interact in shaping intentions. Moreover, by considering the experiences of teachers, pre-service teachers, and academics, the research highlights the importance of stakeholder diversity in the process of technology integration. Practically, the findings of this study hold significant implications for educational policymakers and administrators who aim to foster meaningful technology integration. The results can inform the design of targeted professional development programs, support systems, and institutional policies that address real-world barriers to the adoption of AR and VR in assessment. Furthermore, insights from this research can guide EdTech developers in creating user-centered AR and VR solutions tailored to the needs and challenges of educational practitioners. For teacher educators and curriculum designers, the study offers valuable recommendations for promoting technology adoption among future educators and ensuring that emerging technologies are integrated effectively and equitably.

Given the rapid proliferation of AR and VR technologies in educational contexts, coupled with persistent barriers to their widespread and effective use in student assessment, this research is both timely and necessary. By filling a critical gap in the literature and offering actionable recommendations, the study aims to advance both theoretical understanding and practical implementation of AR and VR in educational assessment, ultimately supporting the development of more effective, equitable, and future-ready evaluation practices.

In response to these gaps, this study is guided by the following research questions:

1. What are the attitudes of academic staff toward the use of AR and VR in student assessment?
2. How do subjective norms influence academic staff's intentions to adopt AR and VR in assessment contexts?
3. What perceived behavioral control factors facilitate or hinder academic staff's integration of AR and VR in assessment practices?
4. How do these attitudes, norms, and control beliefs interact to shape academic staff's overall intention to use AR and VR for student evaluation?

Method

Research Design

This study employed a qualitative phenomenological research design to investigate the intentions of academic staff regarding the use of AR and VR technologies in student assessment. The phenomenon under investigation is the lived experience of academic staff as they encounter, interpret, and make sense of the possibility of adopting AR and VR technologies for assessment purposes. What makes this a phenomenon is that the adoption of AR/VR is not yet a routine or taken-for-granted practice in Turkish higher education; rather, it represents a novel, complex, and evolving educational development that prompts individuals to reflect deeply on its pedagogical, institutional, and professional implications. The phenomenological approach was therefore selected to capture participants' subjective perceptions, meanings, and sense-making processes, as these constitute the essence of how AR/VR adoption is experienced in context (Moustakas, 1994). By focusing on these lived meanings, phenomenology allows the study to move beyond surface-level descriptions of attitudes and instead reveal the underlying structures of thought, expectation, and conditional optimism that shape staff members' intentions toward innovative assessment practices. While the study carries a phenomenological orientation by focusing on participants' subjective experiences of adopting AR/VR for assessment, its TPB-based thematic analysis positions it closer to an exploratory qualitative inquiry rather than a classical phenomenological design.

The research was guided by the TPB (Ajzen, 1991), which posits that behavioral intentions are shaped by attitudes, subjective norms, and perceived behavioral control. This theoretical framework informed both the structure of the semi-structured interview protocol and the thematic orientation of the analysis.

Semi-structured interviews were used as the primary data collection method, enabling the exploration of both predetermined TPB constructs and emergent themes relevant to

the integration of AR and VR in assessment practices. The design facilitated in-depth inquiry into the psychological, social, and contextual dynamics influencing academic staff's technology adoption behaviors.

Throughout the study, rigor was ensured by adhering to established qualitative research standards, including iterative coding, peer debriefing, and the use of an audit trail.

Participants

This study employed purposeful maximum variation sampling to ensure a rich diversity of perspectives regarding the adoption of AR and VR technologies in student assessment. The sample comprised 30 academic staff members from various higher education institutions in Turkey. All participants held academic positions such as lecturer, assistant professor, or professor, and were actively engaged in higher education teaching, assessment, and research activities at the time of data collection.

Participants were evenly split by gender (15 females, 15 males) and represented a broad range of disciplinary backgrounds, including Social Studies Education, Computer and Instructional Technologies, Curriculum and Instruction, Science Education, Educational Measurement and Evaluation, Psychology, Linguistics, Health Sciences, Nursing, Medicine, Sociology, Engineering, and Disaster Management. The inclusion of academic staff from diverse disciplines was intentional to capture cross-disciplinary attitudes and challenges related to AR/VR integration in educational assessment, and to enrich the depth of the qualitative findings.

The years of academic experience among participants ranged from 2 to 21 years, with the sample including both early-career and senior academics. This range enabled the study to explore perspectives related to career stage, technological exposure, and institutional context.

To ensure nuanced insight, the sample included both those with and without experience in AR/VR supported student assessment. Specifically, seven academics reported prior experience in using AR or VR technologies for assessment, while twenty-three academics had no such experience. This balance allowed the study to compare intentions, attitudes, and perceived barriers across both experienced and novice users within academia.

Academic staff were invited to participate via institutional email lists and professional academic networks. Selection criteria included active academic employment and willingness to share views on technology-enhanced assessment. Participation was voluntary, with no financial or other incentives provided. All participants provided informed consent prior to data collection.

A sample size of 30 academic staff was chosen in accordance with qualitative research standards, aiming for thematic saturation and variation across fields, gender, and AR/VR experience. This sampling strategy was designed to address the research

questions and theoretical framework of the study, providing comprehensive insight into the factors shaping academic staff intentions toward AR/VR-supported assessment. Table 1 summarizes the demographic and professional characteristics of the participants.

Table 1

The demographic and background information of the participants

Gender	Field of Expertise	Experience (years)	Previous AR/VR-based Assessment Experience
Male	Social Studies Education	4	Yes
Female	Computer & Instructional Tech.	12	Yes
Male	Social Studies Education	11	No
Male	Curriculum & Instruction	8	No
Female	Distance Education	16	No
Male	Science Education	12	No
Male	Educational Measurement	3	No
Female	Psychology	4	No
Male	Instructional Technologies	5	Yes
Male	Computer & Instructional Tech.	15	No
Female	Health Sciences	7	No
Female	Quality Commission	16	No
Male	Medicine	18	No
Female	Nursing	4	No
Male	Psychology	9	No
Female	Sociology	3	No
Male	Educational Technologies	3	Yes
Female	Linguistics (Second Language)	3	No
Male	Curriculum & Instruction	13	No
Male	Guidance & Counseling	17	No
Male	Guidance & Psychological Coun.	13	No
Male	Industrial Engineering	12	No
Female	Disaster Management	5	No
Female	Pediatric Nursing	16	No
Female	Pediatric Nursing	14	Yes
Male	International Trade	2	No
Female	Pediatric Nursing	21	Yes
Female	Guidance & Psychological Coun.	4	No
Female	Pediatric Nursing	14	Yes
Female	Internal Medicine Nursing	12	No

Data Collection Tools

The main data collection tool for this study was a semi-structured interview protocol developed in accordance with the TPB and Ajzen's (2006) guidelines. The tool was designed to comprehensively capture academic staff members' attitudes, subjective norms, perceived behavioral control, and intentions regarding the use of AR and VR technologies in student assessment.

Initial interview items were generated through a review of TPB literature and prior studies on technology adoption in education, with special attention to the domains of AR and VR. To ensure content validity and contextual relevance, the draft protocol was reviewed by two experts in educational technology and educational measurement. Their feedback resulted in revisions to question wording and construct alignment. The revised protocol was then piloted with three academic staff members, whose feedback informed further refinement; minor adjustments were made for clarity and flow.

A semi-structured, open-ended format was chosen to provide the flexibility to explore both anticipated and unanticipated beliefs, and to allow participants to express their perspectives in depth. This approach facilitated the elicitation of rich qualitative data and enabled probing of complex issues related to AR/VR adoption.

Interviews were conducted in Turkish, the native language of the participants, to promote comfort and authenticity in responses. The interview questions were translated into English for reporting purposes, following a translation and back-translation process by two bilingual researchers to ensure accuracy and equivalence of meaning.

Beyond expert review and piloting, reliability was further supported through iterative revision and consensus meetings among the research team during instrument finalization. All participants gave informed consent. Interviews were audio-recorded with permission, transcribed verbatim, anonymized, and stored in password-protected files to ensure data security and confidentiality.

Each interview question was mapped to specific TPB constructs to ensure comprehensive coverage. This mapping is shown in Table 2. Questions were designed to elicit both direct measures (e.g., overall attitudes, intentions) and belief-based measures (e.g., salient advantages, normative referents, perceived barriers), as recommended by Ajzen (2006).

All interviews were conducted individually, with flexibility to probe further as needed. This mapping ensured that the interview protocol provided comprehensive data for subsequent thematic analysis according to TPB constructs.

Table 2

Mapping of interview questions to TPB constructs

No.	Interview Question	TPB Construct(s)
1	What does the use of AR and VR technologies in student assessment mean to you?	Attitude
2	What are the potential advantages and disadvantages of using these technologies for students and teachers?	Attitude (belief-based)
3	What do you think about the impact of AR/VR applications on student achievement or assessment processes?	Attitude
4	What are the views of your colleagues or administrators regarding using AR/VR in assessment?	Subjective Norm
5	Do you feel any social or professional pressure to use these technologies? Please explain.	Subjective Norm
6	Who are the important people or groups that influence your use of AR/VR technologies?	Subjective Norm (referents)
7	How easy or difficult would it be for you to start using AR and VR in assessment? Why?	Perceived Behavioral Control
8	What challenges might you encounter when using these technologies? Can you overcome these challenges?	Perceived Behavioral Control
9	Is your institution's infrastructure sufficient for such technologies? What needs improvement?	Perceived Behavioral Control
10	Do you intend to use AR/VR in student assessment in the near future? Why or why not?	Intention
11	What conditions would need to be met for you to start using these technologies?	Intention
12	What factors could increase your intention to use AR/VR technologies?	Intention (belief-based)

Data Analysis

The qualitative data obtained from the semi-structured interviews were analyzed using thematic analysis in accordance with the Theory of Planned Behavior (TPB) framework. This approach enabled a systematic and theory-driven exploration of academic staff members' attitudes, subjective norms, perceived behavioral control, and intentions related to the use of AR and VR technologies in student assessment. All interviews were audio-recorded with participant consent and transcribed verbatim. Transcripts were carefully reviewed for accuracy prior to analysis. To organize and manage the qualitative data efficiently, MAXQDA 2022 (VERBI Software) was used. This software facilitated systematic coding, retrieval, and categorization of data.

A hybrid coding strategy was adopted:

• **Deductive coding:** An initial coding framework was built upon the four primary TPB constructs Attitude (ATT), Subjective Norm (SN), Perceived Behavioral Control (PBC), and Intention (INT).

• **Inductive coding:** Additional codes and sub-themes were generated directly from the data to identify emergent, context-specific insights related to the use of AR and VR in higher education assessment.

Themes were developed within each TPB construct, with illustrative participant quotes selected for their clarity, representativeness, and diversity of viewpoint. A summary coding framework table (Table 3) provides examples of codes and associated quotes mapped to each TPB construct.

Table 3

Example Coding Framework (Excerpt)

TPB Construct	Example Code	Illustrative Quote
ATT	Pedagogical Value	"I believe VR can make assessment more interactive and engaging for students."
SN	Colleague Influence	"Most of my peers are still hesitant about using AR in their courses."
PBC	Technical Barriers	"The main challenge is the lack of infrastructure in our department."
INT	Conditional Adoption	"If training were provided, I would definitely try integrating AR into my assessments."

Findings are presented according to the main TPB constructs, highlighting both shared and unique factors influencing academic staff's intentions to use AR and VR for student assessment. This analysis provides a nuanced understanding of the motivational and contextual factors driving technology adoption in higher education.

Credibility and Ethics

To enhance the credibility and confirmability of the findings, multiple strategies were employed throughout the research process. Rigorous procedures were followed to ensure trustworthiness. Initially, a subset of transcripts was coded multiple times to check for internal consistency in interpretation. The researcher maintained a detailed audit trail, documenting all decisions made during data analysis to allow for transparency

and potential replication. To minimize researcher bias, a reflexive journal was kept throughout the study. This journal was used to monitor personal assumptions, prior experiences with educational technology, and potential influences on data interpretation. The researcher also engaged in regular analytic memo writing to critically reflect on emerging themes and consider alternative explanations.

Peer debriefing was employed at multiple points during the analysis. External colleagues with expertise in qualitative research and educational technology were consulted to provide feedback on coding decisions, theme development, and interpretation of findings. Particular attention was given to the ways institutional realities such as infrastructure constraints, professional development opportunities, and academic culture shaped participant responses. These context-specific dynamics were analyzed in relation to each TPB component.

Ethical approval for this study was obtained from the Erzincan Binali Yıldırım University Educational Sciences Ethics Committee (Protocol No: 08/09). All participants provided informed consent prior to data collection. Data was anonymized, securely stored, and used solely for research purposes in line with ethical guidelines.

Findings

Overview of the Analytical Framework

The analysis of interview data in this study was grounded in the TPB, which conceptualizes intention as a function of three interconnected domains: attitude toward the behavior, subjective norm (perceived social and professional expectations), and PBC (Ajzen, 1991). This framework enabled a nuanced examination of not only individual motivations but also the broader psychological and institutional contexts that shape academic staff members' intentions to adopt AR and VR technologies in student assessment.

All interview questions were systematically mapped to TPB constructs, ensuring comprehensive coverage of the beliefs, social pressures, and contextual resources relevant to technology adoption in higher education. The analysis utilized both deductive coding anchored in the TPB domains and inductive exploration to capture emergent themes specific to the pedagogical and organizational realities of Turkish universities.

Thematic analysis revealed several key patterns within each TPB domain:

- Attitude: The majority of participants expressed cautious optimism about the pedagogical value and potential of AR and VR for assessment, citing enhanced engagement and authenticity as potential benefits. However, significant concerns were raised about complexity, equity, and the risk of superficial "technology for

technology's sake." This ambivalence reflects the tension between innovation and constraint frequently reported in the Turkish higher education context.

- Subjective Norm: Social and professional influences including colleagues, departmental leadership, and disciplinary networks were found to play a substantial role in shaping willingness to adopt AR and VR. Most participants described an environment of cautious encouragement rather than strong directive pressure, although minority voices highlighted implicit expectations or peer scepticism, particularly among early-career academics and in technologically progressive departments.
- Perceived Behavioral Control: The sense of agency in adopting AR and VR was profoundly shaped by institutional infrastructure, resource availability, and prior digital experience. Notably, perceptions of feasibility often intersected with attitudes and subjective norms: supportive environments and visible peer models were described as empowering, while institutional inertia and lack of policy guidance acted as strong deterrents.
- Intention: Participants' intentions to use AR and VR in assessment were generally positive but highly conditional. Intention was most robust when favorable attitudes aligned with social support and perceived control; conversely, barriers in any domain often resulted in hesitancy or a "wait-and-see" stance. Contradictory and minority views such as outright scepticism or resistance were most prevalent among staff lacking prior experience or operating in resource-limited settings.

These findings suggest that the adoption of AR and VR in Turkish higher education assessment is best understood as a case of "conditional optimism under constraint" where enthusiasm for innovation is consistently moderated by practical realities and local culture. As researchers embedded in this context, we recognize the influence of our interpretive stance and the limitations of a purposive sample that may overrepresent staff with an interest in educational technology.

This analytical structure forms the foundation for the detailed presentation of findings in the following sections, which elaborate on each TPB construct and illuminate the complex interplay of personal, social, and institutional dynamics shaping AR and VR integration in assessment.

Attitudes Toward the Use of AR and VR in Student Assessment

Analysis of participant responses to Questions 1, 2, and 3 revealed a spectrum of attitudes toward the use of AR and VR technologies in student assessment, ranging from enthusiastic endorsement to scepticism and ambivalence. These attitudes reflect not only instrumental appraisals of technological advantages and challenges, but also deeper beliefs about educational modernization, equity, and professional identity within the evolving landscape of Turkish higher education.

Perceived Meaning and Value (Q1)

For the majority of participants (approximately two-thirds), AR and VR were seen as symbols of innovation and progress, often described as "the future of assessment" and associated with the modernization of Turkish universities. This enthusiasm echoed global trends in EdTech and was sometimes tied to institutional aspirations for international competitiveness. As one academic articulated:

"Integrating AR and VR into assessment is, for me, a sign that we are keeping up with technological advancements and striving to make evaluation more engaging for our students."

However, a significant minority questioned whether these technologies represented genuine pedagogical improvement or were simply "trend-driven," cautioning against adopting innovation for its own sake. Some expressed concern that such initiatives could divert attention and resources from proven assessment practices, especially in resource-constrained or traditionally oriented departments.

Perceived Advantages and Disadvantages (Q2)

Most participants identified clear advantages of AR/VR for assessment, aligning with previous research (e.g., Vola et al., 2025; Akçayır & Akçayır, 2017):

- Enhanced engagement: A large portion believed immersive technologies could increase student motivation and focus, making assessments more stimulating.
- Authenticity and interactivity: Many highlighted that AR/VR enabled the simulation of real-world tasks, offering opportunities for performance-based assessment difficult to achieve otherwise.
- Individualization: Several participants suggested that AR/VR could better accommodate students' diverse learning styles and needs.

A notable quote illustrated these hopes:

"VR allows us to create real-world scenarios for assessment, which is much closer to what students will face after graduation. This is a huge step forward compared to paper-based tests."

At the same time, concerns were prevalent with about half of participants emphasizing:

- Technical and logistical barriers: Limited access to hardware, unreliable software, and insufficient technical support were cited as persistent obstacles, especially in less well-funded institutions.
- Equity and fairness: Many worried about unequal student access to technology or variability in digital skills, which could create new forms of educational inequality an issue echoed in Turkish higher education literature (see Radianti et al., 2020).

- Cognitive overload: A minority raised the risk that technological complexity might hinder rather than help learning, especially for students and staff with lower digital literacy.

These divergent views illustrate how attitude and perceived behavioral control are closely intertwined perceived benefits often depended on the assumption of adequate institutional resources and support.

Perceived Impact on Student Achievement and Assessment Processes (Q3)

While most participants were optimistic about the potential for AR/VR to enhance student achievement and provide more meaningful, memorable assessment experiences, this optimism was tempered by practical caveats. Participants noted that positive impacts are contingent on thoughtful instructional design, careful alignment with learning outcomes, and sufficient training issues that, if overlooked, could undermine validity and reliability. For example:

"Students who are assessed through simulations or interactive environments can demonstrate their competencies more effectively, which could lead to better achievement and deeper learning."

However, a few participants warned that if implementation was rushed or unsupported, AR/VR could distract from core learning goals or even impede fair and accurate assessment.

Thematic Abstraction: "Innovation Under Constraint"

Overall, participant attitudes can be understood as a form of "conditional optimism" a readiness to embrace innovation tempered by awareness of local constraints and professional responsibility. This theme reflects both the excitement and caution found in Turkish higher education, where technological advancement is often viewed as necessary but must be balanced with practical realities and ethical commitments. Such findings both mirror and extend international literature, suggesting that successful AR/VR adoption in assessment depends as much on context and support as on intrinsic technological promise.

Subjective Norms

Analysis of Questions 4, 5, and 6 revealed that subjective norms regarding AR and VR use in student assessment are multilayered and contextually nuanced, shaped by not only colleagues and administrators, but also broader institutional and disciplinary cultures within Turkish higher education. While there is broad recognition of the value of professional and peer support for educational innovation, the reality is often characterized by ambivalence and conditional endorsement rather than strong consensus.

Perceived Attitudes of Colleagues and Administrators (Q4)

A majority of participants described the prevailing attitudes of colleagues and administrators as "cautiously open," reflecting neither uncritical enthusiasm nor outright resistance. For instance, just over half noted that peers expressed interest in AR and VR but hesitated due to lack of experience or confidence a finding that mirrors existing studies in the Turkish context, where technological adoption is often influenced by collective uncertainty and "wait-and-see" attitudes (Akçayır & Akçayır, 2017; Radianti et al., 2020). As one academic reflected:

"Most of my colleagues are still hesitant. They acknowledge the potential, but few have practical experience, so there's a lot of uncertainty."

A notable minority described "innovation pockets" in certain departments, where champions or early adopters actively promoted AR/VR experimentation, especially among younger faculty. Conversely, some participants experienced administrative conservatism, citing priorities for reliability, scalability, and compliance with national education standards as an example of how organizational context mediates both subjective norm and perceived behavioral control.

Social and Professional Pressure (Q5)

Most respondents (approximately three-quarters) felt little direct social or professional pressure to use AR or VR, describing an environment where academic freedom was largely respected. As another participant put it:

"There isn't a sense of pressure. It's more about personal motivation and interest. No one says you have to use VR, but it's welcomed if you want to try."

However, some dissenting voices pointed to subtle, implicit pressures, especially in technology-focused departments or among early-career staff who felt the need to demonstrate innovation for career advancement. These pressures, while not overt, sometimes shaped self-efficacy and willingness to engage an example of how subjective norms and perceived behavioral control can intersect.

Pilot projects and visible departmental champions were also cited as soft sources of influence, creating aspirational rather than coercive environments. This dynamic aligns with research showing that informal leadership and role models can shape innovation climates in higher education (Jensen & Konradsen, 2018).

Influence of Key Referent Groups (Q6)

When discussing influential referents, colleagues and department heads were most frequently mentioned, with professional associations and external grant agencies playing a smaller but sometimes pivotal role in setting local innovation agendas. Peer endorsement was described as both a motivator and a validation of new approaches:

"If respected colleagues are positive about using AR, it definitely makes me more willing to consider it."

Student voices, while less central, were also noted: a few participants described how enthusiastic or curious students inspired them to experiment, while others acknowledged that student scepticism or resistance could dampen their intentions.

Thematic Abstraction: "Collegial Innovation Under Cautious Endorsement"

Taken together, these findings suggest that subjective norms in Turkish higher education are characterized by "collegial innovation under cautious endorsement." Strong, directive pressure to adopt AR/VR is rare; instead, a combination of peer encouragement, departmental champions, and institutional conservatism leads to an environment where innovation is tolerated, sometimes quietly supported, but seldom institutionally required. This dynamic has important implications: where social support aligns with perceived behavioral control and positive attitudes, intentions to adopt AR/VR are strongest. Conversely, where organizational support is absent or peer scepticism prevails, even favorable attitudes may not translate into action.

Perceived Behavioral Control

Participant responses to Questions 7, 8, and 9 revealed that perceived behavioral control (PBC) over adopting AR and VR in student assessment is shaped by a dynamic interplay of individual confidence, technical realities, and institutional resources. This section not only documents practical challenges but also explores how participants' sense of agency is mediated by local organizational and cultural contexts key issues highlighted in prior studies of technology adoption in Turkish higher education (e.g., Akçayır & Akçayır, 2017; Parmaxi & Demetriou, 2020).

Perceived Ease or Difficulty of Adoption (Q7)

A substantial majority of participants (about three-quarters) anticipated that adopting AR and VR in assessment would be challenging. This was often attributed to their limited prior experience, lack of institutional guidance, and the steep learning curve associated with complex digital tools. As one respondent shared:

"I think it would be quite difficult at first. There are so many new things to learn, and I would need a lot of time to get used to the systems."

Contrastingly, a small but notable group typically those with digital teaching experience or previous exposure to educational innovation expressed greater optimism. They believed that with appropriate support, they could successfully integrate these technologies, highlighting the importance of self-efficacy and peer modeling (see also Venkatesh et al., 2003).

Anticipated Challenges and Strategies to Overcome Them (Q8)

Participants' narratives clustered around three principal challenge domains:

- Technical barriers: These included unreliable access to hardware (e.g., VR headsets), software compatibility, and insufficient IT support. Such challenges were especially acute outside metropolitan universities, reinforcing inequities in Turkish higher education.
- Pedagogical challenges: Many questioned how to align AR/VR-based assessment with existing curricula and learning outcomes. A minority raised the risk that the "novelty effect" might distract from genuine learning, connecting PBC to critical attitudes about the educational value of technology.
- Resource and time constraints: Increased workload, insufficient time for experimentation, and lack of administrative incentives were common concerns. Notably, these factors often intersected with subjective norms: faculty in more innovative departments felt greater peer support, which partially compensated for institutional gaps.

Despite these obstacles, about half the participants described strategies for overcoming barriers, including peer collaboration, professional development, and starting with small-scale pilot projects. This "incremental adoption" approach reflects a broader ethos of cautious experimentation, also reported in international EdTech literature (Radianti et al., 2020).

However, a vocal minority remained sceptical, doubting that institutional resources or support would materialize in the near term a finding that reinforces the conditional and context-dependent nature of behavioral intentions in the Turkish setting.

Institutional Infrastructure and Support (Q9)

Nearly all participants identified inadequate institutional infrastructure as a significant limitation to adopting AR and VR in assessment. The challenges cited included lack of dedicated equipment, limited software access, and scarce training opportunities. One participant noted:

"Our university is not really prepared for this yet. The infrastructure is lacking, and there hasn't been much investment in these technologies for assessment purposes."

Many recommended targeted investment in equipment and staff development, as well as clear policy guidance. Interestingly, those who expressed more positive attitudes toward AR/VR (see Section 3.2) often did so under the assumption of future improvements in infrastructure and support, highlighting the tight link between PBC and both attitudes and intentions.

Thematic Abstraction and Reflexivity: "Capability Gap Amidst Aspirational Innovation"

Overall, the findings illustrate a theme of "capability gap amidst aspirational innovation." While academic staff recognize the transformative potential of AR and VR, their confidence and intentions are constrained by local realities and perceived institutional inertia. Importantly, these findings echo international scholarship while foregrounding the specific context of Turkish higher education, where rapid expansion of digital infrastructure is often uneven and policy support inconsistent.

As researchers, we recognize that our interpretation is shaped by our own engagement with digital transformation in higher education, and by the voluntary nature of our sample which may have attracted participants already invested in technology adoption. Future research should explore how faculty who are disengaged or resistant perceive these challenges.

Intention to Use AR and VR in Assessment

Responses to Questions 10, 11, and 12 revealed that intentions to use AR and VR in student assessment are marked by "conditional optimism" a hopeful openness toward innovation that is sharply moderated by real and perceived contextual constraints. This finding echoes previous work in Turkish and international higher education settings, where willingness to adopt new educational technologies is typically contingent on a combination of individual, institutional, and socio-cultural factors (e.g., Akçayır & Akçayır, 2017; Venkatesh et al., 2003).

Current and Future Adoption Plans (Q10)

Only a small subset of participants (less than one-fifth) expressed a clear, proactive intention to implement AR or VR in their assessment practices in the near term. These respondents often had prior exposure to educational technology or operated in departments with strong innovation cultures. Their decisiveness was reinforced by personal confidence and, crucially, by perceptions of local peer support:

"I definitely plan to experiment with VR in my assessment next semester, especially since I have already used similar technologies in my courses."

However, the majority described their intention as tentative conditional on factors such as access to resources, visible administrative support, and evidence of practical benefit. This "wait-and-see" stance reflects a pattern common in the Turkish higher education system, where faculty frequently balance enthusiasm for innovation against resource scarcity and institutional inertia. Some expressed openness "I would like to try if conditions allow" but also voiced hesitancy due to doubts about feasibility, workload, or the real value added for students.

Conditions for Adoption (Q11)

Participants consistently identified several preconditions for moving from intention to action:

- Technical infrastructure: The most frequently cited need was access to reliable devices, software, and ongoing technical support findings in line with both this study's PBC results and the literature on technology integration in Turkish universities (Radianti et al., 2020).
- Professional development: Nearly half the sample emphasized the necessity of structured training and peer-led workshops to build confidence and expertise.
- Guidance and policy: Many desired clear guidelines or best-practice exemplars to ensure that AR/VR-based assessment would be valid and aligned with curricular goals.
- Institutional recognition and time: Participants noted that administrative encouragement, incentives, and reduced workloads would make experimentation feasible, connecting subjective norms, PBC, and intention.

One academic summarized this interplay:

"If there was proper training and if I knew I could get help when needed, I would be much more confident to start."

Minority perspectives added nuance: A few participants, sceptical of current institutional support or the pedagogical value of AR/VR, stated that no reasonable condition would be sufficient to motivate adoption in the near future a valuable reminder that intention is not universal, but deeply context-dependent.

Factors That Could Increase Willingness (Q12)

Reflecting on what would tip the balance toward greater willingness, respondents cited:

- Successful local pilots and exemplars: Firsthand or peer-shared examples of effective AR/VR implementation in their discipline were seen as powerful motivators.
- Collaborative networks: Opportunities for collegial collaboration and knowledge sharing were highlighted as critical, suggesting that subjective norms can "activate" intentions when they reinforce PBC.
- Institutional incentives: Recognition, awards, or dedicated funding were proposed as means to reduce risk and acknowledge innovation.
- Evidence of educational impact: Some emphasized the need for robust evidence either from their own practice or the literature that AR/VR could genuinely improve student learning or assessment quality.

"If I saw that students were truly benefiting, and if there was support from my department, I would definitely want to use these technologies more."

Thematic Abstraction and Reflexivity: "Conditional Optimism in Context"

Overall, intention to adopt AR and VR in student assessment emerges as a case of "conditional optimism in context." While many academic staff display enthusiasm for innovation, their intentions are filtered through practical, institutional, and social realities

unique to the Turkish higher education system such as uneven infrastructure, evolving assessment policies, and varying departmental cultures. Importantly, these findings indicate that intention is not solely a product of personal motivation, but an emergent outcome of cross-construct interactions (attitudes, norms, and PBC) and structural opportunities.

Researcher Reflexivity:

As researchers with experience in Turkish higher education, we recognize our potential bias toward highlighting institutional and cultural constraints, as well as our sample's possible overrepresentation of staff with positive attitudes toward educational innovation. Future work should aim to capture more resistant or disengaged voices to further clarify the full spectrum of intentions.

Discussion

Summary of Results

This study explored academic staff members' intentions to use AR and VR technologies in student assessment, guided by the TPB. The findings reveal a nuanced landscape of "conditional optimism," where the willingness to adopt AR and VR is shaped by a complex interplay of personal attitudes, perceived social norms, and behavioral control, all situated within the unique pedagogical and institutional context of Turkish higher education.

Specifically, the majority of participants expressed positive attitudes toward the potential of AR and VR to enhance engagement, authenticity, and individualization in assessment. However, concerns were also raised regarding equity, technical complexity, and the risk of adopting technology for its own sake. Subjective norms were characterized by cautious encouragement from colleagues and institutional leaders, with social support most influential in departments with a culture of innovation. Nevertheless, the absence of strong directive pressure resulted in a climate where experimentation was tolerated but not universally incentivized.

Perceived behavioral control emerged as a critical determinant, with most participants identifying significant barriers related to technical infrastructure, resource limitations, and the need for targeted professional development. Only a minority typically those with prior digital experience and strong peer support reported clear intentions to integrate AR and VR in the near future. For the majority, intention remained highly conditional, contingent upon improvements in institutional support, the availability of best-practice exemplars, and evidence of positive educational outcomes.

Overall, these findings illustrate that successful adoption of AR and VR for student assessment is not simply a matter of individual enthusiasm, but rather depends on the alignment of positive attitudes, enabling social environments, and sufficient institutional capacity. This conditionality highlights both the promise and the persistent challenges of educational technology innovation in the context of Turkish higher education.

Theoretical Implications

This study employed the TPB (Ajzen, 1991) as its central analytical lens, while also engaging with the TAM (Davis, 1989) and the UTAUT (Venkatesh et al., 2003), to explore academic staff intentions to adopt AR and VR in student assessment. By anchoring the analysis in these widely used frameworks, the study contributes to the cumulative theoretical discourse on technology acceptance in education. At the same time, it provides a novel contextual application by examining Turkish higher education institutions, which are characterized by centralized governance, hierarchical authority, and discipline-specific subcultures. Situating the findings within both global and local debates enables the study to add nuance to existing models of technology adoption, showing that while TPB, TAM, and UTAUT remain robust analytical tools, their predictive power may be mediated or reframed by contextual factors not always emphasized in mainstream adoption research. In this sense, the study contributes to a growing recognition that acceptance models must be flexible enough to account for cultural, structural, and organizational differences across higher education systems.

The results reaffirm the foundational role of attitude, subjective norm, and perceived behavioral control in shaping adoption intentions, consistent with prior research that validates TPB and related frameworks (Prikshat et al., 2025; Xuan et al., 2024). For instance, academic staff who reported positive beliefs about the pedagogical potential of AR/VR, perceived support from colleagues, and confidence in their own abilities to use the technology were more likely to express strong adoption intentions. This aligns with international studies emphasizing that peer encouragement, infrastructural availability, and personal efficacy are key drivers of adoption (Ateş & Garzón, 2022, 2023). Yet, the Turkish context brought to the fore unique socio-organizational dynamics that differentiate it from more individualistic or decentralized systems. Departmental cultures shaped by collective values, shared professional norms, and the prevailing innovation climate were found to exert significant influence over subjective norms. Likewise, hierarchical authority and centralized administrative decision-making amplified the importance of top-down support. These findings resonate with Hofstede's (2001) theorization of collectivism and power distance, and they extend Straub's (2009) insights that adoption is deeply embedded in institutional culture. Thus, while the findings echo established international research, they also demonstrate how cultural and structural particularities modify the salience of classical predictors, highlighting the importance of adapting adoption models to context-specific realities.

A significant theoretical contribution of this study is the articulation of "conditional optimism." This construct refers to a cautious and contextually responsive enthusiasm for AR/VR, where hope for innovation is tempered by pragmatic concerns about feasibility, institutional support, and alignment with professional identity. Conditional optimism builds on but also diverges from established concepts such as Rogers' (2003) *bounded enthusiasm* and Trowler's (1998) *innovation fatigue*. Unlike these earlier notions, which frame optimism as constrained or waning, conditional optimism is dynamic and oscillatory: individuals move back and forth along a spectrum of enthusiasm depending on evolving enabling conditions. For example, participants expressed willingness to experiment with AR/VR if they had access to workshops, technical guidance, or visible peer role models, but hesitated when such supports were absent. This finding parallels international literature emphasizing the role of organizational climate in sustaining innovation (Schmidt & Cohen, 2020), while also highlighting the need for theoretical refinements that capture the fluid and contingent nature of professional attitudes. By theorizing conditional optimism, the study contributes not only a conceptual innovation but also a lens through which to understand how optimism interacts with institutional structures in shaping adoption trajectories.

Another important insight is that not all participant experiences conformed neatly to the predictions of TPB, TAM, or UTAUT. Several narratives revealed misalignments between positive attitudes and actual behavioral intentions, particularly in cases where institutional barriers were severe. For example, staff members who expressed excitement about the pedagogical potential of AR/VR nonetheless reported little or no intention to adopt the technologies due to chronic shortages in infrastructure, lack of dedicated technical support, or bureaucratic hurdles. This pattern challenges the additive, linear logic of TPB, which assumes that favorable attitudes, strong norms, and high perceived control will reliably coalesce into intention. Instead, the findings show that systemic and organizational constraints can override or attenuate individual-level predictors. Similar patterns have been noted in studies of technology adoption in developing contexts, where meso- and macro-level factors such as institutional inertia, government policy, or resource limitations exert disproportionate influence (Al-Emran et al., 2025; Dwivedi & Vig, 2024). The emergence of "wait-and-see" approaches among participants further underscores this point: staff were less influenced by immediate peer or attitudinal factors and more by shifting institutional directives or uncertainties about long-term policy commitments. Such findings extend current critiques of acceptance models and call for frameworks that more explicitly integrate organizational, systemic, and policy-level determinants of adoption.

As researchers embedded in Turkish higher education, we are acutely aware that local organizational norms significantly shape the salience of TPB constructs. In contexts marked by hierarchical authority and centralized policy-making, administrative endorsement or resistance can rapidly shift departmental norms and alter perceptions of feasibility. For instance, when university leadership or national policy explicitly supported technological initiatives, participants reported heightened perceptions of

normative pressure and greater confidence in implementation. Conversely, where administrative resistance or policy ambiguity was perceived, enthusiasm was quickly dampened. These dynamics illustrate how the Turkish higher education system amplifies the influence of hierarchy and collective norms, distinguishing it from more decentralized systems where professional autonomy often carries greater weight. Moreover, disciplinary subcultures added another layer of complexity, as fields such as engineering or design displayed greater openness to experimentation compared to more conservative disciplines. These patterns echo cross-cultural findings (Hofstede, 2001) and underscore the need to recognize cultural and disciplinary moderators in theoretical models of adoption.

In conclusion, this study demonstrates both the utility and the limitations of applying dominant acceptance frameworks such as TPB, TAM, and UTAUT to higher education contexts characterized by strong hierarchy and collectivism. While the models provide a valuable baseline, the findings show that they must be expanded to incorporate systemic and cultural factors that significantly influence adoption. The articulation of conditional optimism enriches theoretical debates by capturing the oscillatory nature of academic staff attitudes under varying institutional conditions. More broadly, the study emphasizes that technology adoption in higher education is not only a cognitive and individual process but also a deeply organizational and cultural one. Future research should prioritize comparative and cross-national work to test the robustness of conditional optimism and other identified patterns across contexts, and should seek to refine theoretical frameworks so that they can account for the interplay between individual intentions, organizational climates, and broader policy environments. By doing so, scholarship on educational technology adoption will gain both greater explanatory power and stronger cross-cultural generalizability.

Practical Implications

The findings of this study offer several actionable insights for educational leaders, policymakers, EdTech developers, and academic staff seeking to foster effective and equitable integration of AR and VR technologies in student assessment within higher education.

A consistent theme across participants was the need for robust technical infrastructure, reliable hardware and software, and ongoing IT support. Universities aiming to promote AR/VR adoption should prioritize targeted investment in infrastructure, including regular maintenance, accessible technical assistance, and updates tailored to assessment needs. Institutions should also consider centralized resource centers or "technology hubs" where faculty can experiment with and receive support for AR/VR tools before deploying them in assessment contexts.

Given the strong influence of perceived behavioral control on adoption intentions, structured professional development programs are essential. Training should go beyond

basic technological orientation, addressing pedagogical strategies, assessment design principles, and discipline-specific applications of AR/VR. Peer-led workshops, communities of practice, and mentoring from experienced early adopters can help build confidence and create a culture of shared learning. Including real-world case studies and success stories can foster "conditional optimism" and reduce hesitation among staff.

The pronounced impact of departmental and institutional culture on subjective norms highlights the importance of leadership and policy in shaping attitudes. University administrators and department heads should actively communicate their support for experimentation, recognize and reward faculty who innovate in assessment, and ensure that policy frameworks are flexible enough to accommodate emerging technologies. Establishing innovation champions or cross-disciplinary task forces can help diffuse best practices and provide visible role models.

Concerns about equity, student access, and assessment fairness were significant. Institutions must ensure that AR/VR resources are distributed fairly and that accommodations are available for students with disabilities or those unfamiliar with immersive technology. Guidelines for inclusive assessment design and regular evaluation of accessibility barriers are crucial to prevent the deepening of existing inequalities.

Policy directives at the institutional and national levels should be aligned with the pedagogical objectives of technology-enhanced assessment. This includes developing clear guidelines for the ethical use of AR/VR, protecting data privacy, and ensuring assessment validity. Policymakers should also consider mechanisms for pilot projects, incremental scaling, and feedback loops so that practice informs ongoing policy development.

To overcome inertia and encourage broader participation, universities can offer formal incentives such as teaching awards, research funding, or reduced teaching loads for faculty who successfully integrate AR/VR in assessment. Recognition programs can validate risk-taking and innovation, amplifying positive subjective norms.

Implementation strategies should be participatory and iterative, involving faculty, students, IT professionals, and administrators in the design, evaluation, and refinement of AR/VR-based assessment initiatives. Stakeholder feedback can help tailor solutions to the diverse needs of different academic units and student populations, increasing the likelihood of sustainable adoption.

Limitations and Future Studies

While this study offers valuable insights into the adoption of AR and VR technologies for student assessment in Turkish higher education, several limitations must be acknowledged.

First, the research employed a qualitative design with purposeful sampling of academic staff. Although this approach enabled in-depth exploration of subjective experiences and contextually grounded interpretations, it may limit the generalizability of findings to other institutional, national, or cultural contexts. The focus on Turkish universities, which are characterized by centralized governance structures and distinct disciplinary cultures, further narrows the scope. Patterns observed in subjective norms and perceived behavioral control may manifest differently in more decentralized systems or in institutions with alternative governance traditions.

Second, the participant group consisted exclusively of academic staff. Perspectives from students, administrators, policymakers, and technical support personnel were not included. A more holistic, multi-stakeholder approach would provide a fuller picture of the institutional ecosystem shaping AR/VR adoption. Future studies could incorporate comparative perspectives across stakeholder groups to capture power dynamics, practical constraints, and user readiness more comprehensively.

Third, although gender, field, and years of experience were balanced, the voluntary nature of participation may have introduced self-selection bias. Those with higher levels of openness to technology or prior exposure to innovation may have been overrepresented. Future research should consider strategies to include less-engaged or more sceptical stakeholders, as their perspectives are crucial for understanding resistance and adoption barriers.

Fourth, the reliance on semi-structured interviews means that data are based on self-reported perceptions and intentions, which may not always align with actual practices. The translation of intentions into sustained practice can be influenced by unanticipated institutional, cultural, or technological barriers. Longitudinal and intervention-based designs could provide richer insights into how AR/VR adoption evolves over time, revealing whether initial conditional optimism is maintained, diminished, or strengthened with experience.

Finally, the proposed conceptual model introduced inductively derived constructs such as conditional optimism, innovation climate, and institutional readiness. While these theoretical contributions extend existing frameworks, their empirical robustness requires further validation. Future quantitative or mixed-methods research should test these constructs across diverse disciplines and contexts. Cross-national comparative studies could illuminate boundary conditions and enhance the external validity of these refinements. Moreover, experimental designs exploring the pedagogical effectiveness of AR/VR in actual assessment tasks would help bridge the gap between perceived potential and realized outcomes.

Conclusion

This study has explored the intentions and determinants underlying academic staff members' adoption of AR and VR technologies for student assessment in Turkish higher

education, employing a conceptual framework that integrates the TPB and relevant constructs from technology acceptance models. Through qualitative analysis, the research revealed that attitudes, subjective norms, and perceived behavioral control remain fundamental predictors of intention; however, their effects are significantly mediated by contextual factors such as institutional readiness, innovation climate, and the emergent theme of "conditional optimism."

The findings underscore the necessity of robust infrastructure, targeted professional development, and supportive organizational culture to enable effective integration of AR/VR in assessment practices. Moreover, the study identified challenges such as resource constraints, equity considerations, and policy uncertainties that can inhibit even the most enthusiastic potential adopters, highlighting the limitations of traditional models when applied in complex, hierarchical, or resource-limited educational environments.

By proposing a refined conceptual model that incorporates both classic and contextually emergent constructs, this research extends current theoretical understandings and offers actionable insights for practitioners, policymakers, and EdTech developers. Ultimately, recognizing the interplay of individual, social, and institutional factors is critical to advancing the effective, equitable, and sustainable use of AR/VR technologies in higher education assessment.

Future research should continue to test and elaborate on this hybrid model across diverse contexts, stakeholder groups, and timeframes to deepen understanding and inform the next generation of technology-enhanced educational practices.

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Appendix A. Coding Framework Table

TPB Construct	Code/Theme	Illustrative Quote
Attitude (ATT)	Pedagogical Value	"I believe VR can make assessment more interactive and engaging for students."
	Assessment Effectiveness	"Using AR in exams could help measure skills that traditional tests overlook."
	Perceived Drawbacks	"Some students may find these technologies distracting rather than helpful."
Subjective Norm (SN)	Colleague Influence	"Most of my peers are still hesitant about using AR in their courses."
	Administrative Support	"Our department head encourages us to experiment with VR in teaching and assessment."
	Social Pressure	"I sometimes feel expected to adopt new technologies, even if I am not fully ready."
Perceived Behavioral Control (PBC)	Technical Barriers	"The main challenge is the lack of infrastructure in our department."
	Self-Efficacy	"I am confident that I can learn to use these tools if I get proper training."
	Resource Needs	"We need more support and funding to implement AR/VR effectively."
Intention (INT)	Conditional Adoption	"If training were provided, I would definitely try integrating AR into my assessments."
	Readiness to Adopt	"I plan to use VR in the next semester if we get the required equipment."
	Hesitancy	"I am interested, but I'm still unsure about how to assess students fairly with these tools."

Genişletilmiş Türkçe Özet

Bu araştırmanın amacı, artırılmış gerçeklik (AR) ve sanal gerçeklik (VR) teknolojilerinin öğrenci değerlendirmelerinde kullanımına ilişkin olarak öğretim elemanlarının niyetlerini ve bu niyetleri etkileyen belirleyicileri incelemektir. Günümüzde AR ve VR teknolojileri eğitim ortamlarında giderek daha fazla yer bulmakta, öğretim süreçlerini daha etkileşimli ve anlamlı kılma potansiyeli taşıdığı düşünülmektedir (Akçayır & Akçayır, 2017; Moro vd., 2021). Ancak bu teknolojilerin ölçme ve değerlendirme bağlamındaki uygulamaları, öğretim süreçlerine kıyasla oldukça sınırlı düzeyde araştırılmıştır. Bu çalışma, Planlı Davranış Teorisi (Theory of Planned Behavior - TPB; Ajzen, 1991) temel alınarak, öğretim elemanlarının bu teknolojileri öğrenci değerlendirmelerinde kullanma niyetlerini şekillendiren tutumlar, öznel normlar ve algılanan davranışsal kontrol unsurlarını analiz etmektedir.

Çalışma, öğretim elemanlarının AR/VR'yi değerlendirmelerde kullanmaya ilişkin öznel deneyimlerine odaklanarak fenomenolojik bir yönelim taşımakla birlikte, TPB temelli tematik analiz yaklaşımı nedeniyle daha çok keşifsel nitel bir araştırma niteliği göstermektedir. Türkiye'de farklı üniversitelerden 30 öğretim elemanı ile yarı yapılandırılmış görüşmeler gerçekleştirilmiştir. Katılımcıların seçiminde maksimum çeşitlilik örnekleme yöntemi kullanılarak; cinsiyet, alan, akademik unvan ve AR/VR deneyimi açısından dengeli bir dağılım sağlanmıştır. Görüşmelerden elde edilen veriler, TPB kuramı çerçevesinde tematik analiz yoluyla çözümlenmiş; ayrıca bağlamsal ve durumsal değişkenlerin etkileri de dikkate alınmıştır.

Araştırma sonuçları, öğretim elemanlarının AR ve VR teknolojilerine yönelik tutumlarının genel olarak olumlu olduğunu, ancak bu tutumların çoğunlukla "koşullu bir iyimserlik" ile şekillendiğini ortaya koymaktadır. Katılımcılar, bu teknolojilerin öğrenci katılımını artırabileceğini, değerlendirmeleri daha özgün ve bireyselleştirilmiş hale getirebileceğini belirtmiştir (Vola vd., 2025; Lee vd., 2024). Ancak teknik altyapı eksiklikleri, zaman ve iş yükü kaygısı, eğitim ihtiyacı ve erişim adaletsizliği gibi faktörlerin bu olumlu tutumların davranışa dönüşmesini engellediği görülmüştür. Özellikle dezavantajlı üniversitelerde donanım ve yazılım eksikliği, teknolojik entegrasyon sürecinde ciddi bir engel olarak öne çıkmaktadır (Radianti vd., 2020).

Öznel normlar açısından değerlendirildiğinde, katılımcılar meslektaşlarının ve yöneticilerinin genel olarak yenilikçi teknolojilere mesafeli fakat teşvik edici bir yaklaşım içinde olduklarını ifade etmiştir. Bazı bölümlerde, yenilikçi uygulamaları destekleyen lider figürlerin varlığı, öğretim elemanlarının teknoloji kullanım niyetini artırırken; bazı durumlarda ise üst yönetimden gelen açık destek eksikliği, bu niyetin zayıflamasına neden olmaktadır (Jensen & Konradsen, 2018). Bu durum, TPB modelinde yer alan öznel normların bağlamsal olarak nasıl işlediğine dair önemli bir içgörü sunmaktadır.

Algılanan davranışsal kontrol boyutunda ise, öğretim elemanlarının büyük çoğunluğu AR/VR teknolojilerini kullanma konusunda çeşitli güçlükler yaşadıklarını belirtmiştir.

Teknik destek eksikliği, kurumsal düzeyde politika ve rehberlik yoksunluğu, mesleki gelişim fırsatlarının sınırlılığı ve bireysel yeterlik algısındaki düşüklük, teknolojilerin uygulanabilirliğini azaltmaktadır. Bununla birlikte, bazı katılımcılar küçük ölçekli pilot uygulamalarla başlayarak kademeli bir entegrasyon süreci önermekte ve bu sürecin desteklenmesi durumunda başarı şansının artacağını ifade etmektedir (Ateş & Garzón, 2023).

Katılımcıların AR/VR teknolojilerini değerlendirme süreçlerine entegre etme konusundaki niyetleri ise büyük oranda belirli koşulların sağlanmasına bağlıdır. Özellikle kurumsal destek, mesleki gelişim olanakları, başarılı örnek uygulamaların paylaşılması ve teknik altyapının güçlendirilmesi, bu niyetin eyleme dönüşmesi açısından kritik rol oynamaktadır. Bu bağlamda çalışmada, "koşullu iyimserlik" (conditional optimism) kavramsallaştırması önerilmiştir. Bu kavram, öğretim elemanlarının yenilikçi teknolojilere yönelik umutlu ancak temkinli yaklaşımlarını betimlemekte ve TPB modeline yeni bir açılım getirmektedir. Koşullu iyimserlik, yalnızca bireysel tutumlara değil; aynı zamanda kurumsal kültür, altyapı yeterliliği ve mesleki toplulukların desteğine bağlı olarak şekillenmektedir.

Sonuç olarak, bu araştırma hem kuramsal hem de uygulamaya dönük önemli katkılar sunmaktadır. TPB modeline dayalı olarak geliştirilen bu nitel analiz, AR/VR teknolojilerinin yükseköğretimde değerlendirme amaçlı kullanımına dair bütüncül bir anlayış geliştirilmesine olanak sağlamaktadır. Araştırma, politika yapıcılara, üniversite yöneticilerine ve eğitim teknolojisi geliştiricilerine, AR/VR entegrasyonu için altyapı yatırımları, öğretim elemanlarına yönelik destek sistemleri ve yeniliği teşvik eden kurumsal politikalar geliştirilmesi yönünde somut öneriler sunmaktadır.

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