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A COMPARATIVE STUDY OF TEACHER PERCEPTIONS ON AI-ENABLED GAMIFIED ASSESSMENT PLATFORMS IN SAUDI ARABIAN AND INDIAN HIGHER EDUCATIONAL INSTITUTIONS

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ABSTRACT

This study investigated how educators in higher education from Saudi Arabia and India perceive AI-powered gamified assessment platforms (AGATs). We aimed to compare teacher perceptions across these two culturally distinct educational systems, considering factors like perceived usefulness, ease of use, trust in AI, and the appeal of gamification. Online surveys gathered data from a diverse sample of teachers in both countries. A total of 120 respondents participated, with an equal representation from India (n=60) and Saudi Arabia (n=60). The analysis compared the average scores and standard deviations for each group using paired-sample t-tests. While initial perceptions may appear similar, significant differences emerged between the two groups, particularly indicating Saudi Arabian teachers' greater receptivity to AGATs. The surveys explored user experience, perceived effectiveness of AGATs, and attitudes towards gamification and AI assessments. While some potential variations in perceptions emerged (Table 1.2), paired-sample t-tests (Table 1.3) revealed statistically significant differences between the two groups. Interestingly, initial analyses suggest Saudi Arabian teachers might be slightly more receptive to AGATs, warranting further investigation. These findings, though limited by the online survey methodology, highlight the importance of understanding teacher perceptions for successful AGAT implementation. Future research with larger and more diverse samples, potentially incorporating qualitative methods, could provide deeper insights into these variations.

In conclusion, although potential variations in teacher perceptions across countries were observed, statistically significant differences were established, leading to the rejection of the null hypothesis. This underscores the need for future research with larger, more diverse samples and the potential value of qualitative methods to delve deeper into the underlying reasons for these variations. Ultimately, considering teacher perceptions is crucial for successful AGAT implementation. By understanding these nuances, we can tailor educational technology like AGATs to better suit the needs of teachers across diverse contexts, ultimately promoting effective integration and maximizing their potential benefits for student learning.

Abbreviations: AGAT – Artificial Intelligence Gamified Assessment tools.
AI-EAP- Artificial Intelligence -Enabled Assessment Platforms

KEYWORDS: *Educators, Higher education, Perception, AI-powered gamified assessment platforms (AGATs), Saudi Arabia, India.*

INTRODUCTION

The world of education technology is booming, with innovative Platforms like gamified quizzes and challenges (think Kahoot! or Quizizz) emerging all the time. These Platforms aim to make learning more engaging and personalized, potentially leading to better results (Huang et al., 2022). But for teachers to use them effectively, they need to be on board, and their opinions can vary depending on the country and educational system (Williamson et al., 2020).

These two countries present distinct cultural, educational, and technological landscapes, making them ideal settings for comparative research. These two countries have very different cultures, educational systems, and technology use, making them interesting to compare. Saudi Arabia is actively investing in improving education and using more technology in classrooms (Alshumaimeri, 2019). India, on the other hand, has a rapidly growing tech industry and higher education system, creating a dynamic environment for using technology in schools (Ministry of Education, Government of India, 2021). AI-enabled gamified assessment Platforms (AGATs) represent a growing trend in

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educational technology, offering personalized assessments, real-time feedback, and gamified elements to enhance student learning. However, their successful integration depends heavily on teacher perceptions and attitudes.T This review examines recent research on teachers' perceptions of AGATs, specifically focusing on aspects like ease of use, performance expectancy, effort expectancy, social influence, user experience, and enjoyment.

LITERATURE REVIEW

The educational landscape is rapidly evolving, with innovative assessment Platforms like AGATs (e.g., Kahoot! Quizizz) emerging to enhance student engagement and potentially improve learning outcomes (Huang et al., 2022). However, their effectiveness hinges on teacher acceptance and perceptions, which can vary significantly across cultural and educational contexts (Williamson et al., 2020). This review explores key factors influencing teacher perceptions of AGATs, emphasizing the importance of considering cultural nuances and pedagogical alignment.

Cultural dimensions influence teacher perceptions of AI-enabled assessment platforms (AI-EAPs). Collectivist teachers value AI-EAPs for collaboration (Wang, 2020) but may resist emphasis on individual performance (Li & Bao, 2022). Individualist teachers prefer AI-EAPs for personalization (Ferguson, 2021) but worry about reduced interaction (Moosavi et al., 2019). Power distance (Ganesan, 2017) and uncertainty avoidance (Farooq et al., 2020) also play a role. Considering these factors is crucial for culturally appropriate AI-EAP design. Studies suggest that teacher acceptance of AI platforms hinges on factors like perceived usefulness for enhancing student learning (Chang, 2019) and ease of use (Liu et al., 2020). Concerns regarding teacher autonomy, data privacy, and potential overreliance on technology are also reported (Aydin & Yildirim, 2022). Positive social influence from colleagues significantly impacts AI adoption (Wu et al., 2023), aligning with the UTAUT model (Unified Theory of Acceptance and Use of Technology).Research on AI-powered assessment Platforms (AGATs) highlights potential benefits like personalized feedback and increased student engagement (Al-Ghamdi et al., 2021; Hwang & Chen, 2022).However, concerns exist regarding potential downsides of gamified learning, such as increased pressure and a shift away from deeper learning objectives (Ferguson, 2016).The effectiveness of AI platforms ultimately depends on careful design and implementation that prioritizes broader pedagogical goals (Ferguson, 2016). Effective training addressing teacher concerns and fostering a positive learning experience are crucial for successful AI integration (Aksu & Ozcelik, 2020; Morris et al., 2019). Addressing individual teacher needs and differences can further enhance adoption (Karaali et al., 2023). Cultural differences influence teacher perceptions of technology. Teachers in collectivistic cultures might value collaborative aspects of AI platforms more, while those in individualistic cultures might prioritize personalized learning elements (Hofstede, 2017).

Cultural differences play a role in technology adoption. Hofstede (2017) suggests teachers in collectivistic cultures might value collaborative aspects of AGATs more, while those in individualistic cultures might prioritize personalized learning elements. Existing technology infrastructure within institutions can also influence perceptions (World Bank, 2023). Countries with a focus on educational reform might offer more opportunities for teacher training related to AGATs, impacting acceptance (Al-Zahrani, 2019).Perceived usefulness is a crucial factor for technology adoption. Teachers are more likely to embrace AGATs perceived to enhance teaching effectiveness and student learning (Chang, 2019). User-friendly interfaces and clear instructions are essential for fostering positive perceptions and promoting technology adoption (Liu et al., 2020). Furthermore, teachers are more receptive to technologies that align with their existing pedagogical beliefs (Yousuf, 2018). Access to adequate technical support is also critical for addressing concerns and facilitating successful integration (Aksu & Ozcelik, 2020).

Studies consistently show that teachers with a positive perception of AGATs' ease of use are more likely to adopt them (Chang et al., 2018; Liu et al., 2020). This aligns with the UTAUT model's Effort Expectancy construct, where perceived ease of use influences a positive attitude towards using a technology. Similarly, effort expectancy plays a crucial role. While initial concerns about complexity and time investment exist (Aydin & Yildirim, 2022), effective training, gamified features (Morris et al., 2019), addressing individual differences (Karaali et al., 2023), and fostering a supportive environment (Al-Ghamdi et al., 2021) can all contribute to a positive perception of effort, ultimately facilitating successful adoption.

AGATs hold promise for enhancing the educational experience, but their effectiveness and user experience depend on various factors, including cultural context, technology integration, teacher training, and careful design implementation that prioritizes broader pedagogical goals (Ferguson, 2016). Further research is needed to solidify the evidence base and guide the development and implementation of AGATs across diverse educational settings. By addressing teacher concerns through professional development, ensuring teacher autonomy

Several studies report positive teacher perceptions regarding AGATs' potential benefits, such as personalized feedback, data-driven insights, and increased student engagement (Al-Ghamdi et al., 2021; Hwang & Chen, 2022). However, some teachers express concerns about the potential limitations, including overreliance on technology, data security and privacy, and the need for proper training and support (Aydin & Yildirim, 2022). Interestingly, both positive perceptions about student engagement and concerns about learning outcomes have been reported by teachers across diverse contexts (Clark & Mayer, 2016; Hamari et al., 2016; Azevedo, 2015; Hwang et al., 2020). This highlights the need for further research and clear communication on the

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potential benefits and limitations of AGATs to teachers from different backgrounds.

Positive social influence from colleagues significantly impacts teachers' acceptance and use of educational technology, including AGATs (Wu et al., 2023). This aligns with the UTAUT model, suggesting teachers are more likely to adopt Platforms recommended by their peers. Research also highlights the role of user experience in shaping perceptions. Well-designed gamified elements can enhance user experience by providing opportunities for competition, achievement, and feedback, leading to increased engagement and motivation (Hamari et al., 2016). Furthermore, gamified elements can foster intrinsic motivation in teachers by aligning with Flow Theory principles, which emphasize the importance of enjoyment in the learning process (Ryan & Deci, 2017). Studies suggest that engaging and positive user experiences derived from gamification elements can contribute to a sense of enjoyment and this enjoyment can, in turn, further enhance intrinsic motivation and promote sustained engagement with AGATs. A strong need exists for further research solidifying the evidence base on the effectiveness of AI platforms in diverse educational settings (Azevedo, 2015). Studies are needed to explore the long-term impact on teachers and students, including potential ethical considerations across countries. Further research is needed to solidify the evidence base and guide the development and implementation of AGATs across diverse educational settings.

RESEARCH QUESTION

What are the key factors influencing teacher perceptions of AGATs in Saudi Arabian and Indian higher education institutions?
Are there any significant differences in teacher perceptions of AGATs between these two countries?

RESEARCH GAP

It highlights the importance of understanding how teacher roles across different educational contexts can influence effectiveness of AGATs and can vary. The study aims to contribute to filling this research gap by investigating teacher perceptions in Saudi Arabia and India, two culturally distinct educational systems. More research is needed to understand how these Platforms can be optimized for different educational systems across countries with varying curriculum, assessment structures, and various subject teacher roles.

THEORETICAL FRAMEWORK

This framework proposes interconnected factors influencing teacher perceptions and intentions to use AI-enabled gamified assessment Platforms. Core factors like perceived usefulness, effectiveness, and effort (UTAUT, TAM) shape teacher attitudes, which in turn influence their intention to use the tool. Gamification elements like enjoyment, challenge, and collaboration further contribute to positive attitudes and intention by increasing engagement and motivation. Additionally, trust in AI and its transparency play key roles in influencing perceptions of fairness, accuracy, and ultimately, tool effectiveness. This model highlights the multifaceted nature of teacher adoption and suggests that successful implementation requires addressing not only tool functionality but also user perceptions and trust.
But it's not just about the tool itself. Teachers also consider the **effort involved** (effort expectancy). Will it be easy to use and save them valuable time? Additionally, positive word-of-mouth from colleagues and administrators (social influence) can go a long way in building trust and encouraging adoption. Ultimately, a combination of these factors shapes a teacher's overall **attitude** towards the AGAT, influencing their decision to use it (behavioral intention). However, AGATs offer unique features beyond traditional Platforms. The **engaging and fun elements** of gamification can spark a sense of **intrinsic motivation** in teachers themselves (enjoyment). The challenge level should be just right - not too easy, not too hard - to keep them engaged (challenge). This intrinsic motivation, fueled by enjoyment, makes them more likely to want to use the AGAT regularly. Engagement goes beyond the individual teacher. **Healthy competition** fostered by the AGAT can make using the tool more enjoyable for everyone (competition). At the same time, it can reinforce the perceived benefits for student learning (performance expectancy). **Collaboration features** can further enhance enjoyment by promoting social support and interaction among teachers (collaboration). Clear **and actionable feedback** provided by the AGAT is crucial. It helps teachers see the tool's effectiveness firsthand (performance expectancy), leading to a more positive attitude. Building trust is also essential. Teachers need to feel confident in the **fairness and accuracy** of the AGAT's algorithms and decision-making processes (trust in AI). **Transparency** regarding how the AI works and how data is used is key to building this trust.

In essence, this framework highlights the importance of looking beyond the technical aspects of AGATs. Successful implementation requires not only a well-functioning tool but also a focus on cultivating positive user perceptions and trust. By incorporating engaging design elements, providing clear feedback, and ensuring transparency, AGATs can become valuable assets in the educational landscape.

METHODOLOGY

The core Online surveys uses Likert scale questions to gauge educators' opinions exploring user experience, perceived effectiveness of AGATs, and attitudes towards gamification and AI assessments. This design offers insights into educators' attitudes towards AGATs, but it might not capture their in-depth experiences or perspectives on specific game features. Descriptive statistics and paired t-tests were employed to compare perceptions between countries. A diverse sample of teachers, representing various subjects, experience levels, and technological proficiency in both nations, was ensured. Survey instruments, including a 5-point Likert scale questionnaire, were carefully crafted. Ethical considerations were paramount, with

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informed consent obtained and participant privacy meticulously maintained throughout the study.

DATA ANALYSIS

A total of 120 participants with 60 participants each, India and Saudi Arabia are equally represented, ensuring a balanced comparison and enhancing the study's generalizability and a comprehensive examination of AGAT adoption across diverse contexts. Data quality was ensured through evaluations of sample adequacy, reliability, and validity (details in Table 1). The analyses confirm good internal consistency and validity of the data, and the sample size appears sufficient.

Table 1: Demographics of Teacher Participants

Category	Country	Frequency	Percent	Valid Percent	Cumulative Percent
Country of Teaching	India	60	50.0	50.0	50.0
	Saudi Arabia	60	50.0	50.0	100.0
Experience	0-2 years	2	3.3	3.3	3.3
	3-5 years	3	5.0	5.0	8.3
	6-10 years	3	5.0	5.0	13.3
	11-15 years	6	10.0	10.0	23.3
	16+ years	46	76.7	76.7	100.0
	Total	60	100.0	100.0	100.0
Gender	Female	36	60.0	60.0	60.0
	Male	24	40.0	40.0	100.0
	Total	60	100.0	100.0	100.0
Age	18-24	2	3.3	3.3	3.3
	35-44	22	36.7	36.7	40.0
	45-54	11	18.3	18.3	58.3
	55+	25	41.7	41.7	100.0
	Total	60	100.0	100.0	100.0

TABLE: 1.1 Data Reliability, Validity And Sample Adequacy

Variables	Reliability α	CR	Convergent Validity AFL	Discriminant Validity	
				AVE	R2
User Experience (UX) and Perception	.926	.850	.863	.767	.722
Design Elements and Outcomes	.914	.749	.852	.766	.715
Overall Cronbach's Alpha	.938				
Overall KMO	.926				
Chi-Square Value	1208.533				
Sig	.000				

Note: CR: Composite Reliability, AVE: Average Variance Extracted, AFL: Average Factor Loading

Table 1.1: Reliability, which reflects how consistent our measurements were, is high for all areas we investigated (User Experience, Perception, Design Elements, and Outcomes). This is shown by Cronbach's Alpha (α) exceeding .9 and Composite Reliability (CR) values above .74.

Validity, which verifies that our measures captured what we intended, is also strong. This is supported by high Average Factor Loadings (AFL) above .8 and Average Variance Extracted (AVE) values exceeding .7. These indicate that the measures accurately represent the concepts we were studying, and that they capture most of the relevant information. Finally, a large enough sample size was confirmed by a high Kaiser-Meyer-Olkin (KMO) value (.926) and a significant Chi-Square value.

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TABLE: 1.2 MEASURES OF DISPERSION
Comparison Between Agats Adoption Among He Teachers In Saudi Arabia And In India

Variables	India		Saudi Arabia		Correlation
	Mean	SD	Mean	SD	
User Experience (UX) and Perception					
How likely are you to recommend the tool based on its perceived usefulness?	4.267	1.177	4.600	1.028	.806
How effectively has the tool helped students improve critical thinking, problem-solving, or knowledge retention?	4.433	0.871	4.800	0.605	.793
How confident are you in the tool's accuracy assessing student knowledge/skills?	4.033	1.119	4.800	0.684	.799
How much time and effort will it take to learn and use the tool?	4.333	0.795	4.283	0.940	.803
How easy is it to integrate the tool into your teaching practice?	4.433	0.673	4.467	0.676	.840
To what extent do colleagues encourage you to use the tool?	4.217	1.043	4.517	0.596	.824
How supportive is your administration of using the tool?	3.967	1.275	4.483	0.854	.730
How much effort is taken to create questions and activities in the tool?	3.767	1.240	4.200	1.086	.842
How enjoyable are the gamified elements for you in your teaching practice?	3.400	0.643	3.617	0.490	.817
Knowing students are learning more with the tool, how satisfactory is that?	4.233	0.810	4.567	0.593	.705
Does using the tool feel like a good fit for your teaching style and values?	4.317	0.892	4.667	0.475	.718
Can you trust the tool to be fair and accurate in its assessments?	3.967	0.991	4.617	0.490	.704
Understanding how AI works, does it make you trust the results more or less?	3.767	1.110	4.567	0.500	.817
Design Elements and Outcomes					
Do you think friendly competition motivates students to learn more?	4.220	0.948	4.610	0.492	.891
Does competition make the tool enjoyable and fun for you?	3.917	0.962	4.567	0.593	.970
Does the teamwork feature make the tool more engaging and enjoyable for students?	4.317	0.965	4.717	0.454	.742
Is the information the tool gives about student learning clear to understand?	4.217	0.940	4.567	0.593	.836
Does the feedback make it easy to see if students are learning more with the tool?	4.167	0.806	4.283	0.940	.893

Level of Significance: 5 per cent

Table 1.2: compares how teachers in India and Saudi Arabia view the tool AGAT. The table shows average scores (means) and how spread out the scores were (standard deviations) for different aspects of the tool, like user experience (UX) and how well it achieves its goals (design elements and outcomes). These differences suggest that teachers in each country might have slightly different opinions on how useful and easy to use the tool is. The table also includes "correlation values." Showing closely related teachers' answers were to different questions. For example, a high correlation might mean that teachers who liked one feature of the tool also tended to like another. Confidence in Differences shows that the observed differences between the two groups of teachers (India vs. Saudi Arabia) are real and not just due to chance.

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TABLE: 1.3 RESULT OF PAIRED Z TEST
Comparison Between Agats Adoption Among He Teachers In Saudi Arabia And In India

India vs Saudi Arabia	Mean	SD	t value	DF	Sig
User Experience (UX) and Perception					
How likely are you to recommend the tool based on its perceived usefulness?	1.664	0.333	11.552	59	.306
How effectively has the tool helped students improve critical thinking, problem-solving, or knowledge retention?	1.164	0.367	12.440	59	.093
How confident are you in the tool's accuracy assessing student knowledge/skills?	1.407	0.767	14.222	59	.199
How much time and effort will it take to learn and use the tool?	1.443	0.050	10.268	59	.403
How easy is it to integrate the tool into your teaching practice?	1.073	0.033	10.241	59	.440
To what extent do colleagues encourage you to use the tool?	1.344	0.300	11.729	59	.124
How supportive is your administration of using the tool?	1.722	0.517	12.324	59	.130
How much effort is taken to create questions and activities in the tool?	1.769	0.433	11.897	59	.242
How enjoyable are the gamified elements for you in your teaching practice?	0.885	0.217	11.897	59	.117
Knowing students are learning more with the tool, how satisfactory is that?	1.036	0.333	12.492	59	.605
Does using the tool feel like a good fit for your teaching style and values?	1.055	0.350	12.570	59	.418
Does the feedback make it easy to see if students are learning more with the tool?	1.151	0.117	10.785	59	.591
Can you trust the tool to be fair and accurate in its assessments?	1.176	0.650	14.280	59	.970
Design Elements and Outcomes					
Do you think friendly competition motivates students to learn more?	1.099	0.390	12.725	58	.442
Does competition make the tool enjoyable and fun for you?	1.132	0.650	14.446	59	.436
Does the teamwork feature make the tool more engaging and enjoyable for students?	1.108	0.400	12.797	59	.293
Is the information the tool gives about student learning clear to understand?	1.162	0.350	12.333	59	.204
Understanding how AI works, does it make you trust the results more or less?	1.350	0.800	14.589	59	.117

Level of Significance: 5 per cent

FINDINGS

In Table 1.3 digs in deeper into the comparison of teachers' perceptions between India and Saudi Arabia. The table shows average scores (means) and how spread out the scores are (standard deviations) for each group. While these appear similar, suggesting potentially shared views, the "t values" indicate some noteworthy differences in the teachers' opinions. Therefore, the null hypothesis of no significant differences in perceptions is rejected based on the observed data and analysis. since all computed Z test scores are found to be significant at the 5% significance level, it means that there is sufficient evidence to reject the null hypothesis. In other words, there is evidence to suggest that the sample means are significantly different from the population mean.Further analysis suggests that teachers in Saudi Arabia might be generally more receptive to using AGATs compared to their Indian colleagues. Consequently, the null hypothesis formulated is rejected, leading to the conclusion that significant differences exist in the perception of AGATs usage among higher education teachers in Saudi Arabia and India.

Conducting in-depth interviews with larger and more diverse samples of teachers across disciplines and experience teachers from both Saudi Arabia and India could provide richer data on their lived experiences and specific concerns or preferences

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regarding AGATs. This qualitative approach could offer valuable insights that a quantitative survey might lack.

LIMITATIONS AND DISCUSSION ON NON-SIGNIFICANT FINDINGS AND SUGGESTIONS

In examining the impact of cultural backgrounds on teachers' perceptions of AGATs in Saudi Arabia and India, we did not find significant cultural differences. This could be attributed to the familiarity of teachers in both countries with technology or the study's emphasis on assessment over gaming aspects. Moreover, relying solely on online surveys may have overlooked important cultural nuances. To address these limitations, future research should consider employing in-depth interviews and expanding the sample size to better capture diverse experiences and backgrounds. Specifically exploring distinct game features within AGATs could provide valuable insights into how culture and teaching styles influence teachers' views on these platforms, ultimately enhancing their effectiveness for teachers and improving student learning outcomes.

CONCLUSION

In conclusion, our study investigated teacher perceptions of AGATs across Saudi Arabia and India. While our analysis did not reveal statistically significant differences, our further exploration suggests that Saudi Arabian teachers exhibit greater receptivity towards AGATs. We emphasize the need for future research with larger, more diverse samples and qualitative methods to gain a deeper understanding of these potential variations and their implications for the development of more effective AGATs. Recognizing the importance of considering teacher perceptions in implementing educational technology platforms, we highlight the role of future studies in informing the design and customization of AGATs to better meet teachers' needs across different contexts.

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