Cross-National Perceptions of Generative AI in Higher Education: A Comparative Study of University Students in the UK and Turkey

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***Abstract*—This study provides a comparative analysis of university students' perceptions and usage of Generative AI (GenAI) in two distinct educational environments: the United Kingdom (UK) and Turkey. Data were collected from approximately 300 students in each country using the Generative AI Student Perception and Experience Index (GEN-AI SPEX) survey. This instrument is designed to holistically measure student interactions with GenAI by capturing their usage patterns, perceptions of benefits and challenges, and future expectations. The findings reveal a shared consensus on GenAI's efficiency and its inevitable impact on future society and employment. However, significant cross-national differences emerge in practical application and critical evaluation. Turkish students report higher usage of GenAI for direct academic tasks like homework and essay writing, positioning them as 'pragmatic adopters'. This term describes users who prioritize the immediate efficiency and task-completion benefits of the technology over a deeper evaluation of its output's accuracy. In contrast, UK students exhibit greater skepticism regarding the reliability of GenAI outputs and are more hesitant to see it as a substitute for human instructors, acting as 'critical evaluators'. This profile characterizes users who actively question the reliability of AI-generated content, valuing accuracy and contextual appropriateness more than speed. Statistical analysis using the Mann-Whitney-Wilcoxon test confirms that these differences are significant across multiple perceptual sub-domains. The study concludes that a one-size-fits-all approach to GenAI integration in higher education is inadequate, highlighting the need for context-aware policies that foster critical AI literacy while harnessing the technology's benefits. Overall, the study provides empirical evidence to enrich the under-explored literature on cross-national perceptions of Generative AI in higher education.**

***Keywords*—Generative AI, higher education, cross-national study, student perceptions, ChatGPT, AI in education, Turkey, UK**

I. Introduction

The rapid development of Generative Artificial Intelligence (GenAI) technologies—such as ChatGPT, Gemini, and CoPilot—has transformed how students engage with academic content. These tools offer immediate feedback, language generation, and idea development, which are increasingly integrated into learning processes across higher education. Despite the expanding interest in GenAI applications, comparative studies across countries remain scarce, particularly within student populations in tertiary education.

This study addresses a significant gap in the literature by comparing university students' perceptions of generative AI (GenAI) tools in two socio-technologically distinct contexts: the United Kingdom (UK) and Turkey. The UK has long been recognized for its advanced digital infrastructure and institutional frameworks supporting ethical AI integration in education [1, 2]. It boasts a high degree of digital maturity, widespread use of AI-driven platforms, and national strategies aligned with AI ethics and digital transformation [3]. Conversely, Turkey represents a rapidly developing context in terms of digital education. While national initiatives like the FATİH Project have improved access to technology in schools, the integration of AI into higher education policies and institutional capacities remains at an emergent stage [4, 5]. This contrast offers a valuable lens for cross-national comparison.

A comparative perspective between the UK and Turkey is particularly valuable for understanding how national context influences students' familiarity with GenAI, their academic use cases of such tools, and their ethical or motivational concerns. Prior studies [6] have provided macro-level insights into cross-national AI attitudes in Europe, but they did not focus on the educational applications or specific student populations. By narrowing the lens to higher education contexts in two distinct national systems, this study contributes unique empirical evidence to the field of AI in education.

II. Literature Review

The rapid advancement of Generative Artificial Intelligence (GenAI) technologies has triggered significant interest in their implications for teaching and learning in higher education. As tools like ChatGPT and other large language models become increasingly accessible, researchers have begun to explore how these systems are transforming students' academic behaviors, learning strategies, and ethical considerations [7, 8]. GenAI's capacity to assist with writing, summarization, ideation, and translation has made it particularly attractive in academic settings [9, 10], where learners often seek personalized and on-demand support.

A growing body of literature highlights university students' generally positive attitudes toward GenAI. In Chan and Hu's survey of 399 Hong Kong undergraduates and

postgraduates, students expressed appreciation for the efficiency, creativity, and brainstorming support these tools offer [11]. Similarly, Zhou (2024) reports that students actively engage with GenAI for academic writing and research tasks, while simultaneously voicing concerns about data accuracy, originality, and dependency. This dual perception—recognizing both the benefits and the risks—has become a recurring theme across multiple studies [12, 13].

Crucially, research suggests that students' underlying attitudes toward AI shape how they perceive its usefulness. For example, positive attitudes correlate strongly with perceived gains in efficiency, creativity, and design autonomy in artistic and design-related education [14]. Conversely, skepticism about AI's role tends to limit its perceived effectiveness and the likelihood of adoption. These findings emphasize the importance of students' cognitive-emotional framing in determining the educational value they attribute to GenAI.

While such research offers valuable insights, most studies are limited to single-institution or national contexts. One of the few cross-cultural studies comparing Indian and Northern Irish students was conducted by Gerard *et al.* [15], uncovering important variations in institutional trust, ethical norms, and readiness for AI integration. Their work points to the influence of cultural and pedagogical traditions in shaping student responses to GenAI. Yet, there remains a lack of comparative data from regions like Turkey and the UK—countries with distinct educational systems, digital infrastructures, and student expectations.

This study contributes to the growing body of research on GenAI in higher education in three significant ways. First, it provides one of the first comparative investigations of university students' perceptions of GenAI tools across two distinct cultural and educational contexts—Turkey and the United Kingdom—thus expanding the geographic scope of existing literature beyond typically studied Anglophone and East Asian regions. Second, by exploring how contextual factors such as educational norms, digital infrastructure, and institutional trust influence student attitudes, the study offers a more nuanced understanding of how GenAI is interpreted and utilized in diverse environments. Third, the findings aim to inform culturally responsive pedagogical strategies and ethical AI literacy frameworks that align with students' needs, concerns, and values as they engage with GenAI in their academic lives.

III. Data Collection

The purpose of the survey is to investigate students' experiences and perceptions of Generative AI (GenAI SPEX Survey). This survey aims to understand how students utilize and perceive Generative AI technologies, including but not limited to tools like ChatGPT.

There are 3 main parts (Familiarity - Benefits and Challenges - Future sections) of the survey, including both 5-scale Likert-type questions and open-ended ones at the end of each section. Specific items for each part are listed as below;

Familiarity (encoded from Familiarity_1 to 8);

- "I believe advancements in generative AI tools will significantly enhance my personal and academic growth."
- "I prefer traditional search engines over Generative AI tools for information."
- "I am confident in my ability to use Generative AI tools effectively."
- "Generative AI tools are essential in my self-learning process."
- "I am not concerned with staying updated on Generative AI advancements."
- "Responses from Generative AI tools often lack reliability and contextual appropriateness."
- "Generative AI tools are accessible and user-friendly, regardless of one's economic or technical background."
- "I lack understanding of data security and privacy concerns in using Generative AI tools.

Benefits and Challenges (encoded from Benefits and Challenges_1 to 9);

- "I believe Generative AI tools can help students save time."
- "I don't think Generative AI tools can help me write more efficiently."
- "I think Generative AI tools can provide me with personalized and immediate feedback."
- "Generative AI tools are as effective as human instructors in guiding coursework."
- "Using Generative AI tools boosts my development of transferable skills."
- "My use of Generative AI tools does not significantly involve critical thinking."
- "Generative AI tools provide little assistance in numerical and quantitative subjects."
- "Generative AI tools effectively overcome language barriers in education."
- "Using Generative AI for homework does not diminish the educational value."

Future (encoded from Future_1 to 6);

- "The possible integration of Generative AI tools in higher education will have a negative impact on teaching and learning."
- "The use of Generative AI tools in academic settings should be allowed."
- "Generative AI tools could potentially substitute for some functions of human teachers and tutors."
- "It is unlikely that personal Generative AI assistants will become widespread."
- "Proficiency in Generative AI tools will be crucial for competitiveness in future job markets."
- "Gen AI tools will dramatically influence work, society, and daily life in the next 5 years."

For the data collection, a university online survey system (such as Jisc or similar) is used for the survey delivery and management. For the UK cohort, students who are taking a course in the School of Mathematics were invited to participate in this study during the second semester in 2023-2024 academic year. In similar timings, for Turkey cohort, the same survey was distributed to university students in Turkey, with participants drawn primarily from the field of Elementary Mathematics Education.

IV. Demographics and Participant Backgrounds

For the UK cohort, the overall participants were classified as Undergraduate (UG) and Postgraduate (PGT) levels, as 89% (262 participants) and 11% (33 participants) in general.

According to the breakdown of Pre-Honours (Years 1–2) and Honours (Years 3–5) based on their year levels, we had an equal number of participants (50%-50%). While the exact breakdown by year or other demographic variables (e.g., gender, age, nationality) was not collected in detail, this classification provides a general sense of the academic progression of the respondents. For further details and some initial findings for UK cohort, interested readers are referred to the published summary [16].

In the Turkey cohort (n = 296), participants represent a diverse range of academic disciplines, providing a broad perspective on GenAI perceptions. The sample is composed of students from mathematics-related fields (e.g., Mathematics, Mathematics Education, Statistics), accounting for approximately 36% of the participants. The cohort also features a substantial representation from other STEM fields, including various engineering and science disciplines (approximately 35%). Furthermore, students from the Social Sciences and Humanities (e.g., Psychology, International Relations, Business Administration) constitute about 20% of the sample, with the remaining 9% from other educational fields (e.g., Foreign Language Education, Early Childhood Education). The majority of participants hold a Bachelor's degree (BS), with a detailed breakdown of their academic year distribution provided in the original study's data. This disciplinary diversity within the Turkish cohort is a key feature of our comparative analysis.

V. Comparative Results

A. Familiarity on Tech Savviness vs. Generative-AI

To describe the general characteristics of the two cohorts, we examined the questions "How familiar are you with technology usage in general?" and "How familiar are you with Generative AI tools?" to understand how the knowledge of general technology is important for familiarity with GenAI tools. The detailed distribution of general technology familiarity for both cohorts is presented in Table 1. Across both the UK and Turkey cohorts, the general patterns of technology familiarity are largely similar, with only minor numerical differences. Still, familiarity with technology does not bring direct familiarity with GenAI because of the general numerical patterns, specifically for the groups of "Very familiar" and "Moderately familiar".

Table 1. Technology familiarity of UK cohort vs. Turkey cohort

Country	Extremely Familiar	Very Familiar	Moderately Familiar	Slightly Familiar	Not Familiar
UK	90 (30.51%)	117 (39.66%)	72 (24.41%)	15 (5.08%)	1 (0.34%)
Turkey	88 (29.73%)	139 (46.96%)	60 (20.27%)	9 (3.04%)	0 (0%)

Table 2. Generative AI tools familiarity of UK cohort vs. Turkey cohort

Country	Extremely Familiar	Very Familiar	Moderately Familiar	Slightly Familiar	Not Familiar
UK	27 (9.15%)	70 (23.72%)	126 (42.71%)	63 (21.30%)	9 (3.05%)
Turkey	40 (13.51%)	91 (30.74%)	116 (39.19%)	43 (14.53%)	6 (2.03%)

An analysis of student self-reported familiarity reveals a nuanced picture of digital competence across the two cohorts. Both UK and Turkish students report very high levels of general technology familiarity, with over 70% in each group identifying as "Extremely" or "Very Familiar". This establishes a strong foundation of tech-savviness in both populations. However, this high level of general confidence does not directly translate to equivalent expertise in Generative AI. A noticeable drop-off is observed when students are asked specifically about GenAI tools. A detailed comparison of students' familiarity with Generative AI tools is provided in Table 2. While the majority in both cohorts possess at least a moderate familiarity, Turkish students report a higher concentration in the "Extremely Familiar" (13.51%) and "Very Familiar" (30.74%) categories compared to their UK counterparts (9.15% and 23.72%, respectively). Conversely, the UK cohort has the largest single group in the "Moderately Familiar" category (42.71%). This suggests that while GenAI exposure is widespread, the depth of familiarity appears slightly more pronounced among the Turkish students, whereas the UK student body's experience is more broadly distributed across a moderate level of engagement.

B. Use of Gen-AI by Students across Countries

For the UK cohort (n = 295), based on the full participant group, the most common use of generative AI tools was asking technical questions, selected by 64.4% of respondents. This was closely followed by asking quick questions when stuck on a problem (60%) and explaining concepts (58.3%), suggesting that learners predominantly use GenAI for immediate, knowledge-focused academic support. General knowledge or advice-seeking also featured prominently (54.2%), while conversational use out of curiosity (50.2%) and checking solutions (41.4%) reflected both exploratory and verification-oriented engagement. Less frequent, but still notable, were uses such as solving homework (28.1%) and writing essays (16.6%). A smaller share of students reported other uses (12.9%), and only 7.1% indicated they had not used generative AI tools. An overview of GenAI usage patterns among UK students is visualized in Fig. 1.

For the Turkey cohort, among students who reported familiarity with generative AI tools (n = 290), the most common usage was "asking general knowledge questions or seeking advice," cited by 63.79% of respondents. This was followed closely by "asking technical questions" (58.62%) and using AI to "explain concepts" (53.79%), suggesting that students primarily engage with generative AI as a learning aid and informational resource. A substantial proportion also reported using "AI for solving homework" (49.66%) and "asking quick questions when stuck on a problem" (47.24%), indicating its perceived utility in real-time academic problem-solving. Other notable uses included "checking solutions" (43.45%), "carrying on conversations out of curiosity" (37.93%), and "writing essays (33.45%)". A small minority indicated that they "had not used" Gen-AI tools despite being familiar with them (4.83%), while other uses (7.93%) reflected a range of less common, potentially

creative or exploratory applications. The distribution of GenAI usage among Turkish students is presented in Fig. 2.

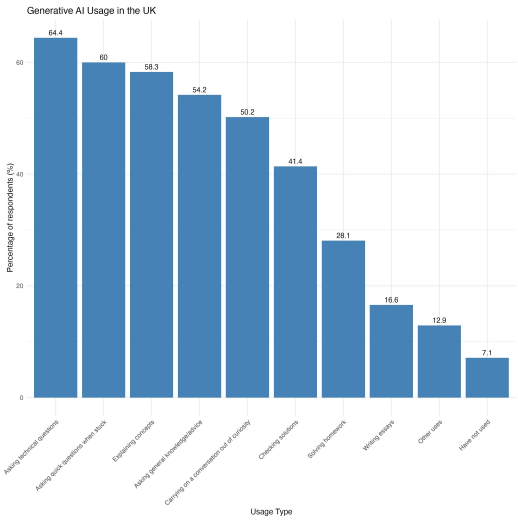

Fig. 1. UK cohort on Gen-AI usage.

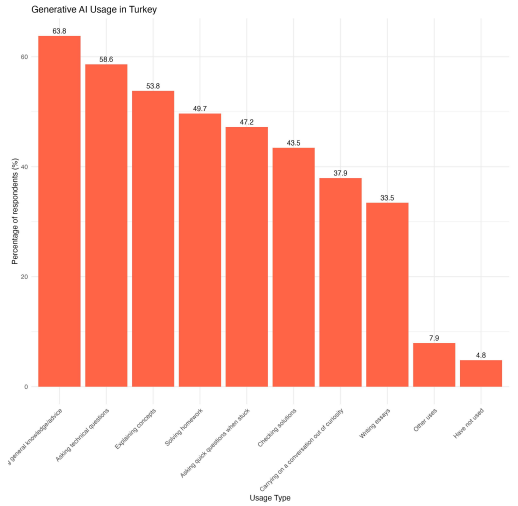

Fig. 2. Turkey cohort on Gen-AI usage.

For both cohorts, explaining concepts and checking solutions are commonly reported use cases, reinforcing the educational use of GenAI tools. On the other side, solving homework and writing essays were substantially more common in Turkey (49.7% and 33.5%) than in the UK (28.1% and 16.6%), suggesting that Turkish students may be leveraging GenAI for more direct academic task support. Overall, while both cohorts rely heavily on GenAI for learning-related tasks, UK students emphasize troubleshooting and concept explanation, whereas Turkish students are more likely to apply GenAI to complete academic work directly, which may have implications for their learning processes. These differences may reflect cultural, pedagogical, or policy factors shaping how GenAI is perceived and permitted in educational contexts.

To further specify the tools in use, participants were asked to list the Generative AI platforms they were familiar with. The responses overwhelmingly identified ChatGPT as the primary tool, mentioned by a vast majority of students. Following ChatGPT, other large language models such as Google's Gemini (formerly Bard) and Microsoft Copilot were also frequently cited. Beyond text-based LLMs, students reported using a range of specialized tools, including image generators (e.g., Midjourney, DALL-E), and AI-powered writing assistants (e.g., Grammarly, QuillBot). For the UK cohort, similarly ChatGPT selected as a primary tool, where some students emphasized the use of open-source LLMs, or more specific tools such as Wolfram Alpha or Github Co-pilot. Google's Gemini (formerly Bard) and Microsoft Copilot (formerly Bing Chat) were also cited, similar to Turkish participants. There are some specific tools cited for certain tasks, including image generators (e.g., Midjourney, DALL-E), and AI-powered writing assistants (e.g., Grammarly, QuillBot) or searching papers (e.g. Perplexity, Elicit). This variety indicates that while ChatGPT serves as the main gateway to GenAI for most students, they also explore a broader ecosystem of specialized tools.

C. Perceptions and Perspectives on Generative AI

Across two countries, similar Likert-type data were collected under three main parts, as described before. For each of the items, the overall numerical summary (mean and st. deviation) is presented below to have a cross comparison.

Table 3. Familiarity Likert items Summary-Mean (SD) values of UK and Turkey cohorts

Country	1	2	3	4	5	6	7	8
UK	3.41 (1.21)	3.82 (1.08)	3.48 (1.14)	2.51 (1.39)	2.93 (1.19)	4.26 (0.86)	3.64 (0.98)	3.41 (1.21)
Turkey	3.80 (0.91)	3.07 (1.10)	3.48 (0.95)	3.72 (1.03)	2.70 (1.19)	3.08 (0.98)	3.76 (0.88)	3.01 (1.20)

As shown in Table 3, a holistic analysis of the familiarity items reveals a complex student relationship with GenAI, characterized by both confidence and caution. While students in both cohorts report similar levels of confidence in their ability to use GenAI tools effectively (Item 3), their perceptions of its role and reliability diverge significantly. Turkish students more strongly endorse GenAI's essential role in their personal and academic growth and self-learning processes (Item 1 and 4). This indicates an integration of these tools into their core learning identity. Conversely, UK students exhibit a far more critical stance. The most striking difference is in their assessment of reliability (Item 6), where the UK mean (M = 4.26) points to a deeply ingrained skepticism not present in the Turkish cohort (M = 3.08). This skepticism is complemented by a stronger preference for traditional search engines (Item 2) among UK students. This suggests that while both groups are technically capable, the Turkish cohort leans towards being 'trusting integrators' while the UK cohort acts as 'cautious evaluators'.

The perceived benefits and challenges of GenAI showcase both universal agreements and context-specific disagreements, given in Table 4. A powerful cross-national consensus exists on the primary benefit of efficiency, with both cohorts strongly agreeing that GenAI saves time (Item 1). However, when moving from efficiency to pedagogical value, clear differences emerge. UK students are profoundly more skeptical about GenAI's effectiveness compared to human instructors (Item 4, M = 1.96), viewing

them as largely inferior. The Turkish cohort, while still favoring human teachers, is significantly less categorical in this view ($M = 2.83$). Furthermore, Turkish students report a stronger belief in GenAI's capacity to provide personalized feedback (Item 3), develop transferable skills (Item 5), and overcome language barriers (Item 8). On the topic of critical thinking (Item 6), the cohorts are closer, suggesting a shared ambiguity about whether GenAI use is a passive or active cognitive process. These patterns imply that while all students value speed, Turkish students perceive a broader, more substantive educational utility in GenAI across various domains.

Table 4. Benefits / challenges Likert items Summary-Mean (SD) values of UK and Turkey cohorts

Country	1	2	3	4	5	6	7	8	9
UK	4.10 (0.90)	2.88 (1.20)	3.30 (1.18)	1.96 (1.18)	2.86 (1.14)	2.93 (1.20)	3.31 (1.24)	3.18 (0.99)	2.80 (1.24)
Turkey	4.32 (0.76)	2.70 (1.28)	3.83 (0.91)	2.83 (1.18)	3.50 (0.98)	3.22 (1.07)	3.18 (1.12)	3.76 (0.94)	2.95 (1.21)

Table 5. Future Likert items Summary-Mean (SD) values of UK and Turkey cohorts

Country	1	2	3	4	5	6
UK	2.95 (1.16)	3.59 (1.13)	2.54 (1.36)	2.35 (1.05)	3.76 (1.02)	4.22 (0.98)
Turkey	2.79 (1.10)	3.66 (1.01)	3.29 (1.08)	2.33 (1.11)	3.96 (0.85)	4.20 (0.79)

When predicting the future, students from both nations share a clear vision of GenAI's macro-level impact but differ on its micro-level integration into education. Students' expectations about future implications of GenAI are summarized in Table 5. There is a robust and compelling agreement on the broader societal and professional consequences; students in both the UK and Turkey are convinced that GenAI will be crucial for future job markets (Item 5) and will dramatically influence daily life within five years (Item 6). Taken together, this signals a unified generational expectation. The divergence occurs when considering GenAI's role within academia itself. Turkish students are notably more open to the idea that AI could substitute some functions of human teachers (Item 3). In contrast, UK students are more resistant to this notion and also show slightly higher concern about the potential negative impacts of GenAI on teaching and learning (Item 1). Despite these differences in role perception, it is crucial to note that both groups ultimately lean towards the conclusion that GenAI tools should be allowed in academic settings (Item 2), accepting their presence even if they disagree on their ultimate function.

To illustrate, one can observe the response distribution across UK on certain items of Future, given as in Fig. 3, which highlights the larger agreement on the "AI will dramatically influence work, society, and daily life in the next 5 years.", similar to the Turkey cohort indeed.

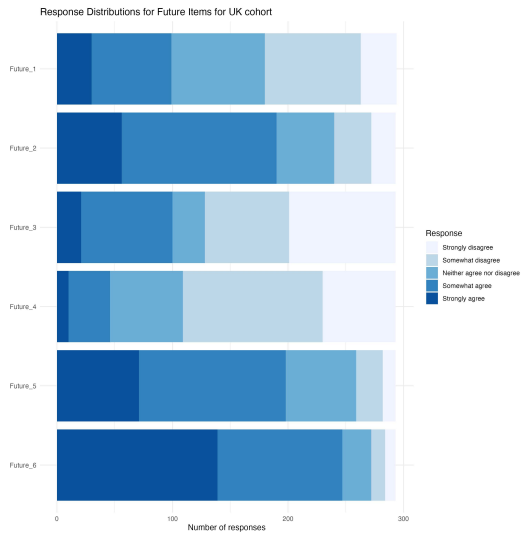

Fig. 3. Responses for the future items for the UK cohort.

Additionally, we examined the correlation structure among the items of each part across two cohorts. To illustrate, again, the relationship between the Future items for the UK cohort is visualized in Fig. 4 below,

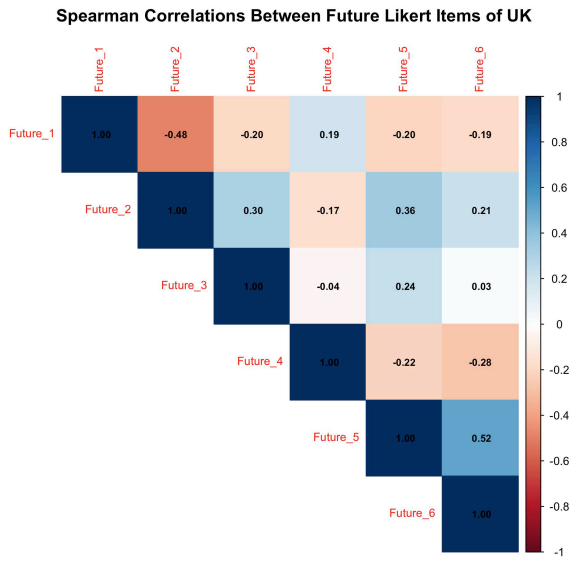

Fig. 4. Future items pair-correlations for UK cohort.

The Spearman correlation matrix for the UK cohort (Fig. 4) illuminates the interconnected nature of their future predictions, suggesting a coherent underlying mindset. The strong positive correlations, particularly between seeing GenAI as crucial for jobs (Item 5), expecting it to influence society (Item 6), and believing it should be allowed in academia (Item 2), reveal a consistent "pro-integration" perspective. Students who believe in GenAI's external impact are also more likely to advocate for its internal acceptance. Conversely, the negative correlations offer a more nuanced view. For instance, the belief that GenAI will substitute for teachers (Item 3) is negatively correlated with the idea that personal AI assistants are unlikely (Item 4). This suggests students see these phenomena as linked: a future with widespread personal assistants is also a future where the role of the traditional teacher might be diminished. Although a matrix for the Turkish cohort is not visualized, the descriptive data suggest that their even stronger conviction in GenAI's importance would likely yield similar, if not stronger, positive correlations between items related to future relevance and societal impact, reflecting a highly optimistic

and integrated future-view. Similar correlation findings are derived for all items under three domains, and available upon request.

D. Testing on Response Distributions

We also check whether there are differences between UK and Turkish students (Mann-Whitney-Wilcoxon test) and the effect size (Cliff's delta) over each item beyond their summary statistics. For that purpose, for the combined data over the Likert-scale item results, we considered the non-parametric Mann-Whitney-Wilcoxon test with the effect size discussion. All the item results are summarized in Table 6 below, where the final column is evaluated based on the magnitude of the size using the thresholds provided in [17, 18].

Table 6. Wilcoxon test and cliff's delta effect sizes for the UK and Turkey cohort comparison

Item Name_No	p-value	Resul t	Cliff delta	Effect Size
Familiarity_1	0.0004	TRUE	−0.161	SMALL
Familiarity_2	0.0000	TRUE	0.368	MEDIUM
Familiarity_3	0.4840	FALSE	0.032	NEGLIGIBLE
Familiarity_4	0.0000	TRUE	−0.488	LARGE
Familiarity_5	0.0208	TRUE	0.106	NEGLIGIBLE
Familiarity_6	0.0000	TRUE	0.622	LARGE
Familiarity_7	0.1820	FALSE	−0.059	NEGLIGIBLE
Familiarity_8	0.0000	TRUE	0.191	SMALL
Benefits and Challenges_1	0.0019	TRUE	−0.135	NEGLIGIBLE
Benefits and Challenges_2	0.0529	FALSE	0.088	NEGLIGIBLE
Benefits and Challenges_3	0.0000	TRUE	−0.241	SMALL
Benefits and Challenges_4	0.0000	TRUE	−0.412	MEDIUM
Benefits and Challenges_5	0.0000	TRUE	−0.309	SMALL
Benefits and Challenges_6	0.0033	TRUE	−0.135	NEGLIGIBLE
Benefits and Challenges_7	0.1333	FALSE	0.069	NEGLIGIBLE
Benefits and Challenges_8	0.0000	TRUE	−0.328	SMALL
Benefits and Challenges_9	0.1611	FALSE	−0.065	NEGLIGIBLE
Future_1	0.0981	FALSE	0.076	NEGLIGIBLE
Future_2	0.8277	FALSE	−0.010	NEGLIGIBLE
Future_3	0.0000	TRUE	−0.317	SMALL
Future_4	0.6735	FALSE	0.019	NEGLIGIBLE
Future_5	0.0494	TRUE	−0.088	NEGLIGIBLE
Future_6	0.1318	FALSE	0.066	NEGLIGIBLE

The Mann-Whitney-Wilcoxon test results in Table 6 move beyond simple mean comparisons to confirm that the response distributions between the UK and Turkish cohorts are, for most items, statistically and practically different. The overall pattern is not one of random variation but of a systematic divergence in perception across multiple domains.

The most profound differences, evidenced by large effect sizes, center on the foundational themes of trust and pedagogical role. The exceptionally large effect on Familiarity_6 (Reliability) confirms that the UK cohort's skepticism is a major, practically significant point of departure. This is coupled with a similarly large effect on Familiarity_4 (essential for self-learning), which underscores the Turkish cohort's fundamentally different view of GenAI as a core educational tool. These are not minor opinion differences; they represent distinct relationships with the technology.

This central divide is further supported by items with medium effect sizes, such as Benefits_4 (Effectiveness vs. human instructors), which highlights the UK students' significantly stronger defense of the human teacher's role. These medium-impact differences reinforce the narrative of the UK cohort as 'critical evaluators' and the Turkish cohort as 'pragmatic adopters'. Finally, the items showing no significant difference are equally telling. The shared confidence in using GenAI (Familiarity_3) and the common belief that it should be allowed in academics (Future_2) represent a crucial 'cross-cultural alignment'. This common ground suggests that policy discussions in both countries can start from a shared baseline of student capability and acceptance, even if the ultimate integration paths and ethical considerations diverge.

VI. Comparative Discussion

Recent research across multiple disciplines demonstrates both convergences and divergences in how students perceive and utilize generative AI tools. In multi-disciplinary contexts, students generally report high enthusiasm for GenAI's potential to enhance learning efficiency and creativity while maintaining concerns about accuracy, plagiarism, and ethics [19–22]. For example, Chan and Hu (2023) found that Hong Kong undergraduates from diverse fields valued GenAI for personalized learning and writing feedback but simultaneously feared over-reliance and loss of critical thinking [10]. Similar patterns were observed in large-scale surveys of Eastern European universities [23], where students acknowledged AI's usefulness for personalized learning yet expressed anxiety about job displacement and the erosion of educational integrity. In contrast, discipline-specific investigations reveal distinctive patterns. Engineering and computing students tend to use GenAI more intensively for coding and problem solving, displaying higher acceptance and technical confidence [24]. Humanities and social-science students, on the other hand, emphasize creativity, originality, and ethical implications, showing greater caution in academic adoption [10, 25].

Within this broader landscape, the present study's mathematics cohort aligns with prior findings that GenAI adoption and trust vary by disciplinary epistemology. Lo [25] observed that ChatGPT performs comparatively poorly in

mathematics due to logical-reasoning errors, leading students to be more skeptical of its reliability. Our UK participants similarly expressed strong reservations regarding GenAI accuracy and effectiveness relative to human instruction, mirroring the critical stance identified among mathematically oriented learners [24, 25]. Turkish students, while equally aware of potential inaccuracies, reported more pragmatic use of GenAI for homework and essay writing. This pragmatic pattern aligns with prior studies reporting similar efficiency-driven adoption among university students in developing contexts such as Saudi Arabia [26] or LLMs-specific usage overview for students in the USA [27]. Collectively, these cross-disciplinary comparisons affirm that the disciplinary culture of mathematics—with its emphasis on precision, proof, and error-free reasoning—cultivates a distinctive blend of competence and caution in GenAI engagement.

VII. Limitations

This study, while providing valuable cross-national insights, is subject to several limitations. First, the findings are based on self-reported data from an online survey. Perceptions of familiarity and usage patterns rely on student recall and self-assessment, which may be subject to social desirability bias or inaccuracies and were not externally validated. To address this limitation, future studies could triangulate self-reported data with digital learning analytics or usage logs from GenAI platforms to provide more objective evidence. Additionally, specific focus group style observations can be implemented to address this limitation. Second, the issue of sampling and generalizability must be considered. Participants were recruited from a single university in the UK and one in Turkey. Although these are prominent institutions, the samples may not be fully representative of the entire student populations in their respective countries. Specifically, while the Turkish cohort includes a wide range of academic disciplines, the UK cohort is primarily composed of students from the School of Mathematics. This limits the direct generalizability of cross-national comparisons on a discipline-by-discipline basis and highlights a valuable direction for future research to explore these perceptions across matched disciplines. Furthermore, the timing of data collection could influence results, as student perceptions may shift rapidly in response to new GenAI advancements. Third, the online data collection method prevented researchers from clarifying potential ambiguities in the survey questions for participants in real-time, which could lead to variations in interpretation. This could be mitigated in future work through mixed-method designs incorporating interviews or focus groups to enrich contextual understanding. Finally, this study employs a cross-sectional design, capturing a single snapshot in time. Given the rapid evolution of Generative AI technologies, where models like those from OpenAI are released in successive versions (e.g., GPT-4, GPT-4o), our findings represent a snapshot tied to the models available during the survey period. Student perceptions and behaviors are likely to change quickly with new iterations, which might introduce performance improvements or new issues not captured by our cross-sectional design. A longitudinal study would be required to track these dynamic shifts over time. Collectively, these measures could help bridge the current research gaps and provide a more comprehensive understanding of GenAI adoption in mathematics education.

VIII. Key Take-Home Messages

This study reveals the emergence of the "AI-Native" student, a profile that has deeply integrated Generative AI into their academic workflow. With usage rates exceeding 90% among those familiar with the tools in both countries, a fundamental shift in learning is evident. Additionally, the GenAI tools they are using as two different cohorts (Turkey - pragmatic adopters vs UK - critical evaluators) mostly overlap even if the participants' demographics are moderately different and the timing of the data collection varies. However, this shared adoption masks a critical divergence in application. The data points towards a significant contrast between Turkish students, who report using GenAI for direct task completion, like homework and essays, at nearly double the rate of their UK counterparts, and UK students, who express far greater skepticism about the reliability of AI-generated content. This suggests a split between a pragmatic, efficiency-oriented approach in one context and a more cautious, evaluative stance in the other, posing different challenges and opportunities for educators in each nation.

Despite these differing application styles, a powerful cross-national consensus exists regarding GenAI's future importance and its relationship with human instruction. Students in both the UK and Turkey overwhelmingly agree that proficiency with these tools will be crucial for the future job market and that GenAI will dramatically reshape society within five years. This shared, forward-looking perspective, however, is balanced by a strong, grounded belief that AI is not an effective substitute for human teachers. This consistent sentiment underscores that students, while early and enthusiastic adopters of AI tools, do not see a future in which human-led pedagogy is obsolete. Instead, they signal a clear desire for a future of education that leverages the best of both worlds: the efficiency of AI and the irreplaceable nuance, guidance, and inspiration of human educators.

IX. Conclusion

This comparative study reveals a fundamental paradox in the perception of Generative AI among university students in the UK and Turkey: while there is a shared and enthusiastic consensus on GenAI's future inevitability, there exists a deep, culturally shaped divergence in its present-day application and perceived reliability. The data, drawn from a discipline-specific UK cohort and a disciplinarily diverse Turkish cohort, suggests the emergence of two distinct user personas. The Turkish cohort emerges as a group of 'pragmatic adopters,' who leverage GenAI for maximum efficiency and direct academic support, reflecting a rapid and deep integration into their learning habits. In contrast, the UK cohort emerges as 'critical evaluators,' who, while proficient with the tools, maintain a significant skepticism about their outputs and are more hesitant to substitute them for traditional academic methods or human instruction.

These findings challenge the notion of a monolithic global student response to AI and carry urgent implications for

higher education. A one-size-fits-all policy on GenAI is evidently inappropriate. For institutions in contexts like Turkey, the pedagogical challenge is to cultivate critical AI literacy to ensure that this rapid adoption is paired with the skills to evaluate, question, and refine AI-generated content, thereby preventing over-reliance. For those in contexts like the UK, the challenge is to harness student skepticism constructively—encouraging innovation and ethical integration while ensuring that caution does not stifle the adoption of tools that are widely seen as essential for future careers.

Future research should not only expand geographically to validate these personas in other regions but also delve qualitatively into the 'why' behind them, exploring how specific pedagogical practices, institutional policies, and cultural attitudes shape these divergent paths of AI adoption.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

All authors jointly designed the survey. O.E. collected the UK data, and S.Ki. collected the Turkey data. O.E. and S.Ki. conducted the data analysis, and O.E. generated the visualizations. S.Kz. prepared the Introduction and Literature Review, while O.E. led the writing of the remaining sections. All authors contributed to revisions and approved the final manuscript.

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