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Investigating Artificial Intelligence Anxiety among University Students in Northern Cyprus

Kuzey Kıbrıs'taki Üniversite Öğrencileri Arasında Yapay Zekâ Kaygısının Araştırılması

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Abstract:

Integrating artificial intelligence (AI) into daily life is becoming widespread in various sectors, especially education, and this increases concerns about artificial intelligence among university students. The current study aims to investigate AI anxiety among university students in northern Cyprus in terms of how prevalent or varied it is according to selected demographic and experiential factors. AI anxiety scale was used to measure students' anxiety along four dimensions: Learning, AI Configuration, Job Replacement, and Sociotechnical Blindness. Data (n=395) were collected from university students in Northern Cyprus and analyzed using Mann-Whitney U tests and Kruskal-Wallis H tests. Findings show that students experienced the highest anxiety at job replacement (Mean = 3.42, SD = 0.82) and the lowest at learning (Mean = 2.91, SD = 1.06). Non-STEM students experienced significantly higher levels of AI anxiety than their STEM students ($p < 0.001$), while females exhibited higher levels than males ($p < 0.001$). Additionally, students with over five hours of use of the technology per day demonstrated the highest anxiety levels ($p = 0.013$). Age differences were significant, too, with the highest level of anxiety toward AI reported among 21–23-year-old students ($p = 0.014$). Based on these results, awareness-raising activities and guidance services regarding the use of artificial intelligence can help students better understand this technology and manage their anxiety. In addition, to reduce the AI anxiety experienced by students during this technological transformation process, it will be useful to develop strategies suitable for the needs of different demographic and academic groups and organize awareness-raising and training programs.

Keywords: Artificial Intelligence, Anxiety, University, Students, Northern Cyprus.

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Öz:

Yapay zekayı (YZ) günlük yaşama entegre etmek çeşitli sektörlerde, özellikle eğitimde yaygınlaşmakta ve bu durum üniversite öğrencileri arasında yapay zekaya ilişkin endişeleri artırmaktadır. Mevcut çalışma, Kuzey Kıbrıs'taki üniversite öğrencileri arasında yapay zeka kaygısını, seçilen demografik ve deneyimsel faktörlere göre ne kadar yaygın veya çeşitli olduğu açısından araştırmayı amaçlamaktadır. Yapay zeka kaygı ölçeği, öğrencilerin kaygısını dört boyut üzerinden ölçmek için kullanılmıştır: Öğrenme, Yapay Zeka Yapılandırması, İş Değiştirme ve Sosyoteknik Körlük. Veriler (n = 395) Kuzey Kıbrıs'taki üniversite öğrencilerinden toplanmış ve Mann-Whitney U testleri ve Kruskal-Wallis H testleri kullanılarak analiz edilmiştir. Bulgular, öğrencilerin en yüksek kaygıyı iş değiştirmede (Ortalama = 3.42, SD = 0.82) ve en düşük kaygıyı öğrenmede (Ortalama = 2.91, SD = 1.06) deneyimlediğini göstermektedir. STEM dışındaki öğrenciler, STEM öğrencilerinden önemli ölçüde daha yüksek düzeyde yapay zeka kaygısı yaşarken ($p < 0.001$), kızlar erkeklerden daha yüksek düzeyler sergilemiştir ($p < 0.001$). Ayrıca, günde beş saatten fazla teknoloji kullanan öğrenciler en yüksek kaygı düzeylerini göstermiştir (p=0,013). Yaş farklılıkları da anlamlıdır ve yapay zekaya karşı en yüksek kaygı düzeyi 21-23 yaş aralığındaki öğrencilerde bildirilmiştir (p=0,014). Bu sonuçlara dayanarak, yapay zekanın kullanımı konusunda farkındalık artırma etkinlikleri ve rehberlik hizmetleri, öğrencilerin bu teknolojiyi daha iyi anlamalarına ve kaygılarını yönetmelerine yardımcı olabilir. Ayrıca, bu teknolojik dönüşüm sürecinde öğrencilerin yaşadığı yapay zeka kaygısını azaltmak için farklı demografik ve akademik grupların ihtiyaçlarına uygun stratejiler geliştirilmesi, farkındalık artırma ve eğitim programları düzenlenmesi yararlı olacaktır.

Anahtar Kelimeler: Yapay Zekâ, Kaygı, Üniversite, Öğrenciler, Kuzey Kıbrıs.

Introduction

Technology has evolved alongside changing global conditions and increasing human demands, eventually extending its influence to nearly every aspect of daily life (Demir and Yurteri, 2025). AI revolutionizes various sectors, and education is one of them, as it can change the teaching-learning process by creating personalized learning, automating assessments, and increasing the accessibility of resources (Zawacki-Richter et al., 2020). While these advances in AI have shaped individuals' perceptions of technology, they have also brought about anxiety about AI. AI anxiety describes people's overall fear or uneasiness in reaction to the quick advancement and pervasiveness of AI technology in society (Kim et al., 2023). This type of anxiety encompasses a range of concerns, including worries about losing control over AI systems, privacy violations, job security, and the potential for biases and misinformation generated by AI (Kim et al., 2023). More broadly, recent findings indicate that technological environments themselves can function as powerful environmental stressors; for instance, Kazaz and Acar (2024) studied that excessive social network uploading significantly predicts depression, anxiety, and stress. . A study examining AI anxiety among university students in China found that concerns about privacy, autonomy, and the impact of AI on future employment contribute significantly to heightened anxiety levels (Chen, Hu, & Wei, 2024). Students' perceptions of AI must be understood, and concerns addressed, to prepare for an academic and professional landscape increasingly shaped and defined by AI (Kim et al., 2023). Also, according to Asio and Suero (2024), students exhibit moderate levels of AI anxiety and self-efficacy, together with high levels of self-competence. Differences in these variables were also found to be highly significant among demographic groupings, which suggests that such factors as gender and academic discipline could play a role in AI anxiety.

Although there exists a considerable amount of literature on technology acceptance and anxiety, studies specifically focusing on AI-related anxiety in higher education remain limited. Zawacki-Richter et al. (2020) extensively review the domain over the last two decades, observing a growing interest in personalized learning, supported by learner profiling and learning analytics.

As AI continues to advance, students are becoming increasingly concerned about the possibility of losing their freedoms related to autonomy, privacy, and other ethical issues. In a recent report on the challenges and opportunities of AI in education, the U.S. Department of Education (2023) states the importance of addressing these concerns to bolster the teaching and learning processes.

In Turkey, researchers have examined AI anxiety concerning AI literacy, attitudes toward AI, and generative AI acceptance among university students. Aydın, Öztürk, and Yılmaz (2025) observed that increasing AI anxiety was correlated with decreasing levels of acceptance of generative AI technologies among Turkish university students. In a parallel manner, Chen, Hu, and Wei (2024) studied AI anxiety, 21st-century skills, and lifelong learning levels among undergraduates, indicating the detrimental impact of AI anxiety on these competencies.

Research investigations in European countries have primarily focused on AI's role in education and students' perceptions of job security and ethical concerns (European Commission, 2022a; Holmes & Tuomi, 2022; Zawacki-Richter et al., 2019). For example, feelings of fear or agitation caused by the perception that AI operates beyond human control are said to be part of AI anxiety (European Commission, 2022b; European Parliament, 2021).

Despite what is at hand, the majority of existing studies have been conducted in different regional and socio-economic contexts, thus rendering it unclear as to how AI anxiety plays out across different educational setups. AI anxiety among university students is something not widely studied up to now in North Cyprus, especially when it comes to relating AI anxiety to demographic variables such as gender, academic discipline (STEM versus non-STEM), level of education, and prior experience with AI. There exists a gap in understanding how these factors

influence anxiety and the perceptions of the students regarding AI and their willingness to engage in AI-driven learning environments. Closing this gap is thus very important, especially as AI assumes a greater role in education and professional development.

AI Anxiety

AI anxiety refers to fear or discomfort that a person experiences because of interaction with AI technologies. It manifests in everyday life, professional settings, and private contexts. AI anxiety usually arises through the ignorance of an individual about AI systems, the fear of job loss, loss of control, and issues of supervision and privacy (Yalcin et al., 2022). AI anxiety is interconnected with wider anxieties of technology, including computer anxiety and technophobia, with variation across demographic segmentation of age, gender, and education (Aydın et al., 2025). There are also gender differences, with females showing higher degrees of anxiety than men toward new technologies, including AI, possibly due to social stereotyping and probable barriers to confidence (Yalcin et al., 2022).

Research indicates that increased AI anxiety correlates with reduced acceptance of generative AI technologies among university students (Cengiz & Peker, 2025).

Wang and Wang (2022) developed a valid and reliable Artificial Intelligence Anxiety Scale (AIAS). They identified four factors of AI anxiety: (1) job replacement anxiety regarding fear of losing jobs due to AI; (2) sociotechnical blindness, or the anxiety resulting from lack of awareness of the dependence of AI on human supervision; (3) AI configuration anxiety, which deals with worries concerning autonomy and decision-making by AI systems; and (4) AI learning anxiety, which refers to anxieties related to understanding and mastering AI technology.

The present research aims to investigate AI anxiety in North Cyprus among university students, specifically prevalence, and variations based on specific demographic factors, such as academic discipline (STEM vs. Non-STEM), gender, educational level, age, experience with AI, and usage frequency. To achieve the aim of this research, the following research questions were considered:

How does AI anxiety differ between STEM and non-STEM university students?

What are the gender-based differences in AI anxiety among university students?

How does AI anxiety vary across different educational levels?

What role does age play in influencing AI anxiety among university students?

How does the number of hours of AI technology usage per day relate to AI anxiety levels?

Methods

Study design

To explore the concept of AI Anxiety among university students, this research was based on a survey-based cross-sectional research design.

Participants and sampling

The questionnaire was given to students in Google Forms, and invitations were sent in different modes such as email, WhatsApp groups, and other social media networking sites. The questionnaire consists of the AI Anxiety scale developed by Wang and Wang (2022) and demographic characteristics such as age, gender, level of study (undergraduate or graduate), academic discipline (STEM or Non-STEM). The scale measured four key dimensions of AI Anxiety: Learning; AI Configuration; Job Replacement; and Sociotechnical Blindness. The sample of the study consists of university students in North Cyprus. The data were collected with an online questionnaire form with a convenience sampling method. 395 students participated in the study (n=395). Table 1 presents the demographic characteristics of the participants. The sample consisted of 179 male students (45.32%) and 216 female students (54.68%). The majority of respondents (36.96%) were aged between 21-23 years. Undergraduate students made up 55.70% of the sample, while 44.30% were graduate students. Regarding academic background, 60.25% of participants were enrolled in STEM disciplines, whereas 39.75% were from non-STEM fields.

Table 1. *Participants' Demographic Features*

Measure	Category	Frequency	Percentage
Gender	Male	179	45.32
	Female	216	54.68
Age	18 - 20	38	9.62
	21 -23	146	36.96
	24 -26	106	26.84
	27 -30	33	8.35
	Over 31	72	18.23
Education Level	Undergraduate	220	55.70
	Graduate	175	44.30
University Department	STEM	238	60.25
	Non-STEM	157	39.75
Hours of AI technology use per day	1-2hr	229	57.97
	2-4hr	133	33.67
	Over 5hr	33	8.35
Have previously interacted with humanoid	Yes	115	29.11
AI products	No	280	70.89

Measure

The primary data collection tool used in this study was the Artificial Intelligence Anxiety Scale (AIAS) developed by Wang and Wang (2022). The AIAS consists of 57 items measured on a 5-point Likert scale: 1 (Strongly Disagree), 2 (Disagree), 3 (Neutral), 4 (Agree), and 5 (Strongly Agree). The scale assesses AI anxiety across four dimensions: Learning (8 items): Measures concerns related to acquiring AI knowledge and skills. AI Configuration (22 items): Examines anxiety regarding AI systems' design, autonomy, and decision-making processes. Job Replacement (12 items): Assesses fears associated with AI's potential to replace human jobs. Sociotechnical Blindness (15 items): Evaluates anxiety stemming from a lack of understanding of AI's social and ethical implications. The Cronbach's alpha for the fifty-seven items in the questionnaire used in this study was 0.981, with the subdimensions showing the following Cronbach's alpha coefficients: Learning (0.957), AI Configuration (0.967), Job Replacement (0.911), and Sociotechnical Blindness (0.960).

Procedure

A comprehensive literature review was conducted to identify relevant studies aligned with the research objectives. Ethical approval for the study was obtained from the Near East University Ethical Committee, Nicosia, North Cyprus (NEU/AS/2025/234) before data collection. The questionnaire was distributed randomly to university students through online (Google Forms).

Data Analysis

Descriptive statistics were computed to summarize data. Since normality assumptions were violated (Kolmogorov-Smirnov test, $p < 0.001$ for all groups), non-parametric tests were applied: Mann-Whitney U tests were used to compare AI Anxiety Levels between two groups, whereas Kruskal-Wallis H tests were applied to examine AI Anxiety Level differences among more than two groups. All analyses were conducted using SPSS version 24.

Results

Descriptive Statistics of AI Anxiety Among University Students

Descriptive statistics such as mean, median, standard deviation (SD), and interquartile range (IQR) were calculated for four scales to describe and examine the AI anxiety status of the students. Cronbach's alpha value was calculated for the scale and its dimensions. In this study, the mean scores obtained were interpreted based on a 5-point Likert scale, where 1.00–1.80 indicates 'Very Low', 1.81–2.60 'Low', 2.61–3.40 'Average', 3.41–4.20 'High', and 4.21–5.00 represents a 'Very High' level. The results were shown in Table 2. All scales showed excellent internal consistency, with Cronbach's alpha values including: Learning (0.957), AI Configuration (0.967), Job Replacement (0.911), and Sociotechnical Blindness (0.967). The scales' mean scores suggest that participants experienced the highest levels of anxiety related to Job Replacement (Mean = 3.42, SD = 0.82) and the lowest levels of anxiety related to Learning (Mean = 2.91, SD = 1.06). Median scores indicate a central tendency for moderate levels of anxiety across subscales, with Job Replacement having the highest median (Median = 3.50, IQR = 1.00). The response range (1–5) indicates that participants utilized the full scale for all subscales. These results highlight variations in participants' perceptions of AI anxiety across different dimensions.

The mean AI anxiety score across all 57 items in the questionnaire was 3.10, indicating an overall average level of AI anxiety among university students. When examining specific dimensions, the Learning scale (Mean = 2.91), AI Configuration scale (Mean = 3.01), and Sociotechnical Blindness scale (Mean = 3.06) all fall within the average range. However, the Job Replacement scale had the highest mean score (Mean=3.42), classifying it as high, which suggests that concerns about AI replacing jobs are more pronounced among students compared to other anxiety dimensions.

Table 2. *Reliability and Descriptive Statistics for AI Anxiety Dimensions*

Scale	Cronbach's alpha	Mean (SD)	Median (IQR)
Learning	0.957	2.91(1.06)	2.75(1.50)
AI Configuration	0.967	3.01(0.87)	3.00(0.81)
Job Replacement	0.911	3.42(0.82)	3.50(1.00)
Sociotechnical Blindness	0.960	3.06(0.85)	3.00(0.94)

Comparison Results of Students' AI Anxiety Level based on Demographic Characteristics

Table 3 presents the comparison results of AI anxiety levels by gender, university department, and education level, based on the Mann-Whitney U test, while Table 4 presents the comparison of AI Anxiety Levels by age and AI usage time based on the Kruskal-Wallis H test.

Table 3. ***Comparison of AI Anxiety Levels by University Gender, Department, and Education Level***

Variable	Group	n	Mean Rank	U	Z	p
Gender	Male	179	161.32	12765.5	-5.818	< 0.001
	Female	216	228.40			
Department	STEM	238	171.51	12378.5	-5.682	< 0.001
	Non-STEM	157	238.16			
Education Level	Graduate	175	221.65	15112.0	-3.674	< 0.001
	Undergraduate	220	179.19			

Gender
The comparison results indicate that the mean rank for AI Anxiety Levels among males (n = 179) was 161.32, while the mean rank for females (n = 216) was 228.40. The Mann-Whitney U test result has indicated that there is a statistically significant difference in AI Anxiety Levels between males and females (Z = -5.818, $\eta^2 = 0.086$, $p < 0.001$). The results suggest that females report higher levels of AI Anxiety compared to males.

Departments
The results indicate that the mean rank for AI Anxiety Levels in the STEM group (n = 238) was 171.51, while the Non-STEM group (n = 157) had a mean rank of 238.16. The Mann-Whitney U test result has shown that there was a statistically significant difference in Anxiety Levels for AI between these two groups of females (Z = -5.682, $\eta^2 = 0.082$, $p < 0.001$). Findings suggest that non-STEM students exhibit higher AI Anxiety Levels as compared with those students in STEM fields.

Education Level
The results indicate that the mean rank for AI Anxiety Levels among graduates (n = 175) was 221.65, while the mean rank for undergraduates (n = 220) was 179.19. The Mann-Whitney U statistic concludes that there is a statistically significant difference in AI Anxiety Levels between graduate and undergraduate students (z= -3.674,η^2= 0.034, $p < 0.001$). The results suggest that graduates report higher levels of AI Anxiety compared to undergraduates.

Table 4. *Comparison of AI Anxiety Levels by Age and AI Usage Time*

Variable	Group	n	Mean Rank	H	df	p
Age Group	18-20	38	153.32	12.422	4	0.014
	21-23	146	218.02			
	24-26	106	190.08			
	27-30	33	214.30			
	Over 31	72	185.17			
AI Usage Time	1-2 hrs	229	204.58	8.747	2	0.013
	2-4 hrs	133	177.31			
	Over 5 hrs	33	235.73			

Age Groups
A Kruskal-Wallis H test indicates a statistically significant difference in AI anxiety levels among the five age groups (H(4) = 12.422, η2 = 0.022, p = 0.014). The highest mean rank was observed in the 21-23 age group (mean rank = 218.02), followed by the 27-30 age group (mean rank = 214.30), while the lowest mean rank was in the 18-20 age group (mean rank = 153.32).To further explore these differences, post-hoc pairwise comparisons using Dunn's test were conducted as shown in Table 5. The results showed that the AI Anxiety Levels of the 18-20 age group were significantly lower than those of the 21-23 age group (p = 0.018). However, after adjusting for multiple comparisons, no other pairwise differences reached statistical significance.

.**Table 5.** *Post-Hoc ResultsUsing Dunn's Test for Age Groups*

Comparison	Z	p-value (Adjusted)
18-20 vs. 21-23	-3.11	0.018
18-20 vs. 24-26	-1.70	0.883
21-23 vs. 24-26	1.92	0.550
18-20 vs. 27-30	-2.25	0.247
21-23 vs. 27-30	0.17	1.000
24-26 vs. 27-30	-1.06	1.000
18-20 vs. Over 31	-1.39	1.000
21-23 vs. Over 31	2.00	0.455

Number of Hours of AI Usage per Day
A Kruskal-Wallis H test revealed a statistically significant difference among the groups (H(2) = 8.747, p = 0.013, η^2 = 0.017). The mean ranks for AI Anxiety Levels were highest for participants using AI for over 5 hours per day (mean rank = 235.73), followed by those using AI for 1-2 hours per day (mean rank = 204.58) and 2-4 hours per day (mean rank = 177.31). Post-hoc pairwise comparisons, as shown in Table 6, revealed a significant difference between participants using AI for 2-4 hours and those using it for over 5 hours per day, (p = 0.025). No significant differences were found between the other groups. These findings suggest that participants who use AI for over 5 hours per day report higher AI Anxiety Levels compared to those using AI for 2-4 hours per day.

Table 6. ***Post-Hoc Results Using Dunn's Test for AI Usage Time***

Comparison	Z	p-value (Adjusted)
1-2 hrs vs. 2-4 hrs	2.19	0.085
1-2 hrs vs. Over 5 hrs	-1.47	0.428
2-4 hrs vs. Over 5 hrs	-2.63	0.025

Discussion

The results of this study indicate that university students experience moderate levels of AI anxiety overall, with notable variations across different dimensions. The highest anxiety was recorded in the Job Replacement scale (Mean = 3.42), suggesting that students are significantly concerned about the impact of AI on employment opportunities. In contrast, the lowest anxiety was observed in the Learning scale (Mean = 2.91), indicating that students feel relatively more comfortable with acquiring AI-related knowledge and skills.

The results highlights the need for tailored AI education strategies to reduce anxiety levels, particularly for students from non-technical backgrounds. These findings are consistent with studies by Gerlich (2024), who established that students with lower exposure to AI technologies exhibit greater anxiety manifestations. Similarly, García-Martínez et al. (2023) found that humanities and social science students displayed greater concern with regard to the implications of AI than did their STEM counterparts.

A comparison of the responses of male and female students brought to light a significant difference regarding AI anxiety, whereby the female respondents reported much higher levels of anxiety relating to AI. This finding corroborates the studies of Grassini and Ree (2022) who identified social stereotypes and confidence gaps as likely contributing factors to increased technology-related anxiety among females. Tang et al. (2025) discussed the importance of addressing gender disparities in AI education programs to mitigate anxiety levels.

Graduate students recorded AI anxiety levels that were significantly higher than those of their undergraduate counterparts. This finding corroborated results obtained from studies by Wang and Wang (2022), where it was suggested that students start to recognize the complexities involved with AI and the ethics at stake as their education level advances, thus causing anxiety to rise. Studies have shown that individuals with higher levels of education tend to exhibit greater anxiety towards AI, possibly due to increased awareness of its potential impact on employment (Horn, 2024).

There were significant differences in AI anxiety levels among different ages ($p = 0.014$). The highest AI anxiety levels were discovered in students aged 21-23 years, followed by those aged 27-30. These agreed with Wang and Wang (2022), who also found higher AI anxiety levels in younger students, due to uncertainties regarding job security and their future careers.

While most literature (Wang and Wang, 2022) covers the aspect of how familiarity with AI reduces anxiety, sometimes, exposure accumulates the development of contrary anxiety, most notably on ethical and societal levels. This study reveals that university students' concerns about artificial intelligence are shaped differently in different dimensions. In particular, job replacement anxiety was observed as the highest anxiety factor compared to all other dimensions (Mean = 3.42, high). While students have a clear perception of the threat against the potential of artificial intelligence to transform the workforce, their anxiety in other areas such as the learning process, AI configuration, and sociotechnical blindness remain at a more moderate level. In addition, significant differences in AI anxiety according to factors such as academic discipline, gender, age, and frequency of use emphasize that AI anxiety is experienced differently among individuals and that strategies appropriate to the needs of different demographic and academic groups should be developed to reduce this anxiety. Based on the findings of the study, it is recommended that awareness and training programs be organized in universities to reduce AI anxiety. In particular, it may be useful to increase course content that will help students develop skills compatible with AI to reduce workforce anxiety. Awareness-raising studies can be conducted on how AI and the human workforce can exist in balance to alleviate job replacement anxiety.

Conclusion

This study investigated the status of AI anxiety among university students in North Cyprus and how it varies by gender, age group, department, and degree of education. The overall mean AI anxiety score of 3.10 suggests an average level of anxiety, with job replacement concerns standing out as the most significant anxiety factor (Mean = 3.42, classified as high). The findings reveal that AI anxiety significantly varies based on academic discipline, gender, age, and frequency of AI use. These results highlight the need for structured AI education programs that balance technical proficiency with ethical awareness to mitigate anxiety and promote confident AI engagement among students.

There are several limitations of this study. The current research only considered university students, while AI anxiety is also likely to affect professionals and the general public. In addition, the number of participants who reported using AI for more than five hours per day was relatively small ($n = 33$), and the distribution of prior experience with humanoid AI products was imbalanced ($n = 115$ had prior experience; $n = 280$ did not). Furthermore, the sample includes an unbalanced distribution of students from STEM and non-STEM disciplines, which may affect the generalizability of the findings across different academic backgrounds. Further research should increase the study sample to individuals from diverse educational and professional backgrounds.

Declarations

Ethics Approval and Consent to Participate
Ethics Approval and Consent to Participate Approval was received from the Near East University Ethical Committee, Nicosia, North Cyprus (Decision No: NEU/AS/2025/234).

Consent for Publicaiton
Not applicable.

Availability of Data and Materials
Not applicable.

Conflict of interest
The author declares that no competing interests in this manuscript.

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Authors' Contributions
NS and NC carried out the proposal of the main idea of the research, OEA contributed to the collection of data. NS and OEA analyzed and interpreted the data. NS, OEA, and NC contributed to the article's writing and revised the article content. All authors have read and approved the final article.

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