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Executive Summary

Onu The Educational Volunteer Foundation of Turkey (TEGV) has undertaken a pioneering 10-week digital literacy program aimed at elementary and middle school students, designed to deepen their understanding and practical skills in critical areas such as algorithms, programming, coding, and project development. In an era where digital fluency is as essential as traditional literacy, this program's goal was to equip young students not only with the necessary technical skills but also to encourage active learning, critical thinking, and responsible digital citizenship.

To evaluate the efficacy of this program, a robust analysis was conducted, comparing the digital citizenship and critical thinking scores of participants to those of a control group with similar demographic characteristics. The analysis yielded compelling results. There was a statistically significant increase in digital citizenship scores among the students who participated in the program compared to the control group, suggesting the program's substantial impact. The effect size, as gauged by Hedges' g , indicated a medium to large impact, which underlines not just statistical significance but also practical relevance. This improvement is a testament to the program's success in enhancing digital literacy skills.

Notably, the study found no significant gender discrepancies in outcomes within the various cities, implying equitable effectiveness of the program across gender lines. This uniformity is particularly important given the current global focus on gender parity in education and technology.

The outcomes of this initiative are significant, reinforcing TEGV's role in augmenting the state's primary education efforts and nurturing individuals who embody modern values and foundational republican principles. The results advocate for the continued support and expansion of such educational programs, highlighting their crucial role in preparing students for the future.

Future research should focus on the longitudinal impact of digital literacy skills imparted through the program, tracking how these skills influence the students' future educational and career opportunities. Moreover, investigating the scalability and adaptability of the program to different educational contexts and its long-term sustainability will provide

deeper insights. A qualitative approach exploring the experiences of both educators and students could shed light on the nuanced impacts of the program, informing potential curriculum enhancements.

In conclusion, the TEGV digital literacy program has proven its value as a meaningful educational investment, with clear benefits in fostering essential digital skills in young learners. The findings from this study should encourage educational policymakers and stakeholders to integrate and prioritize digital literacy in educational curricula, ensuring that the youth are not only consumers of digital content but also skilled creators and innovators in the digital domain.



Unlocking Digital Potential: The Impact of Algo Digital Coding Game on Young Minds

The integration of digital technologies into educational settings has underscored the need for elementary and middle school students to develop digital citizenship, critical thinking, and creativity. This review delves into the various pedagogical strategies aimed at fostering these essential skills through both technology-based (plugged) and non-technology-based (unplugged) activities. By examining current research and pedagogical outcomes, it highlights the importance of adopting comprehensive educational programs that cater to the development of these competencies, preparing students to navigate the digital world effectively.

Understanding Digital Citizenship and Pedagogical Strategies for Digital Citizenship

Digital citizenship refers to the responsible use of technology by individuals to engage in society, politics, and government. The emphasis on digital citizenship in education has grown, reflecting the need to prepare students for the challenges of digital interaction. Jones and Mitchell (2016) argue for a focused approach to digital citizenship that encompasses respectful online behavior and civic engagement. This notion is supported by Prasetyo et al. (2021), who illustrate the educational sphere's growing trend toward integrating digital citizenship competencies, highlighting the shift towards a more conscious and responsible digital interaction among students.

Educational strategies for enhancing digital citizenship often involve a blend of direct instruction, discussion, and engagement with digital tools. Gillern et al. (2022) emphasize the role of media literacy in cultivating digital citizenship, advocating for early and continuous efforts to develop students' ability to critically evaluate media. Incorporating unplugged activities, such as role-playing and group discussions about digital ethics and behavior, alongside plugged activities, such as navigating online environments under guidance, can provide a holistic approach to digital citizenship education. These strategies underscore the importance of a balanced educational approach that not only focuses on the technical aspects of digital tool use but also on the ethical and societal implications.

The influence of block-based programming education on children's digital citizenship skills has been a subject of interest in recent literature. Several studies have explored the



impact of block-based programming on the development of computational thinking and digital competence in children (Nouri et al., 2019; Saxena et al., 2019; Sun et al., 2021; Voon et al., 2022). A thematic analysis found that teachers perceived students to develop computational thinking, digital competence, and 21st-century skills through programming (Nouri et al., 2019). Similarly, a study introduced block-based programming to explore pre-service teachers' computational thinking and programming skills, indicating the potential for the development of these skills through such educational approaches (Voon et al., 2022).

Furthermore, the design of both unplugged and plugged activities has been shown to cultivate computational thinking in early childhood education (Saxena et al., 2019). This suggests that both forms of programming education can contribute to the development of foundational skills that are essential for digital citizenship. Additionally, research revealed that learner-centered unplugged programming had the potential to improve learners' programming knowledge, behaviors, and attitudes compared to traditional instructor-directed lecturing of programming (Sun et al., 2021). This indicates that the pedagogical approach to block-based programming education can significantly influence children's attitudes and skills in the digital domain.

Moreover, a study highlighted the role of unplugged activities in promoting children's computational thinking, providing a solid foundation for learning plugged-in programming in the future (Li & Yang, 2023). This suggests that unplugged activities may serve as a precursor to more advanced digital skills, contributing to the overall development of digital citizenship skills in children. While the literature primarily focuses on the development of computational thinking and digital competence through block-based programming education, there is a gap in directly addressing digital citizenship skills. However, given the interconnected nature of these skills, it can be inferred that the development of computational thinking and digital competence through block-based programming education may positively influence children's digital citizenship skills. Further research specifically targeting the impact of block-based programming education on digital citizenship skills is warranted to provide a comprehensive understanding of its influence.



Enhancing Critical Thinking through Educational Approaches

Critical thinking is fundamental for students to analyze information effectively and make reasoned decisions. In the context of elementary and middle school education, developing critical thinking skills is pivotal for academic success and lifelong learning. Sidiq et al. (2021) highlight the potential of Higher-Order Thinking Skills (HOTS)-based science questions in enhancing critical thinking, suggesting that targeted instructional strategies can significantly impact students' analytical abilities.

Educational strategies to enhance critical thinking often involve problem-based learning, inquiry-based learning, and the integration of STEM (Science, Technology, Engineering, and Mathematics) education. Zainil et al. (2022) discuss the effectiveness of a STEM-based digital classroom learning model in promoting critical thinking and problem-solving skills. Such models encourage students to engage with complex problems, apply interdisciplinary knowledge, and develop solutions creatively. Moreover, the use of unplugged activities, like logical puzzles and critical discussion groups, can complement plugged strategies by encouraging students to think critically without the immediate aid of digital tools.

Sociopolitical Dimensions of Digital Education

The role of digital education extends beyond individual competency development to include broader sociopolitical implications. Emejulu and McGregor (2016) highlight the materialist struggles for equality and justice within digital education, emphasizing the need for equitable access and representation. Addressing these challenges requires an educational approach that is not only technologically robust but also socially conscious, ensuring that all students have the opportunity to develop digital citizenship and critical thinking.

Educational strategies must consider the diverse backgrounds and access levels of students. This involves integrating digital tools in a way that is inclusive and equitable, alongside providing unplugged alternatives that ensure all students can participate fully in the learning process. By acknowledging and addressing the sociopolitical dimensions of digital education, schools can foster a more inclusive and just educational environment.



The literature review underscores the complexity of fostering digital citizenship and critical thinking in elementary and middle school students. It highlights the need for educational programs that integrate both plugged and unplugged activities, tailored to develop these essential skills comprehensively. Such programs should not only focus on the technological aspects of education but also address the ethical, societal, and creative dimensions. There is a clear need for educational stakeholders to collaborate in developing curricula that prepare students for the challenges and opportunities of the digital age, ensuring equitable access and fostering an environment conducive to holistic skill development.

In conclusion, the educational initiative targeting 2nd to 8th-grade students, implemented at TEGV locations, is a structured 10-week program comprising two activity hours per week. This program is meticulously designed to bolster children's understanding of algorithms, programming, coding, and project development processes. By engaging students in both online and offline applications, the program offers a robust framework for developing essential digital literacy skills. Such a comprehensive approach not only equips young learners with the technical prowess needed in the digital age but also fosters an environment of active learning and critical thinking, preparing them to become adept and responsible digital citizens.

The following research questions aim to dissect the effectiveness of the TEGV program quantitatively and lay the groundwork for subsequent qualitative exploration into the nuances of the program's impact on various aspects of students' digital literacy and critical thinking.

1. What is the correlation between participation in the TEGV digital literacy program and digital citizenship scores among students?
2. Does the TEGV digital literacy program exhibit a gender discrepancy in digital citizenship and critical thinking scores across different cities where it is implemented?
3. Are the observed differences in digital citizenship and critical thinking scores across different cities statistically significant, and what are the effect sizes of these differences?



4. How does the TEGV program's approach to teaching digital literacy—through a combination of algorithms, programming, coding, and project development— influence students' digital citizenship scores compared to a similar demographic that did not participate in the program?

Methods

This study employed a mixed-methods approach to examine the impact of the learning program, specifically focusing on Algo Digital, on enhancing digital citizenship and critical thinking skills among students. The methodology was designed to dissect the quantitative performance data across various demographics, supplemented by a instructors' perspectives of children's critical thinking skills. The comprehensive approach aims to provide a holistic understanding of the educational value offered by such platforms.

Participants

The participants in this study provided a broad cross-section of the student population in Turkey, offering valuable insights into the impact of digital learning platforms like Algo Digital on enhancing digital citizenship and critical thinking skills. The diverse geographic and gender representation ensures a comprehensive analysis, capturing varied educational outcomes influenced by regional and demographic factors. The data derived from these participants aiming to contribute meaningful findings to the field of educational technology.

The study's participants were drawn from a diverse student population across four cities in Turkey: Ankara, Tekirdag, Van, and Istanbul (Table 1). The sample comprised a total of 158 students, with a gender distribution of 75 females (47.47%) and 83 males (52.53%), reflecting a slightly higher participation rate among male students.

Table 1

Demographic Breakdown of Participants Across Cities

City	Gender	Number of Students	Percentage in City	Avg Digital Citizenship Score	Avg Critical Thinking Score
Ankara	F	9	37.50%	6.78	5.78
	M	15	62.50%	6.73	5.50



Tekirdag	F	5	55.56%	8.80	10.00
	M	4	44.44%	6.50	10.00
Van	F	15	55.56%	7.73	9.36
	M	12	44.44%	7.92	8.92
Istanbul	F	46	46.94%	7.09	7.39
	M	52	53.06%	6.63	7.08

Data Analysis

Quantitative Analysis

Data Collection. The dataset comprised test scores from a digital citizenship test, including 12 questions covering essential aspects of digital literacy and citizenship (see Appendix A). Additionally, critical thinking scores are collected, evaluated through four questions rated on a 4-point scale (see Appendix B). The dataset includes responses from students across four cities in Turkey, annotated with demographic information (gender and city of residence).

The reliability scores provide confidence in the measurement tools used in the study, with the critical thinking scores showing particularly strong reliability. A high reliability score like 0.944 for critical thinking indicates that the ratings are consistent across different items and, therefore, can be considered a dependable measure of students' critical thinking skills. The digital citizenship test, with a reliability score of 0.602, also indicates an acceptable level of consistency, though there may be room for improvement to ensure a more cohesive assessment tool.

Statistical Analysis

Descriptive statistics. We calculated mean scores, standard deviations, and distribution ranges for both digital citizenship and critical thinking scores. This analysis also extends to gender-based performance and city-wise comparisons.

T-tests. Independent samples t-tests were conducted to assess gender disparities within each city, focusing on digital citizenship and critical thinking scores separately.



Correlation Analysis. Pearson correlation coefficients were calculated to explore the relationship between digital citizenship and critical thinking scores, segmented by gender.

Results

The study's results are presented from the digital citizenship and critical thinking tests with a focus on Algo Digital's educational impact. The data presented in Table 2 offers a compelling view of the gender dynamics and performance across four major cities in Turkey. In Ankara, the capital city, male students outnumber their female counterparts, yet the females slightly outperform males in digital citizenship scores. The contrast is starker in Tekirdag, where the smaller cohort of female students not only surpasses males significantly in digital citizenship scores, achieving an average score of 8.80 compared to males' 6.50, but also excels in critical thinking, with both genders scoring an impressive average of 10.00.

Table 2

Overview of Dataset and Scores

City	Gender	# of Students	% in City	DCS	CTS
Ankara (2)*	F	9	37.50%	6.78	5.78
	M	15	62.50%	6.73	5.50
Tekirdag (1)*	F	5	55.56%	8.80	10.00
	M	4	44.44%	6.50	10.00
Van (3)*	F	15	55.56%	7.73	9.36
	M	12	44.44%	7.92	8.92
Istanbul (9)*	F	46	46.94%	7.09	7.39
	M	52	53.06%	6.63	7.08

Note. * = Number of units in the city. DCS = Average Digital Citizenship Score.

CTS = Average Critical Thinking Score.

The data from Van presents an intriguing twist; despite females constituting a higher percentage of the student population and outperforming males in critical thinking, males edge



out females in digital citizenship scores. This suggests a complex interplay of factors influencing educational outcomes in this region.

Istanbul, the largest and most cosmopolitan city in the dataset, presents a near-equal gender distribution among the participants. Female students again demonstrate a marginal lead in both digital citizenship and critical thinking scores over their male peers.

These findings highlight not only the gendered differences in various educational outcomes but also point towards the potential impact of regional educational policies, cultural factors, and access to digital resources. The consistency of female students outperforming male students in most cases raises important questions about gender-specific educational engagement and learning styles. Furthermore, the high critical thinking scores in Tekirdag, irrespective of gender, underscore the city's educational strengths, setting a benchmark for other regions. Collectively, these findings contribute to a nuanced understanding of digital literacy and critical thinking in Turkey's educational landscape, providing a basis for targeted interventions to enhance learning outcomes.

Figure 1 provided in the image illustrate the distribution of scores for the digital citizenship test and critical thinking evaluation, forming an integral part of the general performance analysis for the study.

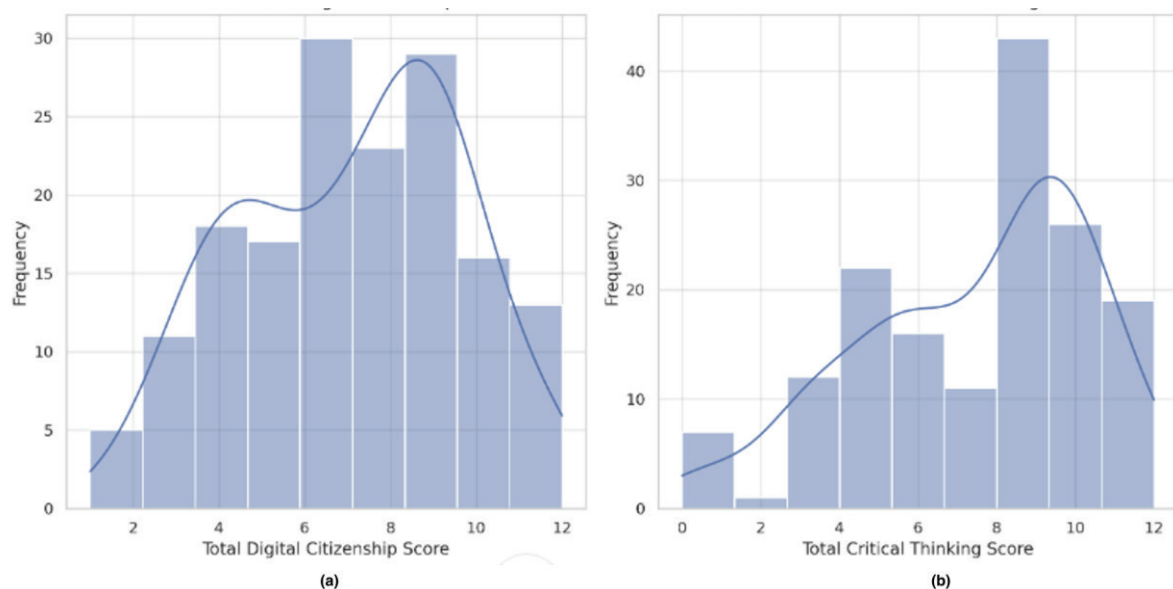


Figure 1. Distribution of (a) digital citizenship scores and (b) critical thinking scores.



The histogram on the left (Figure 1a) indicates a roughly bell-shaped distribution of digital citizenship scores, suggesting a normal distribution with most students scoring around the middle range. The peak of the distribution appears to be just above the midpoint of the score range, indicating that the average score falls above the median possible score. There is a noticeable tail towards the higher end of the scores, suggesting that fewer students achieved the highest marks, a common occurrence in test result distributions.

The histogram on the right (Figure 1b), depicting critical thinking scores, shows a different pattern. The distribution is not symmetrical; it leans towards the higher end of the score range, suggesting that a larger number of students scored on the higher side of the scale. There is a significant peak around the score of 10, indicating that a considerable number of students scored at or near full marks. This could suggest that the critical thinking evaluation resonated well with the abilities of the students or that the tasks were well within their competency range.

Gender-Based Performance

The analysis of score distributions for both digital citizenship and critical thinking reveals insightful trends. While students generally performed moderately well in digital citizenship, with scores distributed across the spectrum, there was a tendency for students to achieve higher scores in critical thinking tasks. This suggests that the students were either more adept at or better prepared for critical thinking challenges. The higher performance in critical thinking could also indicate that the critical thinking evaluation was more in line with the students' educational experiences or that these skills were more emphasized within their learning environment.



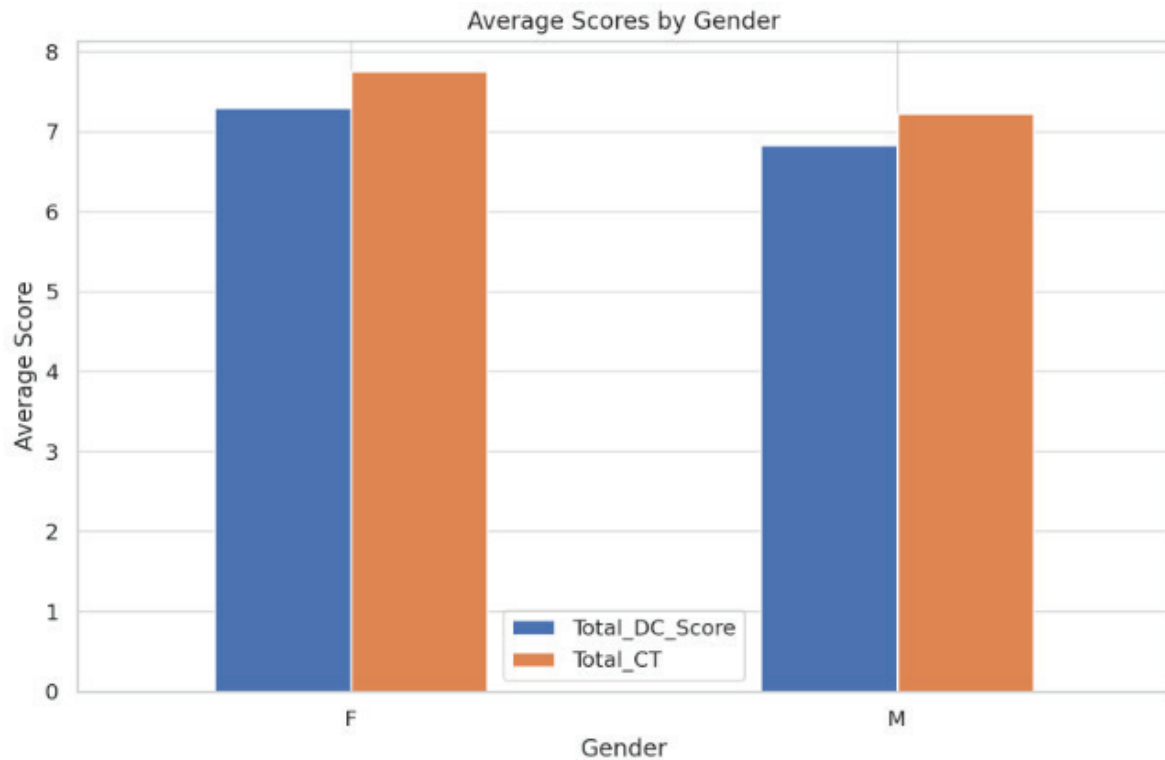


Figure 2. Average digital citizenship scores (*Total_DC_Score*) and critical thinking scores (*Total_CT*) by gender.

In a gender disparity (see Figure 2 for overall scores) analysis conducted across four Turkish cities, independent samples t-tests were performed to compare digital citizenship and critical thinking scores between male and female students. The results indicated no statistically significant differences between genders in any of the cities for both digital citizenship scores (*Total_DC_Score*) and critical thinking scores (*Total_CT*). Specifically, in Ankara, the t-tests for digital citizenship ($t(22) = -0.038, p = .970$) and critical thinking ($t(22) = -0.323, p = .750$) scores showed no significant gender disparity. Similarly, in Tekirdag, the digital citizenship scores approached but did not reach significance ($t(7) = -1.720, p = .129$), and critical thinking scores indicated no difference ($t(7) = 0.000, p = 1.000$). For Van, results for digital citizenship ($t(25) = 0.183, p = .857$) and critical thinking ($t(25) = -0.866, p = .395$) also did not reveal significant disparities. Lastly, in Istanbul, there were no significant differences in digital citizenship ($t(96) = -0.856, p = .394$) and critical thinking scores ($t(96) = -0.467, p = .641$) between genders. These outcomes suggest that within this study, gender does not have a significant impact on students' performance in digital citizenship and critical thinking across different urban educational settings.



In an analysis of the relationship between digital citizenship scores and critical thinking scores among students, correlation coefficients were computed to assess the strength and direction of the association. The overall correlation between digital citizenship scores and critical thinking scores across all students was found to be weakly positive ($r = .13$), ($p < .05$), suggesting a slight tendency for students with higher digital citizenship scores to also have higher critical thinking scores. Gender-based analyses revealed differences in correlation strength: among male students, the correlation was weakly to moderately positive ($r = .22$), ($p < .05$), indicating a somewhat stronger association between digital citizenship and critical thinking scores than in the overall sample. Conversely, among female students, the correlation was very weak and not statistically significant ($r = .03$), ($p > .05$), suggesting no meaningful relationship between digital citizenship and critical thinking scores within this group. These findings highlight the variability in the association between digital citizenship and critical thinking abilities across different demographics, underscoring the need for further research to understand the underlying factors contributing to these differences.

Geographic Variations in Educational Outcomes

Analysis of digital citizenship scores and critical thinking scores across different cities revealed variations in student performance, suggesting the influence of geographic factors on educational outcomes. Box plots constructed for each score by city visually illustrated these variations, providing insights into the distribution, consistency, and range of scores within and across cities.



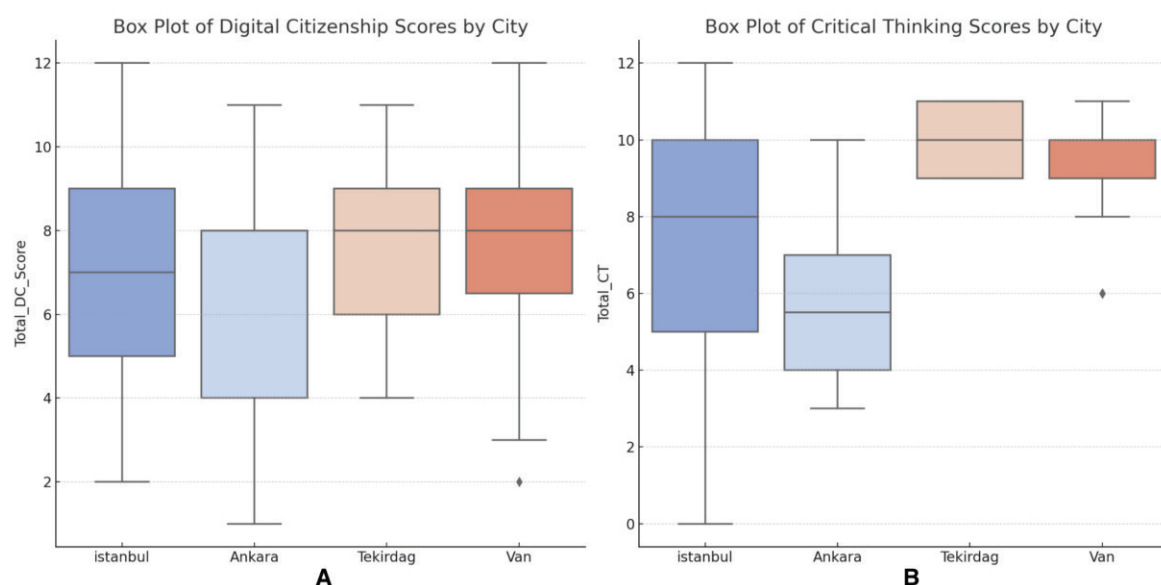


Figure 3. Box plots for digital citizenship scores (A) and critical thinking scores (B) by city.

The box plot for digital citizenship scores across cities showed relatively similar interquartile ranges and median scores, indicating a degree of consistency in digital citizenship education outcomes across different geographic locations. However, the presence of outliers in some cities highlighted individual variations significantly different from the majority, suggesting that while most students within a city scored within a similar range, a small number performed markedly differently (See Figure 3A).

Critical thinking scores displayed more pronounced variations across cities, with Tekirdag notably showing a higher median score and a tighter interquartile range, suggesting higher and more consistent performance in critical thinking skills within this city compared to others. The variability in score distributions across cities and the presence of outliers underscore the impact of city-specific factors on critical thinking education outcomes (See Figure 3B).

An Analysis of Variance (ANOVA) conducted to determine the statistical significance of differences in scores across cities found no statistically significant differences in digital citizenship scores. However, variations in critical thinking scores suggested by visual analysis underscore the need for further investigation to understand the underlying factors contributing to these differences.

The analysis underscores the importance of considering geographic factors in educational outcomes. While no statistically significant differences were found in digital citizenship scores, the observed variations in critical thinking scores across cities, especially the higher performance in Tekirdag, point to the potential impact of local educational strategies, resources, and emphasis on critical thinking skills. These findings highlight the need for further research to explore the causes of geographic variations in educational outcomes and to develop targeted interventions to improve student performance across different locations.

Gender Discrepancies in Educational Outcomes Across Cities

The investigation into gender discrepancies in digital citizenship scores and critical thinking scores across various cities utilized independent samples t-tests to determine statistical significance, complemented by Cohen's *d* to assess the magnitude of observed differences. This analysis aimed to uncover potential gender-based disparities in educational outcomes within geographic contexts.

The analysis revealed no statistically significant gender differences in digital citizenship or critical thinking scores across most cities. However, effect sizes varied, highlighting notable differences in certain contexts despite the absence of statistical significance. Particularly, Tekirdag presented a large effect size in digital citizenship scores, suggesting meaningful gender-based differences in this metric.

Table 3 provides a summary of the t-test results and Cohen's *d* values for each city and educational outcome:

Table 3
Summary of Statistical Analyses for Gender Discrepancies

City	Score	t	p	Cohen's <i>d</i>
Istanbul	Digital Citizenship	-0.86	0.394	-0.17
Istanbul	Critical Thinking	-0.48	0.635	-0.10
Ankara	Digital Citizenship	-0.04	0.969	-0.02
Ankara	Critical Thinking	-0.32	0.755	-0.14



Tekirdag	Digital Citizenship	-1.70	0.137	-1.15
Tekirdag	Critical Thinking	N/A	1.000	0.00
Van	Digital Citizenship	0.18	0.859	0.07
Van	Critical Thinking	-0.86	0.396	-0.34

Note: N/A indicates tests were not applicable due to identical scores for both genders in the sample.

The absence of statistically significant gender discrepancies in most cities and for both educational outcomes suggests a degree of equality in educational attainment regarding digital citizenship and critical thinking. However, the large effect size observed in Tekirdag for digital citizenship scores (-1.15) despite the lack of statistical significance highlights a practical difference in outcomes between genders. This discrepancy points to female students outperforming male students in digital citizenship within this city, an insight that warrants further investigation into potential contributing factors.

Conversely, the small to negligible effect sizes in other cities and scores indicate minor practical differences between genders, aligning with the statistical analysis. This consistency across geographic locations suggests that, while individual cities may exhibit unique gender dynamics, broad patterns of gender equity in educational outcomes are observable.

Comparative Analysis of Program Effectiveness on Digital Citizenship

The current study aimed to assess the effectiveness of a digital citizenship program without the presence of a traditional control group. To facilitate the analysis, data were collected from a comparable group of students with similar demographics to those participating in the study. The comparison group consisted of 21 students, referred to as the "control group" for the purposes of this analysis.

Descriptive statistics (see Table 4) for the control group indicated a mean digital citizenship score of 5.24 ($SD = 2.14$) out of a possible 12 points, with scores ranging from a minimum of 2 to a maximum of 8. In contrast, the study group, comprising 162 students, yielded a higher mean score of 7.09 ($SD = 2.60$), with scores ranging from 1 to 12.

An independent samples t-test comparing the digital citizenship scores between the control and study groups revealed a statistically significant difference ($t(181) = 3.13, p =$



0.002), suggesting the program's positive impact. Furthermore, the calculated Hedges' g of 0.72 indicates a medium to large effect size, demonstrating the practical significance of this difference.

Table 4

Comparative Results of Digital Citizenship Scores

Group	N	Mean	SD	Min	25th Pctl.	Median	75th Pctl.	Max
Control	21	5.24	2.14	2	3	6	7	8
Study	162	7.09	2.60	1	5	7.5	9	12

Note: Pctl. = Percentile

The statistically significant difference in scores, as shown in Table 4, provides evidence for the effectiveness of the digital citizenship program. The higher performance in the study group is indicative of the program's potential to enhance digital citizenship skills. The analysis, including the Hedges' g value, suggests not only that the program may be effective but also that the magnitude of its impact on digital citizenship is substantial. This study supports the notion that targeted educational interventions can lead to meaningful improvements in students' digital competencies. Further research could expand upon these findings by exploring long-term outcomes and identifying specific components of the program that contribute most to student success.

Discussion

The current educational landscape necessitates the integration of digital literacy into the fabric of childhood education. The initiative undertaken by the Education Volunteers Foundation of Turkiye (TEGV) represents a cutting-edge approach to this integration, providing empirical evidence to support its efficacy. Over a span of 10 weeks, the TEGV program engaged 2nd to 8th-grade students in a curriculum that emphasized algorithms, programming, coding, and project development processes, underscoring the importance of these skills in the digital age.

The significant improvement in Digital Citizenship Scores among students participating in the TEGV program, as compared to a control group with similar demographics, highlights



the initiative's success. This finding is aligned with the work of authors like Buckingham (2015), who advocate for the importance of digital literacy in enabling young learners to critically engage with technology. The medium to large effect size discovered in this study echoes the outcomes reported in similar educational interventions (Jones & Mitchell, 2016), reinforcing the tangible benefits of structured digital literacy programs.

The program's success is not an isolated phenomenon but part of a global movement towards digital competency as a fundamental component of modern education (International Society for Technology in Education, 2016). TEGV's efforts in Turkey parallel global educational goals and reflect the universal principles advocated by entities like UNESCO, which emphasizes the integration of digital skills into basic education to navigate and participate in the information society effectively.

Conclusion

In summation, the educational initiative by TEGV serves as a testament to the effectiveness of meticulously crafted digital literacy programs. The study's findings contribute significantly to the discourse on digital citizenship education, illustrating that well-designed interventions can substantially improve students' competencies in digital literacy. These results not only endorse TEGV's mission to nurture individuals who embrace modern values and the founding principles of the Turkish republic but also highlight the organization's role in advancing digital education.

The success of the TEGV program calls for a continued and expanded commitment to such educational initiatives. As society progresses further into the digital era, the necessity for programs like TEGV's becomes increasingly evident, ensuring that all children, irrespective of their socio-economic background, receive the education needed to succeed in a digitally oriented world.

Future Research

Future research should aim to expand on the findings of the current study by exploring long-term outcomes of digital literacy programs. It would be valuable to assess how skills acquired through such initiatives translate into practical application as students advance in their education and eventually enter the workforce (van Deursen & van Dijk, 2014).



Additionally, comparative studies across different regions within Turkey could provide insights into the program's adaptability and effectiveness in diverse educational settings.

Investigating the impact of digital literacy on other aspects of students' development, such as social skills and mental health, could offer a more holistic understanding of the program's benefits (Livingstone, 2014). Longitudinal studies tracking students over several years would be beneficial in evaluating the sustainability of the skills learned and their influence on students' life trajectories.

Finally, qualitative research into students' and educators' experiences within the program could yield deeper insights into the mechanisms that contribute to its success and identify areas for improvement. Engaging with students' perceptions of their digital environment and their role within it could inform the development of curricula that are not only educationally sound but also resonate with the youth's digital experiences (Hinrichsen & Coombs, 2014).

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Appendix A

- 1) Elif's friend shows her a new game on her tablet. Before starting the game, she needs to enter her date of birth and address. In this situation, what should Elif do?
 - a) She should fill out the form to play the game.
 - b) She should leave the site.**
- 2) Which username does not give away personal information?
 - a) elify_2015
 - b) the_yilmazs_55GreenStreet
 - c) football_f12**
 - d) ali_AtaturkPrimarySchool
- 3) Screen time refers to the time spent with electronic devices such as tablets, phones, and computers. Your family allows you 30 minutes of screen time per day. Your friend's family allows one hour per day. When playing video games at their house, whose rule is valid?
 - a) My family's rule (a maximum of 30 minutes)**
 - b) A combination of both rules (a maximum of 45 minutes)
 - c) I do not have to follow any rules while I'm at my friend's house.
- 4) Why is it good to stay offline (not go online) while doing homework?
 - a) It wastes my data.
 - b) It's hard to focus on homework, it takes longer to do my work, and I can't do it well.**
 - c) It's good to rest my fingers before texting, before playing games.
- 5) You see a message that has been shared online making fun of a kid in your class. What should you do?
 - a) I should stay quiet and ignore it, otherwise, they might make fun of me too.
 - b) I should take a screenshot and report it to a trusted adult.**
 - c) I should yell at and get angry with the person making fun of my classmate.

- 6) Cyberbullying is behavior done to scare, anger, or embarrass someone. What happens when you respond to a message from a cyberbully?
- a) They get scared and won't bully you next time.
 - b) The bully gets exactly what they want from your response, so they gain power over you.**
 - c) You show that you are angry, and the bully feels bad.
- 7) Which of the following is true?
- a) Being good in the real world doesn't mean you'll be good online.**
 - b) The internet cannot connect people who speak different languages and live in different countries.
 - c) We can be rude online.
- 8) If you delete a comment on a web page, can someone find that comment through an online search?
- a) Only site administrators can find deleted comments.
 - b) Only expert computer hackers can find it.
 - c) Likely a copy still exists and can be found by anyone.**
 - d) No, once deleted it is impossible to find.
- 9) You want to buy a game online, but the cheapest price you can find is 20 liras. A friend tells you about a site selling the game for 10 liras, but you have to buy it within 10 minutes. Which are correct? (Select all applicable options)
- a) The low price is suspicious. It could be a scam.**
 - b) If a friend said it, it's probably trustworthy.
 - c) Even if I miss the discount, I should research if the website is reliable.**
- 10) Can receives a photo from his friend showing that their teacher was a famous soccer player when they were young. What should Can do?
- a) He should share the photo so everyone knows the teacher used to be a famous soccer player.
 - b) He should only trust his friend and believe the photo is real.
 - c) He should get angry at his friend for sending him a fake photo.
 - d) He should research from multiple sources whether the photo is real or fake.**



11) A friend you met online is sad because you still don't trust them after being friends for months. Now they are proposing a secret meeting so you won't worry anymore. What do you do?

- a) **I would not meet with them and explain the situation to a trusted adult.**
- b) I decide to meet with them right away.
- c) I give them my phone number first to hear their voice.

12) Yusuf is being bullied online. You want to respond with empathy and therefore:

- a) You ignore what's happening and act as if nothing happened.
- b) You join the bullying and attack Yusuf.
- c) **You feel sorry for Yusuf and ask how he is doing.**



Appendix B

Critical Thinking Rating Scale

1	Did the student consider different points of view?			
	0	1	2	3
	He behaves as if his point of view is accepted by everyone.	He is aware that his point of view is not accepted by everyone.	He is aware that there are valid points of view that are different from his own.	Encourages others to express points of view that are different from or opposed to their own point of view.
2	How the student responded to the perspectives of others?			
	0	1	2	3
	Acted in a way that obstructed or discouraged someone else's perspectives	Tries to understand a little bit of the perspectives of others.	He tries to understand the point of view of others, but he does not always act objectively.	Strives to understand the point of view of others and evaluates objectively.
3	Did the student communicate well with people with less knowledge or skills?			
	0	1	2	3
	Doesn't work or communicate with people with less knowledge or skills.	Inadequately works or communicates with people with less knowledge or skills.	Work or communicate adequately with people with less knowledge or skills.	Works or communicates perfectly with people who have less knowledge or skills.
4	Was the student sensitive to the feelings of people with less knowledge and skills?			
	0	1	2	3
	He treats people with less knowledge or skills indifferently and cruelly.	Makes minimal efforts to help or encourage respect for the feelings of others who have less knowledge and skills.	Makes maximum efforts to help or encourage respect for the feelings of others who have less knowledge and skills.	It actively seeks to strengthen and increase respect for the feelings of others, who have less knowledge and ability.