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Digital Citizenship and Its Impact on the use of Eco-Friendly Technologies: A Survey Study from the Perspective of Employees in Educational Institutions

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ABSTRACT: This study aims to explore the impact of digital citizenship on the use of environmentally friendly technologies within educational institutions. Specifically, it analyzes the relationship between the level of digital citizenship and the tendencies of educational staff toward integrating green solutions into their professional environment. The descriptive-analytical methodology was adopted as the most appropriate approach for this study. Data were collected from a stratified random sample of 196 participants working in educational institutions affiliated with the Directorate of Education in Nineveh. The sample included teachers, administrators, and educational supervisors who are actively engaged with digital technologies in their institutions. The research instrument consisted of a structured questionnaire comprising two main sections. The first section addressed digital citizenship through 15 items assessing individuals' responsible and ethical digital behavior. The second section focused on the use of environmentally friendly technologies, encompassing four core dimensions: awareness of the importance of green technologies, readiness to use them, orientation toward practical application, and influence on organizational decision-making. Data were analyzed using the SPSS statistical software, employing descriptive statistics and simple linear regression to test the study's hypotheses.

The findings revealed a clear positive impact of digital citizenship on both environmental awareness and individuals' readiness to use green technologies. Participants with high digital citizenship levels demonstrated a greater understanding of the benefits of sustainable technologies and a stronger willingness to engage with them. However, the study also found that the transition from awareness to actual application was less pronounced, suggesting the presence of institutional and administrative barriers that hinder the practical implementation of environmental solutions. Furthermore, the influence of digital citizenship on organizational decision-making appeared to be weak, indicating that decision-making processes within educational institutions are shaped more by structural and policy-related factors than by individual digital behaviors. Based on these results, the study recommends strengthening digital citizenship practices within the educational sector through targeted training programs, providing supportive environments for the use of eco-friendly technologies, and developing participatory institutional strategies that enable staff to contribute actively to the digital-environmental transformation of their institutions.

Keywords: Digital Citizenship, Environmental Technologies, Sustainability, Education , Digital Transformation.

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المواطنة الرقمية وتأثيرها في استخدام التقنيات الصديقة للبيئة: دراسة مسحية من وجهة نظر العاملين في المؤسسات التعليمية

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المستخلص

تهدف هذه الدراسة إلى استكشاف أثر المواطنة الرقمية على استخدام التقنيات الصديقة للبيئة في المؤسسات التعليمية، من خلال تحليل العلاقة بين مستوى المواطنة الرقمية واتجاهات العاملين في تلك المؤسسات نحو استخدام الحلول البيئية داخل بيئة العمل. وقد تم الاعتماد على المنهج الوصفي التحليلي بوصفه الأنسب لطبيعة هذه الدراسة، حيث جُمعت البيانات من عينة عشوائية طبقية مكوّنة من (196) فردًا من العاملين في المؤسسات التعليمية التابعة لمديرية تربية نينوى، وتوزعت العينة بين معلمين وإداريين ومشرفين تربويين ممن لهم دور مباشر في استخدام التكنولوجيا داخل المؤسسة.

اعتمدت أداة الدراسة على استبيان مقنن تضمن محورين أساسيين؛ الأول تناول المواطنة الرقمية من خلال (15) فقرة تقيس ممارسات الأفراد في التعامل مع البيئة الرقمية بشكل مسؤول وأخلاقي، والثاني ركّز على استخدام التقنيات البيئية من خلال أربعة أبعاد رئيسية تمثلت في: الوعي بأهمية هذه التقنيات، الاستعداد لاستخدامها، الاتجاه نحو التطبيق العملي، وأثرها في اتخاذ القرارات المؤسسية. وقد تم تحليل البيانات باستخدام البرنامج الإحصائيSPSS ، وتحديدًا من خلال الوسائل الإحصائية الوصفية وتحليل الانحدار الخطي البسيط لاختبار فرضيات الدراسة.

كشفت النتائج عن وجود أثر إيجابي واضح للمواطنة الرقمية على مستوى الوعي البيئي والاستعداد لاستخدام التقنيات الصديقة للبيئة، حيث أظهر المشاركون من ذوي المواطنة الرقمية المرتفعة إدراكًا أعلى لفوائد هذه التقنيات واستعدادًا أكبر لتطبيقها. كما أظهرت النتائج أن هذا الأثر كان أقل وضوحًا عند الانتقال إلى التطبيق العملي، ما يعكس وجود معوقات تنظيمية وإدارية تحول دون ترجمة هذا الوعي إلى ممارسات فعلية. أما فيما يتعلق بتأثير المواطنة الرقمية على القرارات المؤسسية ذات الصلة بالاستدامة البيئية، فقد تبين أن هذا التأثير ضعيف، مما يشير إلى أن عملية صنع القرار داخل المؤسسات التعليمية تخضع لعوامل تنظيمية أوسع من مجرد السلوك الرقمي الفردي.

وانطلاقًا من هذه النتائج، توصي الدراسة بضرورة تعزيز مفاهيم المواطنة الرقمية في الوسط التربوي من خلال برامج تدريبية ممنهجة، وتوفير بيئة تعليمية داعمة لاستخدام التقنيات البيئية، بالإضافة إلى تطوير سياسات تشاركية تمكّن العاملين من المساهمة الفاعلة في صياغة القرارات ذات الصلة بالتحول الرقمي البيئي داخل المؤسسات التعليمية.

الكلمات المفتاحية: المواطنة الرقمية، التقنيات البيئية، الاستدامة، التعليم، التحول الرقمي، التكنولوجيا الخضراء، تبني التكنولوجيا، الوعي البيئي

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Background

Digital citizenship is an infrastructure that includes the skills required to participate in the digital world at individual, social and civilian levels. orld at individual, social and civilian levels (Cortai et al., 2020). This concept includes many elements, such as digital literacy, online security and corporate social responsibility, which are necessary to enable individuals to navigate responsible in the modern digital environment (Rahim & Zare, 2021). Digital citizenship was the most prominent of Mike Ripple and Gerald Bailey's early work, which emphasized the importance of digital health and welfare, which originally focused on the effect of technology on physical health, while also addressed to problems that digital used to make addiction and psychological Good (Weinstein & James, 2022).

The need for digital citizenship education has been significantly increased in recent years, especially with increasing dependence on digital units in the educational environment during the COVID-19 epidemic. Students and teachers have become more technology-addicted in their learning and communication processes, highlighting the need for structured training to promote the responsible use of technology (Burnell et al., 2019). As a result, digital citizenship has become a main focus on educational discourse, as teachers want to equip students equipped with skilled and effective integration in digital space (Hawamdeh, 2023).

In the context of Iraq's education scenario, digital citizenship is particularly important, and faces the challenges facing the education system, such as the lack of resources and the need to modernize the teaching methods (Ridff et al., N..). Awareness has increased about the importance of technology to improve the quality of education, educational institutions in Iraq have begun to use a more holistic approach that promotes digital citizenship as a means of supporting the use of environmentally friendly technology. Focus on giving (Al-Azawei et al., 2016). Modern teacher education programs aim to include the best practices that emphasize the importance of digital citizenship, and eventually

help to promote the use of environmental technologies among workers in educational institutions (McClaren, 2019;Dass and Kumar, 2025).

The interaction between digital citizenship and environmental technologies in educational contexts is not only about improving digital skills, but also about creating a permanent learning environment that supports green digital change, which is technical development and environmental protection, it is in line with global trends aimed at balanced. (Armfield and Blocher, 2019; Ali, et al.,2024).

Theoretical framework and previous studies

Theoretical framework

The concept of digital citizenship is an important framework for understanding how individuals interact in a responsible and moral way with technology and digital environment. This concept includes a group of competences that enable individuals to effectively use technology including digital literacy, cyber security, moral behavior and corporate social responsibility (Cortesi et al., 2020). framework is essential in modern educational environments, where digital equipment depends on rapid learning and teaching processes...

Rahim & Zare (2021) Said that digital citizenship is not only technical skills, but it includes the ability to navigate the digital environment responsibly and understand the social and cultural effect of technology. Researchers believe that digital citizenship plays an important role in enabling teachers and students to participate in a safe and effective way in a digital society, causing e-learning experience in digital space (Weinstein & James, 2022).

When it comes to Iraq, where educational institutions face challenges related to the development of digital infrastructure, the need to embrace the concept of digital citizenship is to promote the integration of technology and education. (Hawamdeh,2023) found that the absence of proper training on digital citizenship can give rise to the importance of low awareness of digital security and moral online behavior, which negatively affects the use of technology in the educational process.

Environmentally friendly technologies—often called green technologies—are an essential component of a worldwide transition toward sustainability. They minimize environmental damage with energy efficiency, carbon emission reduction, waste management, and resource conservation (Al-Emran & Griffy-Brown, 2023). On the educational side, these technologies can include digital platforms for the minimal use of paper, smart classroom systems that contribute toward energy conservation, and e-learning tools that reduce the carbon footprint from commuting and physical resources.

The theoretical basis for using environmentally friendly technologies is the environmental sustainability theory, asserting the need to integrate ecological responsibility into institutional practices (McClaren, 2019). Nevertheless, eco-literacy models have been promoted to educate individuals to become aware of environmental impacts and bring about behavioral changes (Al Yakin et al., 2024).

Factors establishing the acceptance of green technologies involve technology acceptance models (TAM) and innovation diffusion theory, which revolve around the way perceived usefulness, perceived ease of use, and institutional support determine individuals' intention to accept

environmentally sustainable innovations (Ali et al., 2024). In the educational context, these theories connect with the notion of digital citizenship, since individuals with strong digital skills can engage in green technologies and understand their long-term benefits (Triantafyllidou & Zabaniotou, 2022).

Integrating environmentally friendly technologies, on the other hand, requires institutions' own strategies and commitment from the leadership, along the lines of the sustainability vision. Hence, fostering green digital transitions in schools and universities requires infrastructural capabilities together with cultural and pedagogical change (Bal & Akcil, 2024). These frameworks bolster the idea that success in sustainable technologies is contingent upon awareness, readiness, and institutional empowerment, which are all factors directly linked to digital literacy and citizenship attributes of individuals inhabiting the organization.

In addition, research suggests that digital citizenship can directly affect the use of environmentally friendly technologies, as individuals with strong digital skills are more likely to use permanent environmental practice, such as reducing paper consumption and using technical solutions to achieve environmental efficiency (Triantafyllidou and Zabaniotou, 2022;Al-Emran and Griffy-Brown, 2023).

Previous studies

1. **Al-Azawei, Parslow, & Lundqvist (2016)**: This study focused on obstacles and occasions related to the implementation of e-learning in Iraq, focusing on public universities. He explained that there are attempts to implement e-learning systems, but they still face challenges such as a lack of infrastructure, poor awareness of the importance of e-learning and adequate training for teachers and students' deficiency. The study recommended to improve digital infrastructure, provide special training programs and raise awareness of the importance of technology in education...
2. **Study of Burnell et al. (2019):** This study saw the effect of negative use of social media on psychological welfare, and found that negative use, such as passive consumption of digital materials without interactions, is associated with fear of disappearing from increased levels and opportunities for social comparison, increased levels and opportunities. ((FOMO), which negatively affects mental health. The study recommends encouraging users to use more interactive and positive behavior when using technology. Of**...**
3. **Cortesi et al. (2020) study:** The study focuses on the concept of "digital citizenship+", given that it is not limited to the responsible use of digital citizenship technology, but also includes important thinking skills, digital cooperation, moral behavior and creativity in the digital environment. The study recommended integrating these skills into education to ensure that individuals are equipped with integrated ability to interact with digital techniques and interact with continuity.
4. **Rahim & Zare Study (2021)**: This study deals with the influence of digital citizenship on educational development of teachers and students, where digital citizenship in education defined for the goals of learning and educational communication through social media platforms and digital equipment as interactions between teachers and students. Was gone results suggested that modern technology has improved the ability to learn skills and create skills, but requires clear policies to ensure its safe and responsible use. The study must integrate information technology into education in a way that strengthens digital infrastructure in educational institutions and meets the changed needs of students and labor market requirements.

5. **Weinstein & James Study (2022):** This study investigated school initiatives with a view to promoting digital citizenship and promoting healthy use of digital media, analyzing 20 different educational programs. The results have shown that programs that focus on significant awareness, self -confidence and behavioral change help to improve the digital skills of students. The study recommended the development of a more comprehensive course to promote digital citizenship in schools..
6. **Studyof Radif, Fan, & McLaughln (2022.)**: This study investigated internal and external obstacles affecting the implementation of the management systems (LMS) for learning in Iraqi higher education, given that these systems can help improve the quality of education, but a suitable technical construction of the environment is necessary. The results showed that lack of training, lack of commitment to modern teaching methods and poor technical assistance are all factors that adversely affect the implementation of LMS. The study recommended the ongoing institutional help to improve the digital skills of faculty members and to ensure the success of these initiatives.
7. **Hawamdeh study (2023)**: This study examined the perception of students and the Faculty of Digital citizenship in a remote learning environment, and found that there is a general awareness of the basic concepts of digital citizenship, but deep of subjects such as digital rights and cyber security there is a lack of understanding. The study recommended integrating these concepts into the course to promote secure digital practice between students and teachers.

Analysis of previous studies

Last studies reflect the importance of digital citizenship in education and e-learning practices and its impact on environmental ability. Most of the studies have confirmed that digital citizenship is not limited to the use of technology, but also includes moral, social and legal aspects that control this use. Some studies, such as Rahim & Zare (2021) and Hawamdeh (2023), have shown that promoting digital citizenship can contribute to the development of a more sustainable and effective teaching environment.

On the other hand, some studies, such as Radif et al. (n.d.) and Al-Azawei et al. (2016), especially in Iraq, where technical problems and poor infrastructure represent the biggest challenges that hinder the actual implementation of digital practice, and then emphasize the challenges facing educational institutions are to use technology.

Some studies, like Cortesi et al. (2020) and Weinstein & James (2022), emphasize the need to include digital citizenship skills on the course to promote the responsible use of technology between students and teachers. Research on technology's impact on psychological welfare, such as Bernel et al. (2019) shows that deep awareness of healthy digital practice is necessary to ensure that technology is maximized without negative effects on mental health.

Conclusions from previous studies

The previous study depicts a set of key problems, which must be considered when examining the relationship between digital citizenship and environmentally friendly technologies. On the one hand, research emphasizes the importance of promoting digital education and building advanced digital skills among employees in educational institutions to ensure the transition to a permanent learning environment. On the other hand, it sheds light on the challenges that interfere with this change, such as poor infrastructure and lack of technical training .

Therefore, these studies indicate the need to develop integrated education policy that promotes digital citizenship and provides a supportive environment to use durable technology, thus contributing to more responsible digital changes in educational institutions. .

Study problem

Notably, whereas there is more cognizance globally and nationally on the subject of sustainability, in reality, eco-friendly technologies remain underutilized in classrooms. Often, such observations raise crucial questions as to what really explains such situations. Ironically, despite many problems in Iraq's education sector—poor infrastructure, inadequate training, and absence of institutional environmental policies—new challenges are entering the scene (Radif et al., n.d.; Al-Azawei et al., 2016). One new element that has come in is the area of digital citizenship, which denotes responsible and ethical use of digital technologies and, as defined by Cortesi et al., encompasses skills like digital literacy, information security, and social responsibility (2020).

Though several studies tend to suggest that digital citizenship can be an asset in creating awareness of the sustainable practices and readiness to employ green technologies (Rahim & Zare, 2021; Weinstein & James, 2022), ambiguity remains on how the concept translates into real adoption behavior and institutional decision-making (Bal & Akcil, 2024; Vallès-Peris & Domènech, 2024). Also, this relationship is still not explored much in the education sector in Iraq, which needs urgent policy and practice alignment with digital sustainability (Al Yakin et al., 2024; Mateos Muñoz, 2022).

Research Questions To what extent does digital citizenship affect **awareness** of environmentally friendly technologies among employees in educational institutions?

1. To what extent does digital citizenship influence their **willingness** to use environmentally friendly technologies in their work environments?
2. How does digital citizenship impact their **orientation toward the practical application** of environmental solutions?
3. To what extent does digital citizenship contribute to **institutional decision-making** related to environmental sustainability in education?

This study will investigate digital citizenship's effect on the use of green technologies in Iraqi educational institutions along four elements: awareness, willingness, real-world application, and influence over organizational decisions.

Study Hypotheses

Based on the theoretical framework and research questions, the following hypotheses were formulated to explore the impact of digital citizenship (independent variable) on the use of environmentally friendly technologies (dependent variable) in educational institutions:

Main Hypothesis (H_0):

There is a statistically significant effect of digital citizenship on the use of environmentally friendly technologies in educational institutions.

This hypothesis is divided into the following sub-hypotheses:

- H_1: There is a statistically significant impact of digital citizenship on individuals' awareness of the importance of environmentally friendly technologies.
- H_2: There is a statistically significant impact of digital citizenship on individuals' willingness to use environmentally friendly technologies in their work environment.
- H_3: There is a statistically significant impact of digital citizenship on the orientation toward the practical application of environmentally friendly technologies.
- H_4: There is a statistically significant impact of digital citizenship on influencing organizational decisions related to environmental sustainability within educational institutions.

These hypotheses were tested using simple linear regression to determine the strength and significance of the relationships between the variables, as guided by the descriptive-analytical methodology employed in this study**.**

Objectives of the study

This study aims to analyze the impact of digital citizenship on the use of environmentally friendly technologies in educational institutions, by exploring the relationship between digital citizenship and individuals' awareness of environmental technologies, their willingness to use them, their tendency towards practical application, and their impact on the institutional decision-making process. The main objectives of the study can be summarized

Scientific and practical importance of the study

Scientific importance

- The scientific significance of this study stems from the fact that it sheds light on the impact between digital citizenship in the environmentally friendly technologies, an issue that has not received sufficient research in the Iraqi context. The scientific significance of the study lies in the following:
- Bridging the knowledge gap in research related to digital citizenship, as the study provides an accurate analysis of its role in shaping environmental behaviors within educational institutions.
- Expand the theoretical framework of digital citizenship by exploring its relationship to the sustainable technologies, which could form the basis for future research on digital and environmental education.
- Provide an analytical model to understand the relationship between technology and sustainability, helping to develop digital learning strategies that contribute to enhancing environmental awareness in academic institutions.
- Contribute to the academic debate on digital sustainability, by providing reliable data that can be used to support the development of green technology-based education policies.

Practical importance

- The practical importance of this study lies in the application of its results on the ground within educational institutions, which contributes to enhancing environmental sustainability through digital transformation. The practical importance is as follows::
- Promoting the use of sustainable technology in Iraqi educational institutions by raising awareness of the role of digital citizenship in achieving environmental transformation.

- Provide practical recommendations to education officials and decision-makers on how to integrate environmental technologies into curricula and educational management systems.
- Improve digital education policies in Iraq by identifying obstacles to the adoption of sustainable technology, and proposing solutions to overcome these barriers.
- Develop training programs for education workers to enhance their skills in digital citizenship and employ them to support environmental sustainability.
- Supporting institutional efforts towards environmental digital transformation by providing a clear vision on how to leverage digital tools to achieve environmentally friendly practices.

Method and procedure

This chapter is related to the method and processes used in studies, where educational institutions were a descriptive method of study to study the effect of digital citizenship with the using of environmentally friendly technologies from the workers' perspective. This approach was chosen for its suitability in the analysis of trends and ideas on the subject. The study included the population of workers in educational institutions, and the sample size was determined based on the stratified random test method to ensure representation of different groups. The data was collected using a closed questionnaire on Lickart five-point scale, and analyzed using SPSS software to test the ratio of the variables. This chapter helps to explain research mechanisms and equipment to ensure that the goals of the study are achieved...

Study methodology: The study was dependent on a descriptive and analytical approach, such as educational institutions because of the suitability of research aimed at studying the effect of digital citizenship with the intention of using environmentally friendly technologies in educational institutions. This approach allows for depth data analysis, understanding of relationships between variables and further trends between the participants**.**. The questionnaire is designed as the main tool for data collection, and its validity and consistency have been verified using **the Cronbach** alpha coefficient To measure the internal consistency of the questions. **Pearson's coefficient** was also relied upon to analyze the relationship between variables and test the level of statistical significance. This approach contributes to providing an accurate description of the variables of the study, which helps in interpreting the results and supporting the hypotheses presented scientifically and systematically...

Study variables: The stage of identifying research variables is very important in the search process, as we must be very careful in formulating and identifying all research variables accurately and clearly. We must ensure that we have made accurate adjustments to these variables and that we are able to differentiate them from any number of other factors negatively affecting the course of our study.

Based on our important hypotheses that we are studying, we can clearly see that there are two variables, one considered independent and the other dependent on the **variables of the study**.

The study includes two main variables: digital citizenship (independent variable) and the use of environmentally friendly technologies (dependent variable), in addition to some demographic variables that may affect the relationship between them..

1. Independent Variable: Digital Citizenship

Represents the level of awareness and responsibility of individuals in the use of technology within educational institutions,

2. Dependent variable: the use of environmentally friendly technologies

Represents the readiness of workers in educational institutions to environmentally sustainable technological solutions, and includes four dimensions:

Awareness of the importance of environmentally friendly technologies

Willingness to use environmental technologies

Orientation towards the application of environmental solutions Influencing the decisions of the organization.

Study population and sample: The study population consists of workers in educational institutions affiliated to the Nineveh Directorate of Education, which includes teachers, administrators, and educational supervisors who have a direct role in the use of digital technologies and their influence on environmental decisions within educational institutions. The sample was selected in a stratified random manner to ensure that all target groups are represented in the study, which contributes to achieving more accurate and comprehensive results..

The sample size reached 200 participants from various educational institutions, and questionnaires were distributed to them with the aim of collecting the necessary data to analyze the relationship between digital citizenship and the use of environmentally friendly technologies. After completing the data collection, 196 valid questionnaires were retrieved for analysis, with a response rate of 98%, reflecting high interaction from participants and a clear interest in the research topic..

This sample represents a suitable area for tests of research hypotheses, as it provides sufficient data to draw reliable conclusions. The use of stratified random sample also contributes to reducing bias and ensuring the representation of different groups within the educational institutions of the Nineveh Directorate of Education. The data will be analyzed using SPSS software to test statistical relationships between variables and study the impact of digital citizenship on the use of environmentally friendly technologies.

Table 1: Demographic data of the study sample

Variable	Category	Number	Percentage (%)
Sex	male	165	84.2
	female	31	15.8
Career Level	teacher	116	59.2
	Administrative	60	29.6
	Educational Supervisor	20	10.2
Years of Experience	Less than 5 years	46	23.5
	(6-10) Years	27	13.8
	(11-15) Years	77	39.3
	Over 15 years	46	23.5
Qualification	Less than collectors	17	8.7
	Bachelor or lower	152	77.6
	Master	21	10.7
	Doctor	6	11.3

The table shows that the percentage of males in the sample was 84.2% compared to 15.8% for females, indicating a greater representation of males in the study.

In terms of job level, teachers constituted the largest percentage with 59.2%, followed by administrators with 29.6%, and educational supervisors with 10.2%, reflecting the diversity of roles within educational institutions.

As for years of experience, the most representative category was those with experience between 11 to 15 years at 39.3%, while the other categories were distributed between 23.5% for those with less

than 5 years, 13.8% for those with between 6 to 10 years, and 23.5% for those with more than 16 years, which shows a variety of experience levels..

With regard to academic qualification, the vast majority of participants had a university degree (77.6%), while the percentage of master's degree holders was 10.7%, doctorate 3.1%, and the lowest university degree reached 8.7%.

This distribution reflects a fairly balanced representation of the different target groups in the educational institutions of the Directorate of Education of Nineveh, which enhances the reliability of the results drawn from the study.

Study Tool: The questionnaire was adopted as the main data collection tool in this study, due to its ability to collect accurate information about the opinions and trends of participants in a systematic and systematic manner. The questionnaire was designed according to the Likert five-point scale, where the answer options ranged from: strongly disagree, disagree, neutral, agree, and strongly agree, in order to ensure an accurate measurement of respondents' attitudes and attitudes..

The questionnaire consisted of two main parts, where the first part dealt with the demographic data of the participants, including questions related to gender, job level, years of experience, and educational qualification, with the aim of determining the general characteristics of the sample and analyzing the extent to which these variables affect the relationship between digital citizenship and the use of environmentally friendly technologies..

The second part focused on the main themes of the study, where the first axis included (digital citizenship), which included 15 phrases that measure the participants' commitment to responsible digital practices, such as respect for laws, digital security, ethical use of technology, and information awareness..

While the second axis dealt with (the use of environmentally friendly technologies), where 28 phrases were distributed on four main dimensions, namely: awareness of the importance of environmental technologies, which focuses on the extent to which participants realize the importance of using environmentally friendly technology, readiness to use environmentally friendly technologies, which measures the extent to which participants accept these technologies in the work environment, and orientation towards applying environmental solutions that reflect the behaviors of participants in adopting sustainable practices, and finally influencing the decisions of the institution, which measures the extent to which participants contribute to supporting and applying Environmental policies within educational institutions.

The questionnaire has been carefully designed to ensure clarity and accuracy, and its truthfulness has been verified by presenting it to a group of specialized academics to ensure that it is compatible with the objectives of the study.

Virtual honesty and content honesty

1. Virtual honesty: The apparent validity of the questionnaire was confirmed by presenting it to a group of academic referees and specialists in the field of research, in order to assess the clarity of the statements and their suitability for the subject of study. Minor modifications have been made to some phrases to ensure ease of understanding and accuracy in measuring the target concepts. This

step helped ensure that the study tool ostensibly seemed to be able to measure what was meant by it, enhancing its reliability when applied to the target sample.

2. Content Authenticity: As for the **authenticity** of the content, it was verified through a comprehensive review of the components of the questionnaire to ensure the comprehensiveness of the statements and their direct relevance to the study axes. It was ensured that **each dimension of the questionnaire** covers all aspects related to the variables studied, so that the phrases reflect **digital citizenship** and **the use of environmentally friendly technologies** comprehensively and accurately. The appropriateness of the number of phrases for each dimension was also verified, to ensure that the tool accurately measures the target phenomenon without bias or decrease.

Tool stability: The stability of the study instrument was measured using the Cronbach alpha coefficient, which reflects the internal consistency of the questionnaire questions. As shown in Table 2, all axes obtained high values for the Cronbach alpha coefficient, demonstrating a high level of stability and reliability in the research instrument..

Table 2: Stability of the study instrument using the Cronbach alpha coefficient

Axles	Number of ferries	Cronbach's alpha coefficient	Order
The first axis (digital citizenship)	15	0.914	1
The first dimension is awareness of the importance of environmentally friendly technologies	7	0.859	2
The second dimension is readiness to use environmental technologies	7	0.851	3
The third dimension is the orientation towards the application of environmental solutions	7	0.830	4
The fourth dimension is the impact on the decisions of the institution.	7	0.706	5
Total Tool	**43**	**0.936**	===

The consequences of the Cronback Alfa coefficient indicate that the study tool has a high degree of internal stability and stability, which increases the reliability of the questionnaire in the measurement of the target variable. The total value of the stability coefficient was 0.936, which is a very high level showing the reliability and accuracy of the research tool in the data collection.

The first axis (digital citizenship) shows the highest stability value of 0.914, which indicates the homogeneity of the phrases associated with this axis and their clarity in expressing the target concept. As for the dimensions of the intention to adopt environmentally friendly technologies, the values of the Cronbach alpha coefficient ranged between 0.706 and 0.859, all of which are within the statistically acceptable limits, reflecting good internal consistency in the statements associated with this variable..

Based on these results, it can be confirmed that the questionnaire used in the study is a reliable measurement tool, as it has a high level of stability, which makes it suitable for analyzing the relationship between digital citizenship and the use of environmentally friendly technologies among workers in educational institutions, and provides accurate results that can be relied upon in achieving research objectives..

Descriptive analysis of the study axes

The first axis (digital citizenship):

We analyze the paragraphs of this axis through the following tables:

Table (3) Descriptive Analysis of the Digital Citizenship Pillar

Question number	Question	Arithmetic mean	Standard deviation	Rank
1	Make sure to respect the laws and regulations related to the use of technology in the work environment.	3.83	0.899	3
2	I use digital resources responsibly and avoid infringement of intellectual property rights.	3.20	1.080	16
3	I deal with others online with ethics and respect as in realistic dealing.	3.64	1.050	7
4	I take care to protect my personal data and the privacy of information when using the Internet.	3.75	0.999	4
5	I encourage my colleagues to use technology responsibly and positively at work.	3.62	0.945	8
6	Adhere to secure digital practices when sharing information online.	3.67	1.103	6
7	Make sure to verify the credibility of information before publishing or sharing it electronically.	3.55	1.191	9
8	I use strong and up-to-date passwords regularly to protect my digital accounts.	3.89	1.042	1
9	I avoid using technology in a way that harms my productivity at work or study.	3.84	1.048	2
10	I commit not to post or share inappropriate or offensive content on the Internet.	3.58	1.081	10
11	Make sure to respect the privacy of others and not to share their personal information without their permission.	3.53	1.059	11
12	I use the Internet as a means of learning and professional development instead of purposeless use.	3.56	1.048	12
13	I believe in the importance of combating cyberbullying and report any abuse I encounter or witness.	3.71	1.063	5
14	I contribute to spreading awareness about the safe and responsible use of technology among my colleagues and students.	3.25	1.125	15
15	I participate in training courses that enhance my understanding of digital citizenship and e-best practices.	3.48	1.152	13
Overall degree of the axis		**3.60**	**0.715**	

The results of the descriptive analysis of the digital citizenship pillar indicate that the participants in the study have a medium to high level of commitment to responsible digital practices, with a total arithmetic average of 3.60, reflecting a general awareness of the importance of digital citizenship with a disparity between different aspects The results showed that the most high average statements were related to the security of digital accounts, with the term "I use strong and regular updated passwords for the security of my digital accounts" records the highest average of 3.89, the importance of importance of importance indicates widespread awareness about digital security, protection of personal information and increasing awareness of the fear of hacking. The term "I avoid using technology in this way that damages my productivity in work or study" came up with an average of 3.84, which reflects awareness of workers in educational institutions about the

importance of responsible use of technology. The institution that can lead to institutional policies that stimulate the balance between work and the use of digital tools.

In contrast, the term "I use digital resources was responsible and avoids violations of intangible rights" recorded at the lowest with an average of 3.20, indicating a lack of understanding of the Copyright and Intellectual Property Act. This can be explained by lack of clarity in these laws for many employees in educational institutions or lack of availability of digital resources in an available form without clear limitations, which reduces compliance with intellectual property rights for the participants. The phrase “I help spread awareness about the safe and responsible use of technology. The phrase "I contribute to spreading awareness about the safe and responsible use of technology among my colleagues and students" also scored a relatively low average of 3.25, which may reflect the weakness of individual initiatives in spreading the culture of digital citizenship within institutions, as this responsibility may be seen as falling on the shoulders of official authorities or specialists in the field rather than being an individual practice adopted by all employees..

These findings can be explained by many factors, including personal experiences that affect where interested individuals are in digital citizenship, because those who have experienced data violations or leaks take stringent safety conditions. . Corporate policy also plays a role in shaping individuals against technology, as the working environment can promote secure digital practice or leave them without clear guidance. On the other hand, the widespread spread of free digital resources may lead to poor adherence to intellectual property rights, while the lack of awareness programs may be the reason for the lack of participation of individuals in spreading digital awareness within their professional environments..

Based on these findings, it can be said that there is a good level of awareness of digital citizenship, but there is a need to strengthen some aspects, especially with regard to respecting intellectual property rights and encouraging individuals to play a greater role in spreading the culture of digital citizenship. This can be achieved by intensifying awareness programs on digital use laws, encouraging employees to adopt responsible practices, as well as activating institutional policies that stimulate the ethical use of technology and enhance digital security. Improving these aspects will contribute to the consolidation of a more conscious and responsible digital learning environment, which will positively reflect on digital security and compliance with digital laws within educational institutions..

2- Paragraphs of the second axis (The use of environmentally friendly technologies):

We analyze the paragraphs of this axis through its dimensions and the following table: -

Table 4: The use of environmentally friendly technologies

Dimensions	Arithmetic mean	Standard deviation	Rank
Awareness of the importance of environmentally friendly technologies	3.65	0.740	2
Willingness to use environmental technologies	3.61	0.766	3
Orientation towards the application of environmental solutions	3.60	0.734	4
Influencing the decisions of the organization	3.70	0.628	1
Total degree for use of environmentally friendly technologies	**3.64**	**0.717**	**-**

The results of the descriptive analysis of the use of environmentally friendly technologies pillar indicate that participants have a relatively positive trend towards using these technologies in their educational institutions, with an overall arithmetic average of 3.64, reflecting a good level of awareness, readiness and orientation towards actual application. It is clear from the results that the

dimension that received the highest arithmetic average is the influence on the decisions of the institution with an average of 3.70, which shows that employees in educational institutions have a strong willingness to participate in supporting and directing decisions that promote environmental sustainability. This can be attributed to increasing education policy that encourages the integration of permanent technology into the working environment, as well as increasing global awareness of the importance of environmental protection and sustainable development. It may also be a result of the internal initiative with a view to confusing workers in the processes of decision -making for decision -making, making them more associated with this type of trend.

Awareness of the importance of environmentally friendly technologies comes second with an average of 3.65, indicating participants' awareness of the role of durable technology to reduce environmental impact and improve resource efficiency in educational institutions. This is likely to be a result of awareness of awareness of consciousness, which aims to promote the knowledge of permanent technology, as well as to talk about issues of environmental and stability in media and educational institutions. However, consciousness alone is not sufficient to ensure effective implementation, as it must be strengthened by sources of support such as financing and logistics facilities to use environmental solutions more efficiently.

The desire to use environmental technologies came in third place with an average of 3.61, indicating a good desire among participants to use these technologies, but this may not be enough to encourage their widespread application. There may be obstacles to using these solutions, such as a lack of adequate training on the way they use or lack of infrastructure support in educational institutions. It is also possible that there is a reluctance to use new techniques from fear of high costs or vague direct direct benefits, which can reduce the enthusiasm for their application.

The tendency to use environmental solutions took place at an average of 3.60, indicating that there are some obstacles that hinder the actual implementation of these technologies despite previous awareness and preparation. This can be explained by a lack of adequate institutional support, as some organizations may have resistance to replacing or lacking clear policies that interfere with the implementation of environmental solutions. It may also be related to lack of financial resources to buy or develop the infrastructure required for these technologies, as well as more training and council programs that help workers effectively implement these solutions effectively.

Overall, these results reflect a positive tendency to use environmentally friendly technologies, but there is still an inequality between consciousness, preparation and real applications. This may be due to various factors, such as institutional support, availability of money and the spread of environmental culture in educational institutions. In order to achieve more effective results, it may be necessary to strengthen internal policy that encourages to use permanent technologies, and encourage workers to encourage these techniques to integrate into their daily tasks, just to explain the real benefits of the real benefits To increase exercise and awareness to use environmental solutions. A permanent change in educational institutions requires concrete efforts to ensure a more sustainable learning environment between individuals, management and supporters..

Hypothesis testing

Main hypothesis: There is a significant impact of **digital citizenship on** the **use of environmentally friendly technologies in educational institutions**

In order to determine the presence of an effect, we will perform a linear regression analysis of underhypotesis:

The first sub-hypothesis: There is a significant impact of digital citizenship on awareness of the importance of environmentally friendly technologies

To determine the degree of influence, we will do a linear regression analysis that follows

Table 5 Simple linear regression analysis of the impact **of digital citizenship on awareness of the importance of environmentally friendly technologies**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	797 a.a.	.636	.634	.44823
a. Predictors: (Constant), **Digital Citizenship**				

ANOVA						
Model		Sum of Squares	Push	Mean Square	F	Sig.
1	Regression	68.014	1	68.014	338.525	.000b
	Residual	38.977	194	.201		
	Total	106.990	195			
a. Dependent Variable: **Awareness of the importance of environmentally friendly technologies**						
b. Predictors: (Constant),						

Coefficientsa						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.682	.165		4.137	.000
	Digital Citizenship	.825	.045	.797	18.399	.000
a. Dependent Variable: **Awareness of the importance of environmentally friendly technologies**						

The results of a simple linear regression analysis reflect a strong significant impact of digital citizenship on awareness of the importance of environmentally friendly technologies, which first support under-pilgrimage. who believe that awareness of digital citizenship in educational institutions helps increase the importance of these technologies..

From the model summary, it is shown that the value of the correlation coefficient (R) was 0.797, indicating a strong correlation between digital citizenship and awareness of the importance of environmental technologies. The R Square value of 0.636 shows that digital citizenship explains 63.6% of the changes in the level of awareness of the importance of environmentally friendly technologies, which means that there is a significant impact of this independent variable on the dependent variable, while 36.4% of the changes remain due to other factors that are not included in the model..

Through analysis of variance (ANOVA), the value of F was equivalent to 338.525, which is very high, and the level of statistical significance (Sig.) was 0.000, which confirms that the model as a whole is statistically significant at a significance level less than 0.05, meaning that digital citizenship significantly affects the level of awareness of the importance of environmentally friendly technologies..

Turning to the regression coefficient, we find that the B value of digital citizenship is 0.825, which means that each increase of one unit in the level of digital citizenship leads to an increase of 0.825 in the level of awareness of the importance of environmental technologies, assuming that other factors are constant. The very high T value of 18.399, coupled with a significance level of 0.000,

confirm that the impact of digital citizenship on awareness of environmental technologies is statistically significant..

Based on these findings, the strong impact of digital citizenship on environmental awareness can be explained by the significant role that digital concepts play in disseminating information and promoting environmental culture among workers in educational institutions. Individuals with a high level of digital citizenship are better able to access information about environmental sustainability and are more aware of the importance of using technology to achieve environmental goals. The responsible use of technology also contributes to the promotion of digital sustainability practices, such as reducing paper consumption, adopting environmentally friendly educational management systems, and moving towards renewable energy..

Accordingly, these results confirm the need to promote digital citizenship within educational institutions, not only in order to develop individuals' skills in dealing with technology, but also to increase their awareness of the importance of sustainable technologies, which contributes to supporting green digital transformation policies within educational institutions..

The Second Sub-hypothesis : There is a significant effect **of digital citizenship** on **the willingness to use environmental technologies**
In order to determine the degree of trace, we will perform a linear regression analysis as follows::

Table 6and simple linear regression analysis of the impact of digital citizenship on readiness to use environmental technologies

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.676a	.457	.454	.56645
a. Predictors: (Constant), **Digital Citizenship**				

ANOVA						
Model		Sum of Squares	Push	Mean Square	F	Sig.
1	Regression	52.345	1	52.345	163.135	.000b
	Residual	62.249	194	.321		
	Total	114.594	195			
a. Dependent Variable: Willingness to use environmental technologies						
b. Predictors: (Constant), **Digital Citizenship**						

Coefficientsa						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.007	.208		4.830	.000
	Digital Citizenship	.724	.057	.676	12.772	.000
a. Dependent Variable: Willingness to use environmental technologies						

The results of a simple linear regression analysis indicate a significant impact of digital citizenship on the willingness to use environmental technologies, which supports the second sub-hypothesis that digital citizenship contributes to enhancing the readiness of individuals within educational institutions to use environmentally friendly technological solutions..

The model summary shows that the correlation coefficient (R) value was 0.676, indicating a strong correlation between digital citizenship and willingness to use environmental technologies. The R Square value of 0.457 means that digital citizenship explains 45.7% of changes in willingness to use environmental technologies, while 54.3% of changes are due to other factors not included in the model. This suggests that digital citizenship plays an important role in shaping individuals' willingness to use these technologies, but it is not the only factor influencing.

In the analysis of variance (ANOVA), the value of F was equivalent to 163.135, which is very high, and the level of statistical significance (Sig.) was 0.000, indicating that the model as a whole is statistically significant at a significance level of less than 0.05. This suggests that the impact of digital citizenship on willingness to use environmental technologies is not just a statistical coincidence, but a real and significant impact..

For regression coefficients, the B value for digital citizenship was 0.724, which means that each one-unit increase in the level of digital citizenship leads to a 0.724 increase in the level of readiness to use environmental technologies, assuming the other factors are constant. A very high T value of 12.772, coupled with a significance level of 0.000, confirms that this effect is strong and statistically significant.

These findings can be explained by the role that digital citizenship plays in improving readiness to use environmental technologies, as digital knowledge allows individuals to access information about the environmental benefits of these technologies, enhancing their acceptance of them. Individuals using technology responsibly make them more inclined to use environmentally friendly digital solutions, such as reducing reliance on paper, using energy-efficient electronic systems, and leveraging smart applications to manage environmental resources. In addition, individuals with high digital citizenship may be better in adapting to new techniques, which increases the desire to use environmental technology in their professional environment.

Based on these findings, the importance of promoting awareness of digital citizenship as a means of supporting environmental technologies in educational institutions can be emphasized. For this, there is a need to intensify the awareness of the awareness on how to use technology in a permanent way, and provide digital environments that encourage individuals to use this practice, in addition to workers in the field of education in addition to including training programs on digital environmental solutions in professional development schemes .

The third sub-hypothesis: There is a significant impact of digital citizenship on the trend towards the application of environmental solutions in the State of Iraq.

In order to determine the degree of trace, we will perform a linear regression analysis asfollows.

Table 7 Simple linear regression analysis of the impact of digital citizenshipon the trend towards the application of environmental solutions.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.636a	.404	.401	.56846
a. Predictors: (Constant), **Digital Citizenship**				

ANOVA						
Model		Sum of Squares	Push	Mean Square	F	Sig.
1	Regression	42.567	1	42.567	131.728	.000b
	Residual	62.690	194	.323		

	Total	105.256	195			

a. Dependent Variable: Orientation towards the application of environmental solutions
b. Predictors: (Constant Digital Citizenship

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.248	.209		5.967	.000
	Digital Citizenship	.653	.057	.636	11.477	.000

a. Dependent Variable: Orientation towards the application of environmental solutions

The results of simple linear regression analysis indicate a significant impact of digital citizenship on the trend towards the application of environmental solutions in Iraq, which supports the third sub-hypothesis that assumes that digital citizenship contributes to enhancing the adoption of environmental solutions by individuals within educational institutions..

The model summary shows that the correlation coefficient (R) value was 0.636, indicating a medium to strong correlation between digital citizenship and the trend towards environmental solutions. The R Square value of 0.404 shows that digital citizenship explains 40.4% of changes in the trend towards environmental solutions, while 59.6% of the changes are due to other factors that were not included in the model. This result shows that digital citizenship plays an important role in shaping this trend, but it is not the only factor influencing it..

In the analysis of variance (ANOVA), the value of F was equivalent to 131.728, which is a high value indicating the significance of the model, and the level of statistical significance (Sig.) was 0.000, indicating that the model as a whole is statistically significant at a significance level less than 0.05. This suggests that the impact of digital citizenship on the trend towards environmental solutions is not just a statistical coincidence, but a real and statistically significant impact..

For regression coefficients, the B value of digital citizenship is 0.653, which means that each one-unit increase in the level of digital citizenship leads to an increase of 0.653 in the level of orientation towards the application of environmental solutions, assuming the other factors are constant. The high T value of 11.477, coupled with a significance level of 0.000, confirms that this effect is significant and statistically strong..

These results can be explained by the role that digital citizenship plays in promoting of environmental solutions, as digital awareness contributes to enabling individuals to identify modern and sustainable technologies that contribute to reducing the negative environmental impact. Individuals with a high level of digital citizenship are more aware of the importance of using environmental technologies in their professional environments, and their ability to engage with modern technology makes them more willing to seek sustainable and effective solutions in their organizations. This effect can also be supported by the efforts of some educational institutions in Iraq, and requires digital environmental practice such as reducing the use of paper, implementing smart resource management systems and renewable energy technology to take advantage of .

On the other hand, 40.4% describing orientation in environmental solutions for digital citizenship, indicating that there are other factors affecting this trend, such as government policy, the

availability of economic resources, institutional culture and general level of environmental awareness in society. Some individuals may have a good understanding of the importance of environmental solutions, but face challenges in implementing them due to lack of institutional support or the absence of clear environmental policy in educational institutions.

Based on these findings, it is clear that promoting digital citizenship in educational institutions can lead to an important contribution to improving the tendency to use environmental solutions. Therefore, it is necessary to promote the use of digital tools that support environmental sustainability, such as digital educational systems that reduce dependence on traditional resources, provide training programs to raise awareness of the importance of sustainable technology, and support policies that encourage the application of environmental technologies in educational institutions. Achieving this will promote a culture of digital sustainability and contribute to a more responsible approach to the environment within educational institutions in Iraq..

Fourth sub-hypothesis: There is a significant impact of digital citizenship on influencing the decisions of the organization.

For the purpose of analyzing this hypothesis and in order to determine the degree of the presence of an effect, we will perform a linear regression analysis asfollows.

Table 8 Simple linear regression analysis of the impact of digital citizenship on influencing enterprise decisions.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	174[K]	.030	.025	.62050

a. Predictors: (Constant), **Digital Citizenship**

ANOVA

Model		Sum of Squares	Push	Mean Square	F	Sig.
1	Regression	2.321	1	2.321	6.027	.015b
	Residual	74.694	194	.385		
	Total	77.014	195			

a. Dependent Variable: Influencing the decisions of the organization.
b. Predictors: (Constant), **Digital Citizenship**

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.252	.228		18.624	.000
	Digital Citizenship	-.152-	.062	-.174-	-2.455-	.015

a. Dependent Variable **Influencing the decisions of the organization..**

The results of a simple linear regression analysis indicate that digital citizenship does not have a strong influence on influencing the decisions of the organization, but rather that the relationship between them is very weak and close to non-existent, which does not support the fourth sub-hypothesis that assumes that digital citizenship contributes to influencing the decisions of the

organization. Contrary to previous hypotheses that showed a strong moral impact of digital citizenship on various dimensions of using environmentally friendly technologies, this result shows that digital citizenship is not a decisive factor in influencing the decision-making process within educational institutions..

The model summary shows that the correlation coefficient (R) value was 0.174, indicating a very weak correlation between digital citizenship and influencing enterprise decisions. The R Square value of 0.030 means that digital citizenship explains only 3% of changes in the level of influence on an organization's decisions, which is very small, indicating that there are other, more influential variables that play a key role in this process..

In the analysis of variance (ANOVA), the value of F was equivalent to 6.027, which is low compared to other hypotheses, and the level of statistical significance (Sig.) was 0.015, indicating a significant but very weak effect. In such a case, although the impact is statistically significant, its size is too small to be of great practical importance, which means that digital citizenship is not a major factor in influencing the organization's decisions compared to other more influential factors..

As for the regression coefficients, the B value of digital citizenship was -0.152, which is a negative value, indicating an inverse relationship between digital citizenship and influencing enterprise decisions, albeit very slightly. The T value was -2.455, and the significance level was 0.015, indicating that the relationship is statistically significant but not of strong practical value, as the effect is weak and not noticeable in practice..

These results can be interpreted in many ways, the main reason may be that the decision-making process within educational institutions is not affected by digital citizenship as much as it is affected by other factors such as institutional policies, laws and regulations, administrative orientations, organizational culture, and the availability of financial and technical resources. Often, decision-making in educational institutions is more centralized and subject to formal determinants than to individuals' digital practices..

The reason for the weak impact may also be that digital citizenship, while important in improving awareness and knowledge of environmental technology, does not give workers the actual ability to make a difference in the organization's decisions, as decisions to shift towards environmental technologies may face obstacles such as lack of infrastructure, poor funding, or resistance to change by senior management..

Based on these findings, it can be concluded that digital citizenship may be a catalyst in raising awareness of environmental technologies within educational institutions, but it is not the primary driver in influencing institutional decisions. To enhance the role of digital citizenship in decision-making, it may be necessary to enhance the role of employees in participating in institutional decision-making related to sustainability technology, provide a work environment that supports environmental digital transformation through formal policies and encourage technological innovation in education..

By analyzing the above hypotheses, it is possible to reach the conclusion that the main hypothesis is correct, which states: There is a significant impact of digital citizenship on the use of environmentally friendly technologies in educational institutions

General Conclusions and Recommendations for the Study Axes and Hypotheses

First: General Conclusions

The study demonstrates that digital citizenship contributes significantly to shaping environmental awareness and behaviors in educational institutions. Participants who exhibit higher levels of digital responsibility tend to be more environmentally conscious and receptive to sustainable practices. However, this influence manifests at varying intensities across different dimensions.

While digital citizenship promotes individual readiness and awareness regarding green technologies, the actual implementation of such technologies remains constrained by institutional limitations—particularly at the level of policy enforcement and infrastructure readiness. Notably, although participants displayed ethical and secure digital behavior, they were less active in disseminating digital responsibility among peers, which reflects the need for broader institutional engagement.

Moreover, the study finds that while digital citizenship encourages environmental attitudes, it is not sufficient by itself to drive strategic decision-making. Institutional governance, resource availability, and leadership commitment play a more substantial role in shaping environmental transformation within educational contexts.

Second: Interpretation of Hypotheses Testing

- The overarching hypothesis regarding the impact of digital citizenship on the use of environmentally friendly technologies is supported. The findings suggest a clear positive relationship between digital responsibility and sustainable technology behavior.
- Digital citizenship strongly correlates with environmental awareness and willingness to use eco-friendly practices, indicating that digitally literate individuals are more inclined to align their behaviors with sustainability principles.
- Although digital citizenship positively influences the use to apply environmental solutions, practical constraints—such as lack of infrastructure or administrative supportmay hinder execution.
- The weakest impact observed was on institutional decision-making, suggesting that the translation of individual digital values into organizational policies requires more than personal readiness—it calls for systemic reform and participatory governance.

Third: Recommendations (with Implementation Mechanisms)

1. **Foster a culture of digital citizenship through structured training.** *Mechanism:* Develop certified training modules for educators and administrators focused on ethical digital practices and environmental responsibility, delivered via professional development platforms.
2. **Approve clear institutional policies that support the use of green technologies.** *Mechanism:* Integrate sustainability goals into school or university strategic plans, including benchmarks for reducing paper use, improving energy efficiency, and promoting digital teaching methods.
3. **Enhance readiness for environmental technologies through targeted support.** *Mechanism:* Provide hands-on workshops and digital toolkits tailored to green solutions (e.g., solar-powered tools, digital resource management systems), alongside ongoing technical support.

4. **Address systemic barriers to technology adoption.** *Mechanism:* Allocate funding within education budgets for upgrading infrastructure, acquiring eco-friendly devices, and integrating cloud-based systems that reduce material consumption.
5. **Enable participatory decision-making around environmental initiatives.** *Mechanism:* Establish sustainability committees composed of staff, teachers, and digital leaders who can advise management and contribute to environmentally oriented decision processes.
6. **Promote applied research in digital environmental transformation.** *Mechanism:* Support academic research grants and institutional partnerships focused on developing local solutions that link digital innovation with sustainability goals in Iraq's educational sector.

Final Remark

This study underscores the strategic role of digital citizenship in enhancing sustainability practices. However, translating awareness into systemic change requires bridging the gap between individual digital competencies and organizational readiness. Lasting impact can only be achieved through integrated policies, participatory structures, and sustained investment in infrastructure and training.

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