

## Digital citizenship for faculty of Iraqi universities

Maha Saleem Kahlaf Wahib<sup>1</sup>, Zainab Aziz Ahmed Alamiry<sup>2</sup>, Ban Hassan Majeed<sup>2</sup>,  
Haider TH. Salim ALRikabi<sup>3</sup>

<sup>1</sup>Department of Information and Knowledge Technologies, College of Arts, University of Basrah

<sup>2</sup>University of Baghdad, College of Education for Pure Science, Ibn Al-Haitham, Baghdad, Iraq

<sup>3</sup>Electrical Engineering Department, College of Engineering, Wasit University, Wasit, Iraq

### ABSTRACT

Digital Citizenship (DC) is a set of rules, controls, standards, norms, ideas, and principles followed in the optimal and proper use of technology, which citizens, young and old, need to contribute to the progress of the nation. In short, it is guidance and protection, guidance to the benefits of modern technologies, and protection from their dangers. Or more precisely, it is the smart approach to technology. The concept of digital citizenship has a strong relationship with the education system, so academics in higher education and scientific research institutions must be the most experienced, and effective among their students in this field. Especially after the Corona pandemic and the trend that the universe has gone through towards using the internet in all areas of life, including education, especially integrated education, it has become very important for a citizen to be digital. This study dealt with a sample of university professors with (200) questionnaires. All the professors who belong to colleges with a scientific and human specialization possess digital citizenship. There are no differences between genders except in the education axis, which was in favor of the teaching staff male. In addition to the specialization, it was in favor of the colleges of science.

**Keywords:** Digital Citizenship, Technology, Education, Corona Pandemic, University, Professors.

### Corresponding Author:

Maha Saleem Kahlaf Wahib  
Department of Information and Knowledge Technologies College of Arts  
University of Basrah  
Basrah, Iraq  
Maha.khalf@uobasrah.edu.iq

### 1. Introduction

In the current era, the world is witnessing amazing technical progress in all fields, because of the quick developments that exceed the aspirations of society and meet the needs in a way that exceeds expectations. So, everyone must compete with time to catch up with development through technical platforms, tools, and smart devices [1, 2]. The phenomenon of using digital technology has spread widely among all members of society and in all aspects of life, from communication to trade, especially during the Corona pandemic and what the whole universe was going through. Therefore, technology is no longer just a game, but it has become a tool to facilitate life. This spread, although it has many advantages such as ease of communication with others and the possibility of obtaining information anywhere and at any time with the speed in completing work, some individuals use it badly for many reasons and at the top of it is a lack of education, training in schools and academic educational institutions [3]. The digital and technological revolution contributed to the occurrence of many transformations that affected various aspects of daily life and contributed to increasing the ability to communicate, exchange information, spread awareness, and created the digital citizen associated with the virtual world in all its affairs such as education, culture, economy, politics, trade, and other aspects, liberating thereby from the restrictions time and place [4]. With the increase in technology users considering the pandemic, there has become an urgent need to talk about the responsible use of technology, which has led to the emergence of digital citizenship. So, the concept of citizenship has evolved into what is known as digital citizenship, and these

two concepts have become linked to the existence of society, but citizenship has its social and digital citizenship has another society. They share rights, duties, and moral principles, and their foundations are required to be learned through the institutions of socialization [5, 6]. At the current stage, and in light of the challenges that society faced during the Corona pandemic, and the tendency of everyone, especially university professors and students, to shift from a traditional educational society to a digital educational society, in which digital citizenship is imperative for us to constitute an important entry point and an essential element whose importance emerges from the reform and development of education in a sustainable manner. Emphasis on the role of the professor, being responsible for the use of technology in the educational process, which makes technology an important role in the future At the current stage, and in light of the challenges that society faced during the Corona pandemic, and the tendency of everyone, especially university professors and students, to shift from a traditional educational society to a digital educational society, in which digital citizenship is imperative for us to constitute an important entry point and an essential element whose importance emerges from the reform and development of education in a sustainable manner. Emphasis on the role of the professor, being responsible for the use of technology in the educational process, makes technology an important role in the future [7, 8]. In the framework of this, the research problem can be crystallized in how education can be supported by instilling the values of digital citizenship among university professors. In the year 2001, [9] defined in one of his articles the users of technology and divided them into two types. From his article, we find ourselves facing a new society that is not traditional, but rather a digital society produced by the rapid development of technology, where the urgent need has become for the emergence of a lifestyle in which each participant learns behaviors appropriate and inappropriate in the digital society. Therefore, the term digital citizenship appeared to us as a way of life to discover the barriers and limits that must be respected in dealing with digital technologies, as many of those interested in this term defined it as the rules, ideas, and principles in using technology that young and old need and directing what benefits us from modern technologies and protection from its dangers or is dealing Smart with technology [10, 11]. Digital citizenship means the interaction of the individual with others by using digital tools and resources such as computers, mobile phones, and all the services they provide such as e-mail, blogs, websites, social networks, and others. With the necessary rules, controls, standards, goals, ideas, and principles that satisfy the optimal and proper use of digital technology [12-14]. It is one of the characteristics of the true digital city, and the digital citizen is defined as a person who uses the Internet regularly and effectively [15, 16]. That is that individual who develops his skills and knowledge to use the Internet and digital technologies effectively [17, 18]. So digital citizenship is a pattern of behavior practiced by an individual and linked to his use of technology; it is a digital behavior based on treating others with respect and not exposing their privacy and helping others in solving their problems or sharing skills with them [19]. Universities began digital transformation and the use of modern technology. Accordingly, educational institutions were restructured, technology infrastructure was supported and developed, and the capabilities of professors and their students were developed. So educational institutions represented by universities are interested in the concept of digital citizenship because they seek the needs of students [20]. They are not just a means to prepare students and educate them, but rather go beyond that to include preparing students for the full orientation and participation in the digital society, as they are characterized by a great responsibility in the development of digital citizenship and its skills [21, 22]. The concept of digital citizenship is related to several concepts, including national security, digital rights, digital communication, e-commerce, e-health, e-culture, and e-government. Therefore, we find that citizenship is not only technical but rather a culture that must be available to all technology users [23-25]. Digital citizenship consists of nine elements, which act as a basis for the appropriate use of technology and form the basis on which the digital society is based, which provides a paved way for each user of technology to understand what is appropriate, and what is not appropriate. If we look closely at each element of digital citizenship and define it quickly, we will realize how important it is for every person who participates in the digital society and deals with technology, so it is a very important lifestyle [26]. So, the first element is digital access, which is full electronic participation in society, in the sense that every individual has the technology that qualifies him to fully participate in the digital society without hindrance in the right way [27]. The second digital commerce is the buying and selling of goods on the Internet, where everyone is now buying, selling, and exchanging on the Internet, but without awareness and falling into many fraud operations, and therefore e-commerce helps to handle things easily [28]. The third one is digital communication is the electronic exchange of information, and it helps to understand what should be exchanged and what should not fall under the law [29, 30]. The fourth is digital [31] culture, which is the ability to use digital technology, and knowing when to use it [32]. The fifth; is the rules of digital behavior which are “norms of digital behavior or procedures” expected by users of digital technology [33]. The sixth; is digital law, which is "the legal rights and restrictions that govern

the using technology" [34]. The seventh is digital rights and responsibilities, which are "the requirements and freedoms extended to all users of digital technology and behavioral expectations" [35]; and the eighth component is digital health and well-being, which are "elements of the physical and psychological well-being of the body related to the use of digital technology [36]. Finally, the ninth is digital security, which is the "precautions that must be taken." All users of technology are required to ensure the safety and security of their network [37]. Characteristics of digital citizenship is a set of operations as follows: Humanitarian includes initiatives that target different groups of people for their development. Modernity emerging from the era, the consequences of development in information technology communications, and related interactions. Social which preserving the society's culture and identity and not assimilating into other cultures, thus enabling the society to survive, develop and modernize like other societies. Organized and planned to pursue patent interests according to a plan studied scientific studies and clear procedural plans. It is a strategic objective that aspires to reach a conscious digital citizen who is sufficiently aware of the digital world through multiple skills, considering the emotional side. Value: aims in its content to form a valuable framework or an internal insight that governs the user's work in the digital environment. Dynamic and evolving are characterized by continuity but are constantly changing direction with the development of information technology and communication. Scientific; relies on a general framework, and it is the product of theoretical and applied sciences. Developmental; aims to increase the human ability to coexist and interact in the world today with all its challenges. Preventive: know-how and awareness of the risks in the digital world and the ways to compose and solve the problems that you encountered, and all of that is a protection system; plus, protection for users of modern technology at different levels. Integrative; achieving integration between religious values, legal frameworks, and social norms according to international standards for the use of the Internet [38-41].

For Digital Citizenship (DC) Axes, nine dimensions of digital citizenship have been identified, which contribute to the preparation of a confidential digital citizen who uses technology and employs it safely and soundly. These were divided into three axes: education, respect, and protection [42, 43], which are as follows:

**First axis:** Education which includes the following dimensions:

- 1- Digital literacy: One of the important issues of digital culture, learning the digital basics, evaluating electronic resources, the accuracy and veracity of their content, revealing learning patterns, and developing it on the network and distance learning.
- 2- Digital communication: It is the new medium with which people interact. So, it is necessary to investigate this contact with others, educating all on the etiquette of questioning and rules to be followed.
- 3- Digital commerce: This dimension deals with educating people about commerce digital, and preparing them to become consumers smart and informed on the issues that may arise encountering them while shopping is as fraud, identity theft, etc. To get to know the form of risks that they may be exposed to during online shopping and understand aspects of online transactions to prepare them for interaction in the digital economy. [44]

**Second axis:** Respect; includes the following dimensions:

- 1- Digital access: This Means equal opportunities, taking into account individual differences concerning technological access to be available to all to engage in the digital world.
- 2- Etiquette and Digital Behavior Standards (Digital Etiquette): Deals with highlighting the role of educators, and academics in handling behavior issues digitally, and familiarising the student with the basics of grammar and digital behavior that is based on the principle of respect.
- 3- Digital law: Consciousness is confirmed in this axis, clarifying the real penalties that ensue some irresponsible behavior students like using hacking software, hacking programs and systems, harassment identity theft, and others. [45]

**Third axis:** Protection; deals with the following dimensions:

- 1- Digital Rights and Responsibilities: This section deals with the statement of duties and rights and educates everyone about the existence of a law that preserves their electronic rights such as intellectual and civil property rights.
- 2- Digital health and well-being: The role of the teacher in educating students need to be careful, of the physical and psychological risks that can occur to infect them because of the use of technology, it must have to take into account the compatibility between its use of responsible manner and maintain their health.

- 3- Digital security: All must go through this dimension to know how to protect electronic data by using antivirus software, the need to make backups, not trust anyone, and exercise caution when giving personal data, fraud, and harassment. The ability to protect a person's data by creating strong passwords, and managing various cyberattacks. [46].

**DC with Education:** Technology is no longer confined to specific people or places but has become accessible to everyone, to be traded small and large, and from various categories. Using the Internet contributes to the establishment of a global interconnected community called the digital society, so we find it everywhere, in education, entertainment, medicine, and engineering, as well as means social media. So, digital citizenship is necessary for the refinement and development of an individual's personality, and all members of society must abide by it and apply its standards and values in all their daily lives. It is essential today that digital citizenship be taught as a new way of thinking about digital technologies, and instead of focusing on what technology can do, the goal is to think about how technology should be used fully and responsibly [47, 48]. During the Corona pandemic, the importance of digital citizenship appeared in all life activities, especially in the educational system through the application of the e-learning system, which provides all educational methods to help teachers and educators on the one hand, and parents on the other hand and help students to use technology accurately. Thus, digital citizenship is an educational tool, and a means to prepare the student and prepare him to enter and participate in society and to actively participate in serving the interests of the state in general and in the digital field in particular [49, 50]. To achieve digital citizenship considering contemporary challenges, it is necessary to focus on the mechanisms of activating the role of the university in achieving citizenship, specifically the mechanisms associated with faculty members, as one of the most important pillars of the university system. This is reflected in the formation of students' awareness and upbringing, addressing the negative aspects of the logical technical revolution, and enhancing its positive aspects among university students. Teacher preparation programs in colleges of education include several standards to qualify him before and during service on how to play his role in education. The principles that educators can build on in developing digital citizenship and include them in school curricula are (usage, dealing skills, software...), operational standards (text structure, translating technical text operations with visual images, semantics analysis of symbols and terms...), and law on digital citizenship [51-61]. As in the first figure.



Figure 1. Active Citizenship

Based on DC and sustainable educational development, technology is the main driver for modern education, and advanced education is a must to embrace technology as an important part and essential to this evolution process. The introduction of technology in education has changed the role of academics and their students, a major change in their tasks, their interaction, and their participation in the educational process, development and self-confidence, self-reliance, and self-realization. Technology also played a role in It is important in highlighting the role of the teacher as a designer of the educational process with its attitudes and activities and has become a guide for his students and guides them towards active learning based on exploration and participation instead of his rigid role in traditional education based on listing huge amounts of information [62, 63]. As an educational institution, it is the most influential in nurturing and deepening the concepts related to technology on the one hand and related to the daily life of the academic professor and his students on the other hand. See, as it intentionally performs its role based on specific, clear, and direct objectives, and based on foundations drawn by the teachers and specialists. Full use of technology in study and learning; It must be properly responsible, and this usage requires everyone to abide by it so that it becomes a clear and explicit

starting point for sound educational development that cannot be completed and is sustainable in the absence of one of its important pillars. Academic professor prepares his lecture using the Google, and Office applications, and it is presented to the students through the classroom application and direct meetings via the Google Meet application, as the lectures are listed sequentially to the students, allowing them to ask their questions and inquiries, and their active interventions during the lecture. [64] She emphasized the role of teachers in teaching students the appropriate behavior in dealing with technology, and how maybe to be a good person in the digital world as in Table 1.

Table 1. Digital citizen in digital world

I am a Digital Citizen	I am inclusive (I engage with others online with respect and empathy)
	I am informed (I evaluate the accuracy, perspective, and validity of online information)
	I am engaged (I use technology for civic engagement and to be a force for good)
	I am balanced (I prioritize my time and activities online and offline)
	I am alert (I know how to be safe online and create safe spaces for others)

## 2. Methodology

The descriptive approach was the most appropriate in terms of the objectives and questions it seeks to answer. A sample was randomly selected from two universities and consisted of (275) male and female professors. Their opinions were collected through electronic questionnaires, numbered 275, valid for analysis. The response from the professors was completed by filling out the questionnaire, as the number of completed questionnaires prepared for analysis became (270) questionnaires representing a sample of the current research. As [65] indicated that the size of the sample is related to the number of paragraphs on the scale, as the size should range from (5-10) times the number of paragraphs. The questionnaire was prepared and divided into two main parts as follows: The first section is concerned with collecting data and personal information for the research sample individuals, which includes: (sex, college, and university), where the classification is (sex in two categories: male and female), (specialized colleges in two categories: scientific and human) and finally there are the two largest universities in the province of Baghdad (the University of Baghdad and Al-Mustansiriya University) as shown in the Table 2.

Table 2. The sample of the proposed work

Sample		Students	Sum
Uni.	Coll.		
University of Baghdad	College of Education for Pure Science/ Ibn Al-Haitham	67	135
	College of Languages	68	
Mustansiriyah University	Faculty of Arts	68	135
	Faculty of Engineering	67	
Total	270		

The second section aims to collect the answers and estimates of the sample members for a group of items assigned to measure (27) phrases distributed over three axes of digital citizenship. The first axis: is the education axis with its phrases consisting of (9) phrases, which includes three dimensions: (Digital culture, digital communication, and digital commerce). The second axis: the axis of respect with its phrases consisting of (9) phrases, which includes three dimensions they are (Digital Access, Digital Code of Conduct, and Digital Laws).

The third axis: the axis of protection in its expression consists of (9) phrases, which include three dimensions they are (Digital Rights and Responsibilities \_ Digital Health and well-being \_ Digital Security), as shown in Table 3.

Table 3. Distribution of the study tool’s poverty areas on its domains

No.	Axis	The number of paragraphs	Gender	
			Male	Female
1	Education	9	135	135
2	Respect	9	135	135
3	Security	9	135	135

The research relied on the electronic questionnaire to collect the required data and identify the level of digital citizenship, using the five-point Likert scale to determine the method of responses of the research sample, as it is the common method in analyzing the answers; Because it provides a visual estimate of the number of closed questions. Where the Likert scale scores ranged between (1 to 5) five (strongly agree, agree, neutral, disagree, strongly disagree), the value (5) means “strongly agree”, and the value (1) means “disagree severely”, as shown in the Table 3, where the table shows the five-point Likert scale and its reversal where the inverse criterion was adopted to evaluate the negative paragraphs, where the grading was reversed as shown in Table 4.

Table 4. Five-point Likert scale

Category Range	1	2	3	4	5
Evaluation	Strongly Disagree	not agree	neutral	Ok	Strongly Agree
Evaluation of negative items	Strongly Agree	Ok	neutral	not agree	Strongly Disagree

The discriminatory power of items for the digital citizenship scale was calculated. The internal consistency was calculated (the style of the relationship of the paragraph score with the total degree of the axis). It is clear from the Table 5.

Table 5. Internal consistency

Axis	The critical value of the correlation coefficient	significance level	DF	correlation coefficients
Education	0.113	0.05	268	Statistically significant
Respect				
Protection				

From the table above, the correlation coefficients are statistically significant, i.e. there is internal consistency between the degrees of paragraphs for each axis with the degree of the total axis. The validity of the content, the structural validity, and the stability of the questionnaire were confirmed. As shown below in Table six.

Table 6. Statistical indicators for each field (axis) of DC

Axis's	1	2	3
Valid	270	270	270
Missing	7	7	7
Mean	28.16	28.79	28.33
Median	27.00	27.00	27.00

Axis's	1	2	3
Mode	27	27	28
Std. Dev.	3.880	3.220	3.398
Variance	15.058	17.806	19.339
Skewness	0.222	0.085	0.428
Std. Error of Skewness	0.201	0.201	0.201
Kurtosis	0.566	0.385	0.904
Std. Error of Kurtosis	0.399	0.399	0.399
Range	17	20	27
Minimum	20	17	18
Maximum	37	37	45

The discriminatory power of the items of the digital citizenship scale; is in Table 7.

Table 7. Reliability Statistics by Cronbach's alpha equation

Cronbach's alpha	N of Items
0.750	27

### 3. Results and discussion

It includes a presentation of the results of the questionnaire, which is the tool of the current study, as it was used with a purpose. Measuring the level of the concept of digital citizenship for Iraqi university professors, and its relationship to the themes of citizenship three (education, respect, protection), in light of the variables of gender, university, and college, by answering study questions:

- **What is the level of Iraqi university professors' possession of the concept of digital citizenship?**

To answer the first question, i.e. identifying digital citizenship among university professors; the values of the arithmetic mean and standard deviations for all subjects were extracted. Scale axes and the standard were adopted to evaluate each paragraph as in Table 8.

Table 8. Arithmetic means, standard deviations, ranks, and scores for the responses of the sample individuals to the questionnaire for the education axis items.

Var.	Domains	Sample	SMA	Std. Dev.	Hypothetical average	t-test		significance level
						Cal.	Tab.	
DC	Ed.	270	28.16	3.88	27	4.915	1.960	0.05
	Res.	270	28.79	3.22		7.585	1.960	
	Sec.	270	28.33	3.39		6.456	1.960	

From the above table, it was found that the professors of the Universities of Baghdad and Al-Mustansiriya, according to the sample that was selected, have DC. The result may be attributed to the tendency of university professors, towards the use and employment of the Internet and technology in their academic work, as technology has become an integral part of their daily lives, and also confirms the professor's ability to learn, use blended learning faster than traditional methods regardless of the individual differences between them. In the field of respect, university professors are aware of the need to respect the rights of others' standards of digital

citizenship, they are also aware of the risks of using hacking and hacking software, and can This is due to the religious and moral motivation and the age and mental maturity in respecting the privacy of others and ensuring that there is no infringement in violating the privacy of others, and the increased keenness to enhance the spirit of digital respect and adherence to the rules of superior behavior in digital transactions. They also can use the student portal google classroom or mobile as a tool for communication between students and the university. These results are attributed to the teachers' awareness of the issue of digital protection for themselves or others, and the awareness-raising role efforts of educational institutions in the field of protection.

- **What is the level of digital citizenship among university professors with gender?**

Identifying statistically significant differences at level (0.05) in digital citizenship among university professors according to the gender variable (male/female). As in Table 9.

Table 9. The gender variable, DF=268; Tabular t-value=1.960; Significance level= 0.05

Axis	Gender	N	Mean	Std. Dev.	Std. Error Mean	Cal. T-value	Sig.
Ed.	Male	135	27.14	3.811	0.328	2.206	Sig.
	Female	135	26.10	3.914	0.337		
Res.	M.	135	26.62	4.211	0.362	0.349	Not Sig.
	F.	135	26.45	3.797	0.327		
Pro.	Ma.	135	27.46	4.341	0.374	0.237	Not Sig.
	Fe.	135	27.58	3.872	0.333		

From the above table, in the field of education, there are differences between male and female teachers, in favor of males. As for the respective axis, there are no differences between the sexes, as well as in the protection axis. A t-test for independent samples was used to find out whether the teachers' possession of the concept of digital citizenship was affected by variable (gender). So, the results proved that there are differences attributed to gender in favor of male professors over females. Maybe in society, they receive a greater degree of awareness and discretion, and they are adventurous and quick to learn.

- **What is the level of digital citizenship among university professors, each according to their scientific or human specialization?**

Identifying statistically significant differences at the level (0.05) in digital citizenship among university professors, according to the variable of specialization (scientific/human) as in Table 10.

Table 10. Specialization (scientific / human), DF=268; Tab. T-value= 1.960; Significance level= 0.05

Axis		N	Mean	Std. Dev.	Std. Error Mean	Cal. T-value	Sig.
Specialization	Sci.	135	81.22	7.854	0.676	2.099	Sig.
	Hum.	135	79.31	7.091	0.610		



Since the calculated t-value is greater than the tabular one, then there are statistically significant differences in digital citizenship among university professors according to the scientific specialization variable, i.e. there are statistically significant differences due to the variable (college) and the researcher is attributable to that academic professor in scientific colleges and humanities faculties do not have the same degree of possession. It agrees with the studies which showed that professors at scientific colleges are higher in achievement than others and that they have an understanding and perception of matters more scientific than humanity.

#### **4. Conclusions and recommendations**

Digital citizenship is one of the modern concepts of our time, and the results attributed to owning it because the nature of the primary goal is social communication in the first place, followed by e-commerce that flourished due to the Covid pandemic, with the necessity to prevent its risks such as fraud through electronic payment sites for buying and selling sites. It is also necessary to raise awareness of one's rights and duties while surfing the Internet. The need to provide digital access to all, without exception, within an educational institution. Providing opportunities to include the digital citizenship course in universities and approving it within the plans and study paths to facilitate their electronic transactions. Holding introductory seminars from specialists in all aspects of Legal and digital technologies from Professors and faculty members and educating them about risks arising from the incorrect use of technology and cyberspace. Conduct regular research and scientific studies that are concerned with spreading the culture of digital citizenship and its dimensions. Encouraging the teaching staff to take advantage of the great opportunities offered by digital media in their support and enriching them scientifically in applying active learning strategies based on critical and creative thinking. Instilling the ethics and values of digital citizenship in the academic community, training them on positive behavior, and guiding them in using the Internet. Raising awareness of adherence to the principles of respect that protect against the risk of falling into electronic criminal penalties, because of non-compliance with standards of digital behavior, digital laws, and digital access. Providing intensive awareness to ward off the dangers of cybercrime and its electronic penalties.

#### **Conflict of Interest**

The authors declare that they have no conflict of interest, and all the authors agree to publish this paper under academic ethics.

#### **Author Contributions**

All the authors contributed equally to the manuscript.

#### **Funding**

The work was not supported by any official Institute or company.

#### **References**

- [1] D. K. A.-R. Al-Malah, and B. H. Majeed, "Enhancement the Educational Technology by Using 5G Networks," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 18, no. 01, pp. 137-151, 2023.
- [2] N. A. Jasim, A. Z. Abass, and I. R. N. ALRubee, "Smart Learning based on Moodle E-learning Platform and Digital Skills for University Students," *International Journal of Recent Contributions from Engineering, Science & IT (iJES)*, vol. 10, no. 1, pp. 109-120, 2022.
- [3] D. S. W. Ting, L. Carin, V. Dzau, and T. Y. Wong, "Digital technology and COVID-19," *Nature Medicine*, vol. 26, no. 4, pp. 459-461, 2020.
- [4] B. Majeed, "The Relationship Between Conceptual Knowledge and Procedural Knowledge among Students of the Mathematics Department at the Faculty of Education for Pure Science/Ibn Al-Haitham," *International Journal of Innovation, Creativity and Change (IJICC)*, vol. 12, no. 4, pp. 333-346, 2020.

- 
- [5] B. H. Majeed, A. Z. Abass, and D. Al-Malah, "The influence E-Learning platforms of Undergraduate Education in Iraq," *International Journal of Recent Contributions from Engineering, Science IT*, vol. 9, no. 4, pp. 90-99, 2021.
- [6] I. A. Aljazaery, and Jaafar Q. Kadhim, Enhancement of Online Education in Engineering College Based on Mobile Wireless Communication Networks and IOT," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 18, no. 02, 2023.
- [7] E. M. Onyema *et al.*, "Impact of Coronavirus pandemic on education," *Journal of Education Practice*, vol. 11, no. 13, pp. 108-121, 2020.
- [8] A. H. M. Alaidi, A. S. Abdalrada, and F. T. Abed, "Analysis of the efficient energy prediction for 5G wireless communication technologies," *International Journal of Emerging Technologies in Learning*, Article vol. 14, no. 8, pp. 23-37, 2019.
- [9] T. D. Clark, "The New 21st Century Literacy: Problems and Challenges for the Digital Age," *Interfaces*, vol. 2, no. 1, 2008.
- [10] D. Faquir, N. Chouliaras, V. Sofia, K. Olga, and L. Maglaras, "Cybersecurity in smart grids, challenges and solutions," *AIMS Electronics Electrical Engineering*, vol. 5, no. 1, pp. 24-37, 2021.
- [11] M. J. Krile and D. F. Cihak, "Social Media, Digital Inclusion, and Internet Safety," in *Autism Spectrum Disorders*: Routledge, 2022, pp. 544-564.
- [12] L. F. Jawad, and B. H. Majeed, "The Impact of Teaching by Using STEM Approach in The Development of Creative Thinking and Mathematical Achievement Among the Students of The Fourth Scientific Class," *International Journal of Interactive Mobile Technologies*, vol. 15, no. 13, pp. 172-188, 2021.
- [13] B Majeed, "Computational Thinking (CT) Among University Students," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 16, no. 10, pp. 244-252, 2022.
- [14] O. H. Yahya, and I. Aljazaery, "Reducing the Data Rate in Internet of Things Applications by Using Wireless Sensor Network," *International Journal of Online and Biomedical Engineering (iJOE)*, vol. 16, no. 03, pp. 107-116, 2020.
- [15] N. A. Jasim and H. T. Salim, "Design and Implementation of Smart City Applications Based on the Internet of Things," *International Journal of Interactive Mobile Technologies*, vol. 15, no. 13, pp. 4-15, 2021.
- [16] B. K. Mohammed, S. A. Alsaidi, and R. F. Chisab, "Efficient RTS and CTS mechanism which save time," *International Journal of Interactive Mobile Technologies*, Article vol. 14, no. 4, pp. 204-211, 2020.
- [17] A. D. Al-Malah and H. A. Mutar, "Cloud Computing and its Impact on Online Education," *IOP Conference Series: Materials Science and Engineering*, vol. 1094, p. 012024, 2021.
- [18] Z. H. Ibrahim, "Computer Literacy with Skills of Seeking for Information Electronically among University Students," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 17, no. 07, 2023.
- [19] B. H. Majeed, and L. F. Jawad, "Tactical Thinking and its Relationship with Solving Mathematical Problems Among Mathematics Department Students," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 16, no. 9, pp. 247-262, 2021.
- [20] B. Majeed, "The Effect of Cognitive Modeling in Mathematics Achievement and Creative Intelligence for High School Students " *International Journal of Emerging Technologies in Learning (iJET)*, vol. 18, no. 09, 2023.
- [21] L. M. C. Benavides, J. A. Tamayo Arias, M. D. Arango Serna, J. W. Branch Bedoya, and D. Burgos, "Digital transformation in higher education institutions: A systematic literature review," *Sensors*, vol. 20, no. 11, p. 3291, 2020.
- [22] B. Hasan, "Effect of Augmented Reality Technology on Spatial Intelligence among High School Students," *International Journal of Emerging Technologies in Learning*, vol. 17, no. 24, pp. 131-143, 2022.
- [23] N. A. Jasim, and M. S. Farhan, "Internet of Things (IoT) application in the assessment of learning process," in *IOP Conference Series: Materials Science and Engineering*, 2021, vol. 1184, no. 1, p. 012002: IOP Publishing.
- [24] N. A. Hussein, and H. T. Hazim, "A Novel Method of Invisible Video Watermarking Based on Index Mapping and Hybrid DWT-DCT," *International Journal of Online and Biomedical Engineering (iJOE)*, vol. 19, no. 04, 2023.
-

- [25] B. Majid, "Mathematical-procedural Knowledge and its relation to logical-mathematical intelligence among students at the third stage in the mathematics department," *Journal Of Educational and Psychological Researches* vol. 15, no. 58, pp. 478-498, 2018.
- [26] M. Ribble and M. Park, *The digital citizenship handbook for school leaders: Fostering positive interactions online*. International Society for Technology in Education, 2022.
- [27] M. M. Ribeiro, M. A. Cunha, and A. F. Barbosa, "E-participation, social media and digital gap: Challenges in the Brazilian context," in *Proceedings of the 19th annual international conference on digital government research: Governance in the data age*, 2018, pp. 1-9.
- [28] M. Kim, "Digital product presentation, information processing, need for cognition and behavioral intent in digital commerce," *Journal of Retailing Consumer Services*, vol. 50, pp. 362-370, 2019.
- [29] A. Lapidot, *A foundation in digital communication*. Cambridge University Press, 2017.
- [30] A. Hassan, "The Impact of a Scenario - Based Learning Model in Mathematics Achievement and Mental Motivation for High School Students " *International Journal of Emerging Technologies in Learning (iJET)*, vol. 18, no. 07, 2023.
- [31] H. T. S. A. Mohammad K. Abdul-Hussein, "Secured Transfer and Storage Image Data for Cloud Communications," *International Journal of Online and Biomedical Engineering (iJOE)*, vol. 19, no. 06, 2023.
- [32] V. Miller, *Understanding digital culture*. Sage, 2020.
- [33] S. Stockwell *et al.*, "Digital behavior change interventions to promote physical activity and/or reduce sedentary behavior in older adults: a systematic review and meta-analysis," *Experimental gerontology*, vol. 120, pp. 68-87, 2019.
- [34] A. Marwan and F. Bonfigli, "Detection of Digital Law Issues and Implication for Good Governance Policy in Indonesia," *Bestuur*, vol. 10, no. 1, pp. 22-32, 2022.
- [35] L. Taylor, "What is data justice? The case for connecting digital rights and freedoms globally," *Big Data Society*, vol. 4, no. 2, p. 2053951717736335, 2017.
- [36] P. A. Amoah *et al.*, "Digital health literacy and health-related well-being amid the COVID-19 pandemic: the role of socioeconomic status among University Students in Hong Kong and Macao," *Asia Pacific Journal of Public Health*, vol. 33, no. 5, pp. 613-616, 2021.
- [37] E. Popov and K. Semyachkov, "Problems of economic security for digital society in the context of globalization," *Ekonomika Regional= Economy of Regions*, no. 4, p. 1088, 2018.
- [38] H. R. Abdel Ati, *Digital citizenship in the educational context*. Dar Al-Jinan for publication and distribution, 2021.
- [39] L. F. Jawad, M. K. Raheem, and B. Hasan, "The Effectiveness of Educational Pillars Based on Vygotsky's Theory in Achievement and Information Processing Among First Intermediate Class Students," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 16, no. 12, pp. 246-262, 2021.
- [40] B. Majeed, "Impact of a Proposed Strategy According to Luria's Model in Realistic Thinking and Achievement in Mathematics," *International Journal of Emerging Technologies in Learning*, vol. 17, no. 24, pp. 208-218, 2022.
- [41] S. S. Hammadi, "Impact of Deep Learning Strategy in Mathematics Achievement and Practical Intelligence among High School Students " *International Journal of Emerging Technologies in Learning (iJET)*, vol. 18, no. 06, 2023.
- [42] A. S. Al-Qahtani, "Digital Citizenship Values Included in the Educational Technologies Curriculum from the Faculty's Point of View," *IUG Journal of Educational and Psychology Sciences*, vol. 26, no. 1, pp. 57-97, 2018.
- [43] B. Majeed, "The Conceptual Mathematical Knowledge and Analytical Thinking for the First Sage Students at Math Sciences Department, Faculty of Education for Pure Sciences, IBN Alhathem, University of Baghdad " *International Journal of Science and Research (IJSR)*, vol. 6, no. 12, pp. 1379-1392, 2017.
- [44] N. Hussien, I. Ajlan, and M. M. Firdhous, "Smart shopping system with RFID technology based on internet of things," pp. 17-29, 2020.
- [45] D. K. A.-R. Al-Malah, and H. H. K. Jinah, "Enhancement of educational services by using the internet of things applications for talent and intelligent schools," *Periodicals of Engineering Natural Sciences*, vol. 8, no. 4, pp. 2358-2366, 2020.

- [46] B. Al Knawy *et al.*, "Successfully implementing digital health to ensure future global health security during pandemics: a consensus statement," *JAMA Network Open*, vol. 5, no. 2, pp. e220214-e220214, 2022.
- [47] B. H. Majeed, "Mathematical Logical Intelligence and its Relationship with Achievement among College of Education Students in Baghdad Governorate," *Nasaq*, vol. 1, no. 2, pp. 307-354, 2014.
- [48] L. Jawad, "The Impact of CATs on Mathematical Thinking and Logical Thinking Among Fourth-Class Scientific Students," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 16, no. 10, pp. 194-211, 2021.
- [49] B. H. Majeed, "The Impact Of Reflexive Learning Strategy On Mathematics Achievement By First Intermediate Class Students And Their Attitudes Towards E-Learning," *Turkish Journal of Computer Mathematics Education*, vol. 12, no. 7, pp. 3271-3277, 2021.
- [50] Z. A. A. Alamiry, "Effect of (Joyce & Weil) and (JJK) in the skills of students," *Opción*, vol. 34, pp. 1248-1272, 2019.
- [51] M. K. R. Al-Haydari and B. H. Majeed, "Impact of ASSURE Model on Mathematical Correlation and Achievement in Mathematics," *European Journal of Humanities Educational Advancements*, vol. 2, no. 11, pp. 62-68, 2021.
- [52] H. Sabah, "A Detection of Deep Fake in Face Images Using Deep Learning," *Wasit Journal of Computer and Mathematics Sciences*, vol. 1, no. 4, pp. 94-111, 2022.
- [53.] M. K. A.-H. H. T. Salim, "Secured Transfer and Storage Image Data for Cloud Communications," *international Journal of Online and Biomedical Engineering*, vol. 19, no. 06, 2023.
- [54] A. Alaidi, and O. Yahya, "Using Modern Education Technique in Wasit University," *International Journal of Interactive Mobile Technologies*, vol. 14, no. 6, pp. 82-94, 2020.
- [55] M. H. Abd and O. W. Allawi, "Cheating in E-learning from the perspective of lecturers within Iraqi universities," *Wasit Journal of Computer and Mathematics Science*, vol. 1, no. 4, 2022.
- [56] H. Ahmed, "A Review of Hash Function Types and their Applications," *Wasit Journal of Computer and Mathematics Sciences*, vol. 1, no. 3, pp. 120-139, 2022.
- [57] H. T. S. ALRikabi, A. H. M. Alaidi, and F. T. Abed, "Attendance System Design And Implementation Based On Radio Frequency Identification (RFID) And Arduino," *Journal of Advanced Research in Dynamical Control Systems*, vol. 10, no. 4, pp. 1342-1347, 2018.
- [58] S. Perumal, "The Quality of Interactive E-Learning for Students to understand the Course Material," *Wasit Journal of Computer and Mathematics Sciences*, vol. 1, no. 3, pp. 15-23, 2022.
- [59] M. Roa'a, I. A. Aljazaery, and A. H. M. Alaidi, "Automated Cheating Detection based on Video Surveillance in the Examination Classes," *iJIM*, vol. 16, no. 08, p. 125, 2022.
- [60] G. A. Aramice and J. Q. Kadhim, "Secure Code Generation for Multi-Level Mutual Authentication," *TELKOMNIKA (Telecommunication Computing Electronics and Control)*, vol. 16, no. 6, pp. 2643-2650, 2018.
- [61] R. A. Azeez, M. K. Abdul-Hussein, and M. S. Mahdi, "Design a system for an approved video copyright over cloud based on biometric iris and random walk generator using watermark technique," *Periodicals of Engineering Natural Sciences*, vol. 10, no. 1, pp. 178-187, 2021.
- [62] K. A. Hamoody, and B. Hasan, "The Impact of Educational Curricula On Promoting Sustainable Development," *Nasaq*, vol. 36, no. 1, pp. 1597-1623, 2022.
- [63] Z. A. Alamiry, and R. K. Alshimary, "Visual culture skills among students of the College of Education for Pure Sciences/Ibn Al-Haitham," *Journal Of Educational Psychological Researches*, vol. 18, no. 71, pp. 481-469, 2021.
- [64] M. Ribble, *Digital citizenship in schools: Nine elements all students should know*. International Society for Technology in Education, 2015.
- [65] B. Hassan, "The Skill of Making a Decision and its Relationship of Academic Achievement Among Students," *Int. J. Recent Contrib. Eng. Sci. IT*, vol. 09, no. 04, pp. 77-89, 2021.