



## Investigating Students' Digital Citizenship Practices for Undergraduate Students at Al-Qunfudhah University College

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**Abstract-** This quantitative study explores the extent to which students at Al-Qunfudhah University College, a branch of Umm Al-Qura University, have practiced digital citizenship skills. A proposed scale was designed for this study based on Ribble's nine dimensions of digital citizenship. Two-hundred and sixty-four students were involved in this investigation and completed an online questionnaire. Performing Exploratory factor analysis confirmed the convergent and discriminant validity of the questionnaire. The nine extracted factors explained 69.49% of the total variance. The results showed that a high percentage of students at Al-Qunfudhah University College practiced all nine digital citizenship skills. The results also showed that there were no statistical differences between students' digital citizenship practices regarding their gender, age, or academic level, but there was a statistical difference between students' digital citizenship practices attributed to their daily usage of electronic devices.

**Keywords—**digital citizenship, Al-Qunfudhah University College, Ribble's dimensions, Umm Al-Qura University

### I. INTRODUCTION

With the emergence of the internet and smartphones in recent decades, the concept of communication has evolved dramatically (Walters, Gee & Mohammed, 2019). These methods of communication have created a modern social system that regulates who communicates and where and when they communicate. Digital communication gives users immediate access to anyone on an unimaginable scale. Current knowledge and networking technologies have already turned the planet into a virtual community, allowing people to share their wishes, dreams, worries, and even disappointments regardless of geographical location and time. In the educational system, the pervasive use of new technology has helped not only to improve teacher engagement with the virtual world (Isman & Canan Gungoren, 2014) but also to create possibilities for online communication and information transfer (Hintz, Dencik & Wahl-Jorgensen, 2017). However, as new technologies are adopted the technology reformation is rooted in, it is not unusual for learners and educators to misuse or abuse emerging data and technology services due to a lack of consciousness and education about good behavior regarding technology usage (Selwyn, 2016).

Moreover, the universal use of technologies is accompanied by new and daunting ethical problems. Young millennials are more engaged in the viewpoints of their classmates now than ever before. According to Cotten, Anderson & McCullough (2013) Social media sites have decreased the loneliness in young people's life. It conveys them to a social life in which they become increasingly social and self-satisfied. The technological advancements designed to bring the entire world together and make it more united have thus marginalized its inhabitants, especially young people, leaving countries to devise their own corrective policies and strategies to amend the condition (Cotten et al., 2013).

The educational system in Saudi Arabia aims to guarantee that all educational institutions in the country incorporate institutional, political, and symbolic structures (Saeed, Almas, Anis-ul-Haq & Niazi, 2014). In a period of rapid technical transition, the education sector is expected to take steps to improve the student experience. This has contributed to the growth of digital citizenship in the educational system (Andrejevic, 2017). The institutional architecture of the education sector in Saudi Arabia has shown advances in technological acceptance, mainly through the introduction of digital communications networks. However, many education organizations in Saudi Arabia have not been able to discuss or encourage digital citizen-

ship in school settings (Al-Zahrani, 2015). It is clear that instructional staff and learners in Saudi Arabia have made little effort to adopt technology in the education process, taking only small steps toward entering the digital education community (Alharbi, 2017). In particular, school institutions in Saudi Arabia, which monitor the higher education classroom environment, do not have a technological strategy to incorporate emerging sector developments into the different practices of institutions (Al-Zahrani, 2015).

To address these issues, this paper explores the extent to which students at Al-Qunfudhah University College possess digital literacy skills. This paper also seeks to suggest a valid and reliable scale that is suitable in the Saudi context based on Ribble's model dimensions.

### **1.1 Significance of the study**

This study will enrich the literature in two different ways. First, to the best of our knowledge, no study has investigated undergraduate students' digital citizenship practices in the western provinces of Saudi Arabia. Thus, the results will hopefully enlighten policymakers in Saudi universities about students' strengths and shortcomings in terms of digital citizenship practices so that they may be proactive in tailoring suitable interventions (policies, activities, courses, workshops, seminars, and so forth) that satisfy students' needs. Second, this study seeks to establish a valid and reliable scale for digital citizenship dimensions that is applicable and suitable for the Saudi context.

The need to explore students' digital citizenship practices at Al-Qunfudhah University College stems from the fact that there was a considerable increase in internet users during the COVID-19 lockdown. In addition, in the Saudi context, Al-Abdullatif and Gameil (2020) found that even though undergraduate students have been using technology for more than 10 years, the majority of them lack digital citizenship skills.

### **1.2 Research questions**

1. To what extent do students at Al-Qunfudhah University College possess digital citizenship skills?
2. Do students' gender, daily usage of electronic devices, and academic class year result in statistical differences in their digital citizenship skills at Al-Qunfudhah University College?

## **II. LITERATURE REVIEW**

### **2.1 What is Digital Citizenship?**

Digital citizenship is described in the literature as standards of conduct with respect to the usage of technology (Ribble, 2015). Snyder(2016) described digital citizenship as a virtuous, moral, and accountable utilization of technology to guarantee the safety of one's self and others while working together in an evolving technological, integrated, and globalized world. Digital citizenship, sometimes called e-citizenship, involves continuous exposure to the efficient use of media platforms that require a number of conditions, such as the existence of internet access, the accessibility of computer systems or gadgets, the readiness to use modern technology, and comprehension skills to assess the integrity of the information gathered online (Isman & Canan Gungoren, 2014).

In essence, digital citizenship seeks not only to provide young people with resources and a moral framework to make responsible decisions in online worlds but also to maintain future security and to enable meaningful contact and partnerships through social media. Based on Ribble's model, the critical goal of digital citizenship is to help each person in a country establish a certain degree of knowledge of the dangers and vulnerabilities, as well as the benefits, of being a digital citizen in a connected society (Ribble, 2012).

### **2.2 Al-Qunfudhah University College at Glance**

Al-Qunfudhah University College was founded in 1987 to train elementary school teachers in basic teaching skills. In 2007, it became a branch of Umm Al-Qura University called Al-Qunfudhah University College, made up of eight academic departments for bachelor's degrees(UQU, 2020). According to Al Zebidi (2016), there are some issues related to internet usage and the integration of technological tools at this institution due to the lack of technology infrastructure and faculty members' attitudes toward using such technologi-

cal tools. Recently, Al-Qunfudah University College has improved its internet speed and begun using Blackboard as a learning management system to meet the demands of around 7,500 students and 280 faculty members.

### 2.3 Ribble’s Model of Digital Citizenship

Ribble (2015) recommended educating digital citizenship according to the REP principles: respect, educate, and protect. These aspects form the foundation for recognition and comprehension of digital citizenship. The broad definition of REP helps to illustrate and teach the concepts of digital citizenship, which include etiquette, accessibility, law, connectivity, literacy, commerce, responsibility and accountability, protection (security), and health and wellbeing. Each of the three REP system categories has three concepts that clarify proper conduct in the online world (Ribble, 2015; Walters et al., 2019), prompting a need to discuss these categories and concepts in more depth. The current literature suggests that the REP structure can be used in academic settings to increase understanding of standards that exemplify gracious and accountable use of technological devices to learn and exchange knowledge (Kim & Choi, 2018).

The first category, respect, covers the topics of etiquette (electronic rules or procedures), access (full digital involvement in society), and law (electronic accountability for acts and behaviors) (Ribble, 2015). Research has repeatedly demonstrated that elevated levels of subjective internet mindset and machine self-efficiency have improved the willingness of technology consumers to value themselves and others online by showing greater control over and accountability for their own behaviors (Kim & Choi, 2018). In their research, Lawrence and Calhoun(2013) noted that regard was a critical point for learners and lecturers participating in digital environments, as it highlighted the significance of respect for personalities, ethnicities, and human equality. Admittedly, literature stated that regard, particularly for others, is critical in digital communities as it is much simpler to violate the freedom of others as a result of ICT progresses (Al-Zahrani, 2015).

The second category, education, includes communication (electronic sharing of data), literacy (the procedure of teaching and understanding emerging technologies and the use of new tech), and commerce (electronic purchasing and sale of goods). Al-Zahrani (2015) found that learners with more computer use experience and expertise were more engaged in self-education and communication activities than students with less tech knowledge. Tech literacy, expertise, understanding, and experience play a significant role in guaranteeing that users are able to communicate and share data with one another in an online environment.

The third category, protect, covers the theories of rights and accountability (liberties must cover all in the virtual environment), security (electronic safety and precautionary protection measures), and wellness and wellbeing (personal and social wellbeing in the virtual technology universe). Simsek and Simsek (2013) found that learners with higher monthly average technology usage prefer to secure themselves and others in virtual settings more than their classmates with lower monthly average technology usage do. Figure1 shows the nine elements of Digital citizenship skills.

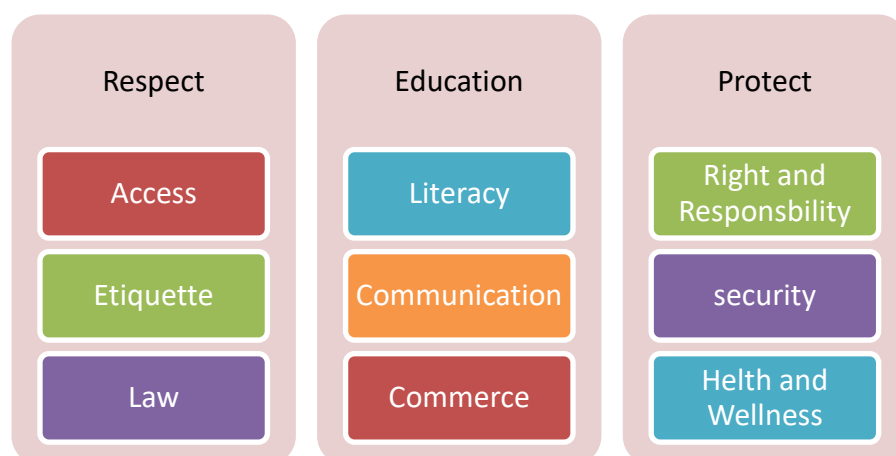


Figure 1. The nine elements of digital citizenship skills by Mike Ribble (2015)

## 2.4 Current Studies on Digital Citizenship

The majority of administrators and teachers think that schools' adoption of new technology in tutoring and learning is crucial to keep up with existing trends in our progressively digital society. However, making technology more efficient in the classroom requires more than just providing students with an internet connection and related hardware (Snyder, 2016). Students need to consider how to use personal technologies in ways that improve their learning environment and contribute to self-empowerment and understanding. Schools need to demonstrate that they support students by directing their discovery of the digital world (Walters et al., 2019).

The value of digital citizenship recognition has been reported in many research studies. In their research, Hollandsworth, Donovan, and Welch (2017) stated that a lack of digital literacy and education could and has contributed to troublesome, even harmful student actions. Kim and Choi (2018) state that the potential of the internet for education could be reduced if young people lack the essential skills to explore it, if they continuously interact with internet resources in a flimsy manner, and if they restrict their investigation to a shallow range of subjects, they think are worth researching. Sufficient education and understanding of digital citizenship strengthen user groups to make sensible, accountable, and respectful moral choices when communicating with one another in an online environment (Orth & Chen, 2013). Moreover, Ohler (2011) noted that digital citizenship awareness is required to apply sound judgment and generosity when using the internet to gather information and interact socially and to illustrate the implications of actions made online by individuals (Ohler, 2011).

In the context of a Saudi university, Al-Abdullatif and Gameil (2020) conducted a study to explore students' practice of digital citizenship. A total of 204 undergraduate students from the College of Education at King Faisal University participated in the study. The results of this study revealed that respondents showed insufficient awareness of good citizenship.

Many studies on digital citizenship literacy and understanding of usage have concentrated on learners ignoring teachers. In a detailed analysis, Al-Zahrani (2015) observed that learners with a decent degree of perspective toward the internet could be strong digital citizens who value themselves and other people and actively participate in more appropriate practices to teach themselves online. Explicitly, the study showed that learners with greater levels of self-belief and faith in their technical knowledge valued themselves and others digitally, learned and exchanged knowledge in acceptable virtual worlds, and shielded themselves and others from digital violations, including cyber-bullying, abusive language, and unwanted access.

Additionally, many empirical analyses have attempted to examine how demographic factors, such as age, nationality, and socioeconomic status, have influenced the usage of technology (Isman & Gungoren, 2013). The results of this research revealed that cultural and racial factors, the systemic difference in opportunities available to individuals and societies, wealth, academic levels, and profession have a substantial effect on the rate of home computer ownership and internet connectivity. Ackleson (2014) demonstrated that these demographic features affect the establishment of attitudes toward using technology for education and communication. Motivational concerns, cultural norms, time limitations, and family commitments have all been reported to affect the use of technology. In terms of gender, Ritzhaupt, Liu, Dawson and Barron (2013) indicate that research data show virtually no substantial gap between males and females in self-reported technological competence, computer literacy, or capacity to use the internet to gather information. All in all, these results have shown that demographic factors may serve as a valuable reference point for addressing problems of literacy and appreciation of digital citizenship.

### III. METHOD

This quantitative descriptive study was designed to examine the extent to which students at Al-Qunfudhah University College have practiced digital citizenship skills during the COVID-19 pandemic. A questionnaire was chosen as the appropriate instrument to obtain information about students' beliefs, attitudes, values, and behaviors (Johnson & Christensen, 2014) and to reach as many students as possible (Sue & Ritter, 2007).

The questionnaire items used in this study were based on Ribble's (2015) model. The questionnaire included 35 items for all nine dimensions. A 4-point Likert scale was adopted (1 = Strongly Disagree, to 4 = Strongly Agree). The primary reason the mid-point on the Likert scale was excluded was that students were expected to have an opinion about their practices of digital citizenship (Ducharme, 2014).

After the questionnaire was designed and the validity was ensured, the questionnaires were sent to students via their formal email addresses. In order to reach more students, WhatsApp was also used as a recruitment platform. In total, 264 students completed the entire questionnaire, ranging in age from 21 to 26. Table 1 reflects all collected demographic information about the sample.

**Table 1. Demographics information distribution of participants**

<b>Demographics Information</b>		<b>Frequency</b>	<b>Percent</b>
<i>Gender</i>	Male	133	50.4
	Female	131	49.6
	Total	264	100.0
<i>Academic class Level</i>	Firstyear	20	7.6
	Second year	112	42.4
	Third year	96	36.4
	Fourth year	36	13.6
	Total	264	100
<i>Daily Usage of Electronic Device</i>	Less than one hour	8	3
	1 hour to less than 3	55	20.8
	3 hours to less than 6	98	37.1
	More than 6 hours	103	9.0
	Total	264	100
<i>Major</i>	Arabic	83	31.4
	Art Education	14	5.3
	Chemistry	20	7.6
	Islamic Studies	2	.8
	Mathematics	123	46.6
	Physical Education	16	6.1
	Physics	6	2.3
	Total	264	100
<i>Having Social media Account</i>	Yes	256	97.0
	No	8	3.0
	Total	264	100

### 3.1 Instrument Validity

To ensure the construct validity of the questionnaire, the questionnaire was reviewed by different experts in the field, and some amendments were made to the questionnaire based on the experts' comments and suggestions. To confirm the convergent and discriminant validity, the researchers used exploratory factor analysis (EFA) (Ul Hadia, Abdullah & Sentosa, 2016). Regarding convergent validity, all items within a single factor were significantly loaded. Therefore, items with low loading (< 0.4) were deleted, according to Stevens(2009). In addition, to ensure discernment validity, items with cross-loading were deleted. Factor correlation was examined, and the correlation between components did not exceed 0.59, which indicated that the components were not correlated, and, therefore, discernment validity was achieved, as shown in Table 2.

**Table 2. Component correlation matrix**

<b>Component</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
1	1.000	.233	.232	.365	-.003-	.351	.307	.215	.279
2	.233	1.000	.455	.392	.591	.326	.458	.523	.343
3	.232	.455	1.000	.347	.405	.271	.391	.528	.342
4	.365	.392	.347	1.000	.266	.305	.420	.309	.362
5	-.003-	.591	.405	.266	1.000	.252	.365	.506	.354
6	.351	.326	.271	.305	.252	1.000	.415	.382	.312
7	.307	.458	.391	.420	.365	.415	1.000	.398	.462
8	.215	.523	.528	.309	.506	.382	.398	1.000	.393
9	.279	.343	.342	.362	.354	.312	.462	.393	1.000

Extraction Method: Principal Component Analysis.  
Rotation Method: Promax with Kaiser Normalization.

To ensure each item had loaded on the expected factor properly, principal component analysis (PCA) with Promax rotation, specifying the nine extracted factors, was performed multiple times to reach the best model fit. Items with cross-loading or low loading (< 0.4) were deleted according to Stevens (2009). The nine extracted factors explained 69.49% of the total variance. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.900, Bartlett's test was significant, and communalities ranged between 0.51 and 0.85, which indicated that the EFA performance was marvelous (Hair, Black, Babin, & Anderson, 2010), as shown in Table 3. Table 4 also shows the pattern matrix.

**Table 3. KMO and Bartlett's Test**

<b>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</b>	<b>.900</b>	
<b>Bartlett's Test of Sphericity</b>	Approx. Chi-Square	5521.769
	df	630
	Sig.	.000

**Table 4. The pattern matrix**

<b>Item</b>	<b>Component</b>									<b>Communalities</b>
	<b>D4</b>	<b>D5</b>	<b>D8</b>	<b>D2</b>	<b>D6</b>	<b>D9</b>	<b>D3</b>	<b>D7</b>	<b>D1</b>	
<b>D1_1</b>									.643	.505
<b>D1_2</b>									.823	.725
<b>D1_3</b>									.533	.626
<b>D2_1</b>				.529						.609
<b>D2_2</b>				.802						.766
<b>D2_3</b>				.837						.754
<b>D2_4</b>				.798						.734
<b>D3_1</b>							.776			.715
<b>D3_2</b>							.884			.739
<b>D3_3</b>							.670			.666
<b>D4_1</b>	.776									.657
<b>D4_2</b>	.790									.736
<b>D4_3</b>	.754									.725

D4_4	.545								.700
D4_5	.724								.700
D5_1		.751							.693
D5_2		.773							.653
D5_3		.738							.742
D5_4		.753							.730
D5_5		.680							.752
D6_1					.990				.848
D6_2					.958				.851
D6_3					.538				.696
D7_1								.758	.647
D7_2								.578	.675
D7_3								.726	.574
D7_4								.646	.691
D8_1			.544						.659
D8_2			.600						.596
D8_3			.810						.711
D8_4			.893						.736
D8_5			.560						.591
D9_1						.672			.653
D9_2						.834			.760
D9_3						.777			.718

Extraction Method: Principal Component Analysis.  
 Rotation Method: Promax with Kaiser Normalization.  
 a. Rotation converged in 8 iterations.

### 3.2 Instrument reliability

To ensure the reliability of the questionnaire, a Cronbach’s alpha value bigger than 0.7 was considered acceptable [30]. In this study, the Cronbach’s alpha for the scale was 0.94, and the Cronbach’s alphas for each dimension ranged from 0.66 to 0.87. Eight of the nine constructs had Cronbach’s alphas bigger than 0.7. However, the Cronbach’s alpha for the digital access construct was 0.66, which was less than the recommended 0.7 threshold. One possible explanation is that having few items to represent the digital access construct leads to low Cronbach’s alpha levels (Field, 2009). Although the digital access constructs had Cronbach’s alphas of less than 0.7, some researchers argue that an alpha of 0.6 is acceptable in exploratory research (Hair, Black, Babin& Anderson,2010). Table 5 shows the Cronbach’s alpha values for all the constructs.

### 3.3 First research question

To answer the first research question, to what extent do students at Al-Qunfudhah University College possess digital citizenship skills. Descriptive statistics were used for the nine factors as shown in Table 5. The average value of the nine factors ranged from 2.90 to 3.60 out 4. All dimensions were found to have large mean scores, as their response was “strongly agree,” while digital literacy has responding to “Agree”. Table 6 shows student respondents’ digital citizenships on the nine dimensions.

**Table 5. Cronbach's Alpha for All Digital Citizenship Constructs**

<b>Constructs</b>	<b>Cronbach's</b>	<b>Number</b>	<b>Mean</b>	<b>Std.</b>	<b>Description</b>
	<b>Alpha</b>	<b>of Items</b>		<b>Deviation</b>	
Digital Access (D1)	.66	3	3.25	0.63	Strongly Agree
Digital Commerce (D2)	.84	4	3.27	0.68	Strongly Agree
Digital communication (D3)	.78	3	3.45	0.57	Strongly Agree
Digital Literacy (D4)	.87	5	2.90	0.70	Agree
Digital Etiquette (D5)	.87	5	3.53	0.49	Strongly Agree
Digital Law (D6)	.86	3	3.60	0.58	Strongly Agree
Digital Right & Responsibility (D7)	.77	4	3.55	0.49	Strongly Agree
Digital health & wellness (D8)	.82	5	3.38	0.56	Strongly Agree
Digital Security (D9)	.75	3	3.43	0.62	Strongly Agree

**Table 6. Student respondents' digital citizenships on the nine dimensions**

<b>Digital Access (D1)</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Mean</b>	<b>SD</b>
<i>I use a digital device, whether a PC or a laptop, to do my homework and surf the Internet. (D1-1)</i>	14 5.3%	28 10.6%	112 42.4%	110 41.7%	3.21	.83
<i>I have an Internet subscription that enables me to use the Internet to carry out my educational tasks, such as accessing the university's electronic portal, registration, and withdrawal. (D1-2)</i>	13 4.9%	22 8.3%	112 42.4%	117 44.3%	3.26	.81
<i>I have the knowledge to log into the blackboard system, review and download scientific content, and upload assignments. (D1-3)</i>	14 5.3%	15 5.7%	116 43.9%	119 45.1%	3.29	.80
<b>Digital Commerce (D2)</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Mean</b>	<b>SD</b>
<i>I am aware of the purchase and payment basics when using bank cards. (D2-1)</i>	9 3.4%	47 17.8%	96 36.4%	112 42.4%	3.18	.84
<i>I carefully read the policies of commercial sites before buying from them, such as the return, exchange, and warranty policies. (D2-2)</i>	15 5.7%	35 13.3%	99 37.5%	115 43.6%	3.19	.87
<i>I make sure that the website I want to buy from is reliable by checking whether it is registered on the Maroof website affiliated with the Saudi Ministry of Commerce. (D2-3)</i>	13 4.9%	17 6.4%	96 36.4%	138 52.3%	3.36	.81
<i>I compare the prices of goods on multiple websites so that I get the best price from a safe website. (D2-4)</i>	13 4.9%	14 5.3%	103 39%	134 50.8%	3.36	.80

<b>Digital Communication(D3)</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Mean</b>	<b>SD</b>
<i>I can handle digital communication media like Facebook, Twitter, WhatsApp, and Snapchat. (D3-1)</i>	5 1.9%	5 1.9%	92 34.8%	162 61.4%	3.56	.63
<i>I use instant messaging and/or send emails consciously and responsibly. (D3-2)</i>	9 3.4%	19 %7.2	112 %42.4	124 %47	3.33	.76
<i>I use social media platforms (WhatsApp, Snapchat, Instagram, etc.) to search for knowledge, share ideas, and learn. (D3-3)</i>	5 1.9%	9 3.4%	111 %42	139 52.7%	3.45	.66
<b>Digital Literacy (D4)</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Mean</b>	<b>SD</b>
<i>I participate in training courses regarding computer skills and their application. (D4-1)</i>	41 %15.5	113 %42.8	62 %23.5	48 %18.2	2.44	0.96
<i>I watch educational videos and tutorials on how to use various digital applications. (D4-2)</i>	19 %7.2	55 %20.8	117 %44.3	73 %27.7	2.92	0.88
<i>I benefit from the e-courses available on digital platforms such as IEN, Rwaq, Duroob, and Edraak. (D4-3)</i>	27 %10.2	67 %25.4	104 %39.4	66 %25	2.79	0.93
<i>The university promotes a culture of benefiting from digital technology. (D4-4)</i>	10 %3.8	29 %11	127 %48.1	98 %37.1	2.79	0.77
<i>University curricula help me shape my digital culture. (D4-5)</i>	11 %4.2	37 %14	122 %46.2	94 %35.6	3.13	0.80
<b>Digital Etiquette (D5)</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Mean</b>	<b>SD</b>
<i>I choose a suitable time when I want to communicate with others. (D5-1)</i>	6 %2.3	16 %6.1	110 %41.7	132 %50	3.39	0.71
<i>I do not get distracted by my smartphone during lecture time. (D5-2)</i>	2 %0.8	13 %4.9	109 %41.3	140 %53	3.47	0.63
<i>I use polite phrases while I communicate with others on digital devices. (D5-3)</i>	1 %0.4	4 %1.5	97 %36.7	162 61.4	3.59	0.54
<i>I review applications' policies and understand what the appropriate and inappropriate behaviors are before joining any group on social media or registering on any digital application. (D5-4)</i>	3 %1.1	5 %1.9	104 %39.4	152 %57.6	3.53	0.60
<i>I adhere to ethical principles and good conduct when using digital technologies. (D5-5)</i>	1 %0.4	1 %0.4	86 %32.6	176 %66.7	3.66	0.51
<b>Digital Law (D6)</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Mean</b>	<b>SD</b>
<i>I never hack other people's digital devices. (D6-1)</i>	9 %3.4	6 %2.3	73 %27.7	176 %66.7	3.58	.70

<i>I do not use hacking software and malware. (D6-2)</i>	8 %3	8 %3	69 %26.1	179 67.8	3.59	.70
<i>I adhere to digital websites' acceptable use policies. (D6-3)</i>	2 %0.8	2 %0.8	85 %32.2	175 %66.3	3.64	0.54
<b>Digital Right and Responsibility (D7)</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Mean</b>	<b>SD</b>
<i>I report an impersonation, threat, or misuse of digital technologies. (D7-1)</i>	8 3%	13 4.9%	111 42%	132 50%	3.39	.72
<i>I use digital technologies ethically. (D7-2)</i>	4 1.5%	3 1.1%	88 33.3%	169 64%	3.60	.59
<i>I do not use technology to cheat on tests or assignments (D7-3).</i>	4 1.5%	7 2.7%	86 32.6%	167 63.35	3.58	.62
<i>I avoid entering suspicious websites on the Internet. (D7-4)</i>	3 1.1%	6 2.3%	78 29.5%	177 67%	3.62	.59
<b>Digital health and wellness (D8)</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Mean</b>	<b>SD</b>
<i>I am aware of the negative impact that prolonged use of technology and digital games can have, such as addiction, moodiness, and social isolation. (D8-1)</i>	4 1.5%	9 3.4%	85 32.2%	166 62.9%	3.56	.64
<i>I adhere to a proper and healthy sitting position when using digital devices. (D8-2)</i>	10 3.8%	42 15.9%	101 38.3%	111 42%	3.19	.84
<i>I take breaks while using digital devices. (D8-3)</i>	8 3%	15 5.7%	105 39.8%	136 51.5%	3.40	.73
<i>I avoid overusing digital devices. (D8-4)</i>	10 3.8%	21 8%	111 42%	122 46.2%	3.31	7.77
<i>I adjust the position of the screen of the electronic device to be at my eye level. (D8-5)</i>	4 1.5%	13 4.9%	105 39.8%	142 53.8%	3.46	.66
<b>Digital Security (D9)</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Mean</b>	<b>SD</b>
<i>I use a strong password (using letters and numbers) to protect my personal accounts on the Internet and change it frequently. (D9-1)</i>	4 1.5%	9 3.4%	78 29.5%	173 65.5%	3.59	.63
<i>I regularly update my electronic device's operating system, software, and applications. (D9-2)</i>	6 2.3%	15 5.7%	88 33.3%	155 58.7%	3.48	.71
<i>I use antivirus software on my digital devices. (D9-3)</i>	18 6.8%	31 11.7%	89 33.7%	126 47.7%	3.22	.90

### 3.4 Second research question:

In order to answer the second research question, an independent sample test and one-way ANOVA were used to examine if gender, academic class level, or daily usage of electronic devices has an impact on students' digital citizenship practices. With regard to gender, the results show that there was no significant difference between male and female responses across all nine constructs, as shown in Table 7.

**Table 7. Results of t-tests and descriptive statistics for the nine digital citizenships diminutions by gender**

Dimen- sions	Group				95%Clf or MD	t	df	p
	M		F					
	M	SD	M	SD				
(D1)	3.246	0.647	3.257	0.611	-0.011	-0.147	262	.883
(D2)	3.318	0.712	3.223	0.656	0.094	1.120	262	.264
(D3)	3.439	0.587	3.455	0.557	-0.017	-0.240	262	.811
(D4)	2.967	0.747	2.823	2.823	0.144	1.668	262	.097
(D5)	3.534	0.531	3.522	0.437	0.012	0.195	262	.845
(D6)	3.639	0.521	3.562	0.630	0.077	1.078	251.6	.282
(D7)	3.570	0.508	3.525	0.473	0.045	0.740	262	.460
(D8)	3.406	0.573	3.359	0.538	0.047	0.690	262	.491
(D9)	3.444	0.654	3.422	0.583	0.021	0.278	262	.781

Regarding student academic class levels, a one-way ANOVA was conducted, and the results show that the *F* value for the one-way ANOVA was not statistically significant, as shown in Table 8. That is, there was no statistically significant difference between the first-, second-, third-, and fourth-year students regarding their digital citizenship practices.

**Table 8. One Way ANOVA Investigating Difference in the Responding Students Digital Citizenship Practices According to their Academic Class Level**

The Nine Dimension		Sum	ofdf	Mean Square	F	Sig.
D1	Between Groups	1.942	3	.647	1.651	.178
	Within Groups	101.946	260	.392		
	Total	103.888	263			
D2	Between Groups	1.812	3	.604	1.292	.278
	Within Groups	121.573	260	.468		
	Total	123.385	263			
D3	Between Groups	.277	3	.092	.281	.839
	Within Groups	85.425	260	.329		
	Total	85.702	263			
D4	Between Groups	1.932	3	.644	1.304	.274
	Within Groups	128.383	260	.494		
	Total	130.315	263			
D5	Between Groups	.305	3	.102	.428	.733
	Within Groups	61.728	260	.237		
	Total	62.033	263			
D6	Between Groups	.395	3	.132	.392	.759
	Within Groups	87.356	260	.336		
	Total	87.751	263			
D7	Between Groups	.433	3	.144	.597	.617
	Within Groups	62.850	260	.242		

	<i>Total</i>	63.283	263			
D8	<i>Between Groups</i>	.423	3	.141	.454	.714
	<i>Within Groups</i>	80.657	260	.310		
	<i>Total</i>	81.080	263			
D9	<i>Between Groups</i>	.499	3	.166	.432	.730
	<i>Within Groups</i>	100.096	260	.385		
	<i>Total</i>	100.596	263			

A one-way ANOVA test was conducted to examine whether students' daily usage of electronic devices had an impact on their digital citizenship practices. The results show that the  $F$  value of the one-way ANOVA test was only statistically significant for the digital commerce construct ( $F(3, 260) = 3.415, p < .05$ ), as shown in Table 9. This means there was a statistically significant difference between students' digital commerce based on their daily usage of electronic devices.

**Table 9.** One Way ANOVA investigating the difference in the responding students' digital citizenship practices according to their daily usage of electronic devices

<b>The Nine Dimensions</b>		<b>Sum of Squares</b>		<b>Mean Square F</b>		<b>Sig.</b>
D1	<i>Between Groups</i>	1.445	3	.482	1.223	.302
	<i>Within Groups</i>	102.443	260	.394		
	<i>Total</i>	103.888	263			
D2	<i>Between Groups</i>	4.678	3	1.559	3.415	.018
	<i>Within Groups</i>	118.707	260	.457		
	<i>Total</i>	123.385	263			
D3	<i>Between Groups</i>	.471	3	.157	.479	.697
	<i>Within Groups</i>	85.231	260	.328		
	<i>Total</i>	85.702	263			
D4	<i>Between Groups</i>	.303	3	.101	.202	.895
	<i>Within Groups</i>	130.011	260	.500		
	<i>Total</i>	130.315	263			
D5	<i>Between Groups</i>	.094	3	.031	.131	.942
	<i>Within Groups</i>	61.939	260	.238		
	<i>Total</i>	62.033	263			
D6	<i>Between Groups</i>	1.757	3	.586	1.771	.153
	<i>Within Groups</i>	85.994	260	.331		
	<i>Total</i>	87.751	263			
D7	<i>Between Groups</i>	.281	3	.094	.387	.762
	<i>Within Groups</i>	63.002	260	.242		
	<i>Total</i>	63.283	263			
D8	<i>Between Groups</i>	.137	3	.046	.146	.932
	<i>Within Groups</i>	80.943	260	.311		
	<i>Total</i>	81.080	263			
D9	<i>Between Groups</i>	.208	3	.069	.180	.910
	<i>Within Groups</i>	100.387	260	.386		
	<i>Total</i>	100.596	263			

Tukey's test (Table 10) also revealed a difference in the digital commerce practices of students who used electronic devices for less than 1 hour and those who used them for 1–3 hours; the results favored the latter group. In addition, the results revealed a difference in the digital commerce practices of students who used electronic devices for less than 1 hour and those who used them for 3–6 hours; the results favored the latter group.

**Table 10. Tukey HSD for the digital commers practices**

<b>(I) Daily Usage of Electronic Device in Hour</b>	<b>(J) Daily Usage of Electronic Device in Hour</b>	<b>Mean Difference (I-J)</b>	<b>Std. Error</b>	<b>Sig.</b>	<b>95% Confidence Interval</b>	
					<b>Lower Bound</b>	<b>Upper Bound</b>
<i>Less than 1 hour</i>	From 1 hour to less than 3 hours	-.72045*	.25568	.027	-1.3816-	-.0593-
	From 3 hours to less than 6 hours	-.72449*	.24845	.020	-1.3669-	-.0821-
	More than 6 hours	-.58131-	.24800	.091	-1.2226-	.0599
<i>From 1 hour to less than 3 hours</i>	Less than 1 hour	.72045*	.25568	.027	.0593	1.3816
	From 3 hours to less than 6 hours	-.00404-	.11384	1.000	-.2984-	.2903
	More than 6 hours	.13914	.11284	.606	-.1526-	.4309
<i>From 3 hours to less than 6 hours</i>	Less than 1 hour	.72449*	.24845	.020	.0821	1.3669
	From 1 hour to less than 3 hours	.00404	.11384	1.000	-.2903-	.2984
	More than 6 hours	.14318	.09535	.438	-.1034-	.3897
<i>More than 6 hours</i>	Less than 1 hour	.58131	.24800	.091	-.0599-	1.2226
	From 1 hour to less than 3 hours	-.13914-	.11284	.606	-.4309-	.1526
	From 3 hours to less than 6 hours	-.14318-	.09535	.438	-.3897-	.1034

#### IV. DISCUSSION

This study attempted to identify the extent to which students at Al-Qunfudhah University College possess digital citizenship skills based on Ribble's (2015) model. Another aspect of this study was to validate the nine dimensions of Ribble's (2015) model. According to the results stated previously, all nine dimensions of Ribble's model—etiquette, accessibility, law, connectivity, literacy, commerce, responsibility and accountability, protection (security), and health and wellbeing—were met by the students of Al-Qunfudhah University College. This finding may be attributable to the continuous demands of utilizing and integrating educational tools into teaching and learning processes (Al Zebidi, 2016).

Al-Qunfudhah University College, as a branch of Umm Al-Qura University, is a Saudi higher educational institution that is financially supported and administered by the government and works together with other parts of the country toward the goals of KSA Vision 2030, which supports the education sector (KSA.gov, 2020). Recently, Saudi universities have held workshops to train faculty members on educational technology and encourage their staff to use it for education (Albugami & Ahmed, 2015; Alghamdi & Holland, 2020). In addition, students are quite familiar with computers, smartphones, and the internet because they use such tools in their daily lives (Wilson et al., 2011; Mossberger, Tolbert & Hamilton, 2012). Consequently, students at Al-Qunfudhah University College meet the dimensions of digital citizenship skills proposed by Ribble (2015). This result is consistent with previous research (Kara, 2018; Al-Zahrani, 2015).

In this study, researchers validated the dimensions of Ribble's (2015) model by creating a scale based on the literature that contributes to a more in-depth review of this model. This proposed scale was validated in two ways: through a review by different experts in the field and by an EFA. The result of the EFA, as stated in Table 3, showed that all scale items were highly loaded and categorized under all dimensions of Ribble's [11] model, with a score of over 0.5. This presents an opportunity for further research to reapply the proposed scale in different study contexts. In addition to validity, the reliability of the proposed questionnaire was met, as shown in Table 2. This finding was in line with that of Isman and Canan Gungoren (2014).

This study also found no statistical differences between students' digital citizenship skills based on gender. Male and female students in general, and in Saudi Arabia in particular, have equal opportunities to learn and have access to technology tools, such as computers and smartphones (Al Zebidi, 2016; Al-Shawi & Al-Wabil, 2013). Thus, this result is comparable with those of previous studies, which found no statistical differences in digital citizenship between male and female students (Isman & Gungoren, 2014; Erdem & Koçyigit, 2019). However, the findings of this study regarding gender variables contradict the findings of some other studies (Som Vural & Kurt, 2018; Kocadağ, 2012). Similar results were found regarding differences between students based on age and academic levels. All students between the ages of 18 and 24 were found to practice digital citizenship skills. Finally, the daily usage of electronic device variables played a critical role among students' practice of such skills: students who were more exposed to devices were highly practiced in digital citizenship because they had more experience with digital issues than those who spent less time on electronic devices.

## V. CONCLUSION

This study sought to explore the extent to which students at Al-Qunfudah University College have practiced digital citizenship skills during the COVID-19 pandemic. Students demonstrated high practice of each dimension of Ribble's (2015) model of digital citizenship. Moreover, a scale of 35 items was developed for this study that represents all nine dimensions of digital citizenship. The study instrument was determined to be valid and reliable because the EFA showed that all items were loaded and organized in each factor of Ribble's (2015) model. Consequently, this study provides a new scale of digital citizenship based on the literature. This scale can be applied in future studies, and its validity and reliability can be tested in different settings.

In addition, this study asserts that variables such as age, gender, and level of study do not affect Saudi students' digital citizenship skills; however, there is a relationship between the daily use of electronic devices and the level of digital citizenship practice. In conclusion, since students live in the 21st century and daily use of the internet has become a part of our lives, academic institutions should provide courses and workshops on digital citizenship skills for their students and faculties so that they can develop their awareness and understanding of technology devices and their applications.

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