Digital Citizenship of Catholic School Students in Nakhon Sawan Province, Thailand

Rangsiphon Plianplan[1*]
Faculty of Education, St Teresa International University, Thailand
Email: rangsiphon.p@trsu.ac.th
*Corresponding Author

Somjate Waiyakarn[2]
Faculty of Education, St Teresa International University, Thailand
Email: somjate.wai@trsu.ac.th

Orawan Chanchalor[3]
Faculty of Education, St Teresa International University, Thailand
Email: orawan@trsu.ac.th

Wannee Tapaneeyakorn[4]
Faculty of Nursing, St Teresa International University, Thailand
Email: wannee.t@trsu.ac.th

Janpen Hongtong[5]
Academic Freelance
Email: janpen.hongtong@gmail.com

Received: *21/04/2024* Revised: *25/05/2024* Accepted: *27/05/2024*

Abstract

The research focused on assessing the digital citizenship of students attending Catholic schools in Nakhon Sawan province. Its goal was to determine the varying levels of digital citizenship among students based on factors such as gender, class level, and the duration of social media usage on their smartphones. The study encompassed 418 students from Grade 7 to Grade 12. Researchers utilized a questionnaire as the primary research tool and applied statistical analysis methods such as mean, standard deviation, t-test, and one-way ANOVA. The findings revealed that a majority of students used smartphones for more than 2 hours per day and displayed a high overall level of digital citizenship. While no significant differences in digital citizenship were observed between male and female students, variations were identified across different class levels. Moreover, the duration of smartphone use did not significantly impact overall digital citizenship, but did influence specific aspects such as privacy management and digital empathy. In light of the results, the study recommended the implementation of training activities to promote the responsible use of digital technology, ensuring the availability of adequate equipment and infrastructure, and organizing initiatives to foster digital citizenship skills among students.

Keywords: Digital Citizenship, Social Media Use, Catholic School Students in Nakhon Sawan Province

1. Introduction

The technological progress of the world in the 21st century has now fully entered the digital technology era (Puncreobutr et al., 2022). As a result, humans enter into a new technological paradigm where digital technology becomes the fifth requisite in human life. This creates new lifestyle behaviors, and a new type of citizenship originated, which is called digital citizenship (Castells, 2000).

Digital citizenship is the norm and responsibility of using digital technology appropriately and co-living in a quality digital community (Isman & Gungoren, 2014; Ribble, 2017). It is a practice that allows citizens to learn and make use of digital technology wisely and knowingly, along with being able to protect oneself from various risks associated with digital technology that may occur, respecting oneself and others, and being socially responsible (Sadiku et al., 2018).

When the way of life in society changes, schools which are a part of society needs to adjust the learning management process to be in line with the changes, in order for students to be smart, good people and be able to live happily in society (Puncreobutr, 2016). This is especially true for digital transformation, which is necessary to organize learning for students appropriately, to build a skill that can be used safely in life in the digital world (Puncreobutr & Puncreobutr, 2023).

Most importantly, increasing students' digital citizenship skills will increase their adaptability in using digital technology appropriately and with respect on the part of themselves and others. They will be able to connect their own knowledge and skills to those of others proficiently. It will also allow students to protect themselves and help protect others safely (Hussainy & Jumalullah, 2021; Ribble, 2021; Sadiku et al., 2018).

In many countries, the development of digital citizenship focuses on three characteristics of digital citizenship: 1) Self-respect and respect for others, including etiquette in the use of digital technology, equal accessibility, and compliance with digital laws. 2) Self-respect and relationships, including digital communication, digital knowledge and competency, digital literacy, and digital trading. 3) Protecting oneself and others in the digital world, such as acting responsibly according to one's own rights and the rights of others, digital security, taking care of one's own physical and mental health when using digital technology. Digital citizenship is divided into 9 aspects: digital access, digital commerce, digital communication, digital etiquette, digital law, digital rights and responsibilities, digital health and wellness, digital literacy and digital security (Ribble, 2011; Ribble, 2015; Ribble, 2017).

For Thailand, digital citizenship has been emphasized on many levels and defined into 8 aspects: skills for maintaining a good self-identity (digital citizen identity), skills for maintaining one's own personal information (privacy management), skills in analytical thinking and judgment (critical thinking), skills for screen time management, skills in dealing with online threats (cyber bullying management), skills in managing one's digital footprint, skills in maintaining one's safety online (cyber security management), and skills for digital empathy (Wongkitrungruang, 2018; Ministry of Digital Economy and Society, 2019; Thai Health Promotion Foundation, 2019).

In order to follow the changing trends of the world, a number of schools in Thailand have developed digital citizenship skills for their students, especially those at the secondary level which is the appropriate level for cultivating students with knowledge, ability, and a good attitude towards applying digital skills in life. This will help to reduce problems associated with digital use, cybercrimes, and help increase the learning potential of students, to keep up with changes (Chumpanin, 2020).

Catholic schools in Nakhon Sawan province are a group of schools that pay attention to developing digital citizenship skills for students. There has been a development of teaching

and learning management and organizing activities to enhance learning for a period of time. Therefore, the researcher deemed that a study should be conducted on the digital citizenship of Catholic school students in Nakhon Sawan province. Research results of this study would be beneficial to students, teachers, administrators of educational institutions and those responsible for organizing education both of Catholic schools in Nakhon Sawan province and those responsible for organizing education policies. The information can be used to further develop digital citizenship at relevant levels.

2. Research Objectives

2.1 To analyze the digital citizenship level of Catholic school students in Nakhon Sawan province.

2.2 To compare the digital citizenship level of Catholic school students in Nakhon Sawan province, based on gender, level of education, and duration of social media use.

2.3 To investigate methods to enhance the digital citizenship level of Catholic school students in Nakhon Sawan province.

3. Research Methodology

This research is a quantitative research, carried out as follows:

3.1 Population and sample group

The population consists of students from Mathayom 1 - Mathayom 6 of Catholic schools in Nakhon Sawan province in the academic year 2022. The sample group was selected from the population of every school, totaling up to 418 students, through stratified sampling, using the class level as a criterion for stratification.

3.2 The variables studied were:

3.2.1 The independent variables

1) Gender: male and female

2) The class level as follows: Mathayom 1 (M1), Mathayom 2 (M2), Mathayom 3 (M3), Mathayom 4 (M4), Mathayom 5 (M5) and Mathayom 6 (M6).

3) The duration of smartphone use per day: more than 2 hours per day, 1-2 hours per day, less than 1 hour per day, and hardly used at all.

3.2.2 The dependent variable is digital citizenship, consisting of 8 aspects: digital citizen identity, screen time management, cyber bullying management, cyber security management, privacy management, critical thinking, digital footprint and digital empathy.

3.3 Research instruments and statistics:

The instrument used was a questionnaire created by the researcher, with a discriminant index between .382-.898, and a reliability index of .90. The statistics used in the research were mean, S.D., t-test and one-way ANOVA.

3.4 The research period was between June 2022 – January 2023.

4. Research Results

The results obtained from the study are as follows:

4.1 Basic information of the sample group

The study on digital citizenship of Catholic school students in Nakhon Sawan province was conducted with secondary school Grades 7 - 12 students and the length of time they used their smartphones for studying and for social media communication with friends per day, as shown in Table 1.

Table 1 Basic information of the sample group, by class level and duration of smartphone use for studying and communication on social media (N=418)

Class level	Duration of smartphone use per day				Total
	Hardly used	Less than 1 hour	1-2 hours	More than 2 hours	
M1	2	5	37	45	89
M2	1	3	27	41	72
M3	3	2	19	46	70
M4	3	3	20	34	60
M5	1	6	23	35	65
M6	1	5	15	41	62
Total	**11**	**24**	**141**	**242**	**418**

According to Table 1, the overall proportion of smartphone use per day for: hardly used, less than 1 hour, 1-2 hours, and more than 2 hours were 1.1 : 2.4 : 14.1 : 24.2. When considering by class level, it was found that for M1 students, the proportion of smartphone use per day for: hardly used: less than 1 hour: 1-2 hours: and more than 2 hours were .2 : .5 : 3.7 : 4.5. For M2 students, the proportion of smartphone use per day for: hardly used: less than 1 hour: 1-2 hours: and more than 2 hours were .1 : .3 : 2.7 : 4.1. For M3 students, the proportion of smartphone use per day for: hardly used: less than 1 hour: 1-2 hours: and more than 2 hours were .3 : .2 : 1.9 : 4.6. For M4 students, the proportion of smartphone use per day for hardly used: less than 1 hour: 1-2 hours: and more than 2 hours were .3 : .3 : 2.0 : 3.4. For M5 students, the proportion of smartphone use per day for: hardly used: less than 1 hour: 1-2 hours: and more than 2 hours were .1: .6: 2.3: 3.5. For M6 students, the proportion of smartphone use per day for: hardly used: less than 1 hour: 1-2 hours: and more than 2 hours were .1 : .5 : 1.5 : 4.1. All of which went in the same direction for both class level and in the overall picture.

4.2 Study of the digital citizenship level of Catholic school students in Nakhon Sawan province

A study of the digital citizenship level of Catholic school students in Nakhon Sawan province is presented in Table 2.

Table 2 Digital citizenship level of Catholic school students in Nakhon Sawan province (N=418)

Aspects	Mean	S.D.	Level of digital citizenship	Ranking
Digital citizen identity	4.20	.678	High	4
Screen time management	3.78	.851	High	8
Cyber bullying management	4.14	.723	High	6
Cyber security management	4.22	.745	High	3
Privacy management	4.36	.642	High	1
Critical thinking	4.23	.641	High	2
Digital footprint	4.12	.647	High	7
Digital empathy	4.19	.702	High	5
Overall digital citizenship	**4.17**	**.563**	**High**	

Table 2 shows that the overall level of digital citizenship of Catholic school students in Nakhon Sawan province was at a high level (mean 4.17). When considering each aspect, it was also found to be at a high level. The top 3 aspects were privacy management, critical thinking and cybersecurity management. The last 3 aspects were cyberbullying management, digital footprint and screen time management.

Additional detailed information of each aspect in order from high to low level of citizenship is as follows;

Significant citizenship in terms of privacy management of Catholic school students in Nakhon Sawan province, arranged from highest to lowest, are as follows: 1) Protecting personal and confidential information in the digital world, 2) the use of information in the digital world, taking into account everyone's privacy, 3) sharing or forwarding information in the digital world, taking into account everyone's privacy, 4) protecting personal and confidential information of others in the digital world.

Significant citizenship in relation to the critical thinking aspect of Catholic school students in Nakhon Sawan province, arranged from the highest to the lowest, are as follows: 1) Making decisions based on rational reasoning so as not to become victims of scammers/criminals in the digital world, 2) distinguishing between legitimate or deceptive content (such as stories, clips) received in the digital world, 3) the ability to safely respond to information and content received in the digital world, 4) using logical thinking to choose to contact reliable social media and end contact with suspicious social media, 5) the ability to distinguish between true and false information received in the digital world.

Significant citizenship with regards to cybersecurity management of Catholic school students in Nakhon Sawan province, arranged from the highest to the lowest, are as follows: 1) Management of smartphone use for safe living, 2) having a careful method of securing personal information in the digital world, 3) having methods to deal safely with various threats associated with the digital world.

Significant citizenship regarding digital citizen identity of Catholic school students in Nakhon Sawan province, arranged from the highest to lowest, are as follows: 1) Safe use of one's own identity information in the digital world, 2) the ability to manage identity information in the digital world so as to be a good digital citizen, 3) the ability to create quality self-identity information, both online and offline, with integrity.

Significant citizenship in terms of digital empathy of Catholic school students in Nakhon Sawan province, arranged from the highest to lowest, are as follows:
1) Congratulating or expressing admiration towards others in the digital world appropriately, 2) showing sympathy or empathizing with others in the digital world appropriately, 3) cooperating or providing assistance to colleagues when facing problems in the digital world appropriately, 4) providing appropriate assistance to others in society, 5) the ability to respond to the needs of others in the digital world in a timely manner.

Significant citizenship in relation to cyberbullying management of Catholic school students in Nakhon Sawan province, arranged from the highest to lowest, are as follows: 1) The ability to protect oneself from being bullied in the digital world, 2) never bullying others in the digital world, 3) the ability to control the situation when being bullied in the digital world, in a timely manner.

Significant citizenship with regards to digital footprint of Catholic school students in Nakhon Sawan province, arranged from the highest to lowest, are as follows: 1) Being a person with a digital footprint that showed responsibility for themselves and others, 2) being a person who understands that the digital footprint could be used to monitor everyone's life in the digital world forever, 3) being a person who plans the beneficial use of the digital footprint in the future, such as creating an e-portfolio, 4) being a person who is prepared to

prevent harmful effects from the digital footprint in the future, such as legal lawsuits in violation of rights or defamation.

Significant citizenship in terms of screen time management of Catholic school students in Nakhon Sawan province, arranged from highest to lowest, are as follows: 1) The ability to responsibly allocate time in the digital world, 2) the ability to allocate time to use all types of communication devices appropriately, 3) the ability to spend time watching movies, listening to music and playing games in the digital world with self-discipline.

4.3 Comparison of digital citizenship level of Catholic school students in Nakhon Sawan province

Results of the comparison of the digital citizenship level of Catholic school students in Nakhon Sawan province, according to gender, class level and the duration of smartphone use, are presented as follows:

4.4 Comparison of digital citizenship level of Catholic school students in Nakhon Sawan province, based on gender.

Results of the comparison of digital citizenship level between male and female students are shown in Table 3 below.

Table 3 Comparison of digital citizenship of students by gender (N=418)

Aspects	Male (N=114)		Female (N=304)		t	P
	Mean	S.D.	Mean	S.D.		
Digital citizen identity	4.11	.645	4.24	.688	1.671	.095
Screen time management	3.66	.887	3.82	.834	1.650	.100
Cyberbullying management	3.99	.753	4.19	.704	2.642**	.009
Cybersecurity management	4.21	.670	4.22	.772	.174	.862
Privacy management	4.27	.695	4.40	.619	1.748	.082
Critical thinking	4.18	.670	4.25	.630	1.089	.277
Digital footprint	4.03	.744	4.15	.605	1.616	.108
Digital empathy	4.13	.678	4.21	.711	1.000	.318
Overall digital citizenship	**4.09**	**.573**	**4.20**	**.557**	**1.779**	**.076**

* p< .05 ** p< .01

Table 3 demonstrated that overall, female students had a higher level of digital citizenship than male students, the differences were not statistically significant.

For the comparison by aspect, it was found that for only one aspect, cyberbullying management, female students had a higher level of digital citizenship than male students, statistically significant at the .01 level. As for the other 7 aspects, female students had a higher level of digital citizenship than male students, but the differences were not statistically significant.

4.5 Comparison of digital citizenship level of Catholic school students in Nakhon Sawan province, Thailand, based on class level.

Table 4 Comparison of the digital citizenship level of students, by class level (N=418)

Aspects	Sources of variance	df	SS	MS	F	p
Digital citizen identity	Between groups	5	3.200	.640	1.396	.224
	Within groups	412	188.831	.458		
	Total	417	192.031			
Screen time management	Between groups	5	12.622	2.524	3.593**	.003
	Within groups	412	289.422	.702		
	Total	417	302.044			
Cyber bullying management	Between groups	5	3.378	.676	1.297	.264
	Within groups	412	214.660	.521		
	Total	417	218.039			
Cybersecurity management	Between groups	5	4.679	.936	1.700	.133
	Within groups	412	226.814	.551		
	Total	417	231.493			
Privacy management	Between groups	5	7.658	1.532	3.833**	.002
	Within groups	412	164.605	.400		
	Total	417	172.263			
Critical thinking	Between groups	5	6.472	1.294	3.226**	.007
	Within groups	412	165.316	.401		
	Total	417	171.788			
Digital footprint	Between groups	5	4.984	.997	2.417**	.035
	Within groups	412	169.923	.412		
	Total	417	174.906			
Digital empathy	Between groups	5	7.753	1.551	3.225**	.007
	Within groups	412	198.116	.481		
	Total	417	205.868			
Overall digital citizenship	Between groups	5	4.798	.960	3.101**	.009
	Within groups	412	127.516	.310		
	Total	417	132.315			

* $p < .05$ ** $p < .01$

According to Table 4, the comparison of digital citizenship of Catholic school students in Nakhon Sawan province, overall, the results of the variance analysis reveal that students from different class levels have different levels of digital citizenship. The differences have a statistical significance level of .01. Therefore, the researcher conducted further analysis on a pair basis.

The paired analysis discovered that M6 had the highest level of digital citizenship, M6 had a higher level of digital citizenship than M5 and M1 with statistical significance at the .01 level, M6 had a higher level of digital citizenship than M4 with statistical significance at the .05 level, M6 had a higher level of digital citizenship than M3 and M2 with no statistical significance.

The M2 class had the second highest level of digital citizenship. M2 had a higher level of digital citizenship than M5 with statistical significance at the .01 level, M2 had a higher level of digital citizenship than M1 with statistical significance at the .05 level, M2 had a higher level of digital citizenship than M3 and M4 with no statistical significance.

The M3 class had the third highest level of digital citizenship. M3 had a higher level of digital citizenship than M5 with statistical significance at the .05 level, M3 had a higher level of digital citizenship than M1 and M4 with no statistical significance.

As for the other classes, their digital citizenship levels were different, but with no statistical significance.

Withregards to the comparison of students' digital citizenship, by aspect, variance analysis results show that the levels for digital citizen identity, cyber bullying management and cybersecurity management of students from different classes were different, but the differences were not statistically significant. On the other hand, there were different levels of digital citizenship in the aspects of screen time management, privacy management, critical thinking, digital footprint and digital empathy of students from different class levels, with a statistical significance level at .01. The researcher then analyzed it on a pair basis. The results of the paired analysis are as follows:

1) Results of the paired analysis for digital citizenship in the aspect of screen time management

The results found that M6 students had the highest level of digital citizenship in screen time management and had a higher level of digital citizenship than M1, M5, M3, M4 and M2, with a statistical significance level of .01. As for the other class levels, their levels of digital citizenship were different, but with no statistical significance.

2) Results of the paired analysis for digital citizenship in privacy management

The results revealed that M3 students had the highest level of digital citizenship in privacy management. They had a higher level of digital citizenship than M5 and M1 students, with a statistical significance level of .01. M3 had a higher digital citizenship level than M4, M6 and M2, but the differences were not statistically significant.

M2 had the second highest level of digital citizenship in privacy management. M2 had a higher level of digital citizenship than M5 and M1, with statistical significance at the .01 level. M2 had a higher level of digital citizenship than M4 and M6, but the differences were not statistically significant.

Furthermore, M6 had the third highest level of digital citizenship in privacy management. M6 had a higher level of digital citizenship than M5 and M1, with statistical significance at the .05 level. M6 had a higher level of digital citizenship than M4, but the difference was not statistically significant.

As for the other classes, there were different levels of digital citizenship, but the differences were not statistically significant.

3) Results of the paired analysis of digital citizenship in critical thinking

The results of the study indicated that M6 had the highest level of digital citizenship in critical thinking. M6 had a higher level of digital citizenship than M5, with a statistical significance level of .01. M6 had a higher level of digital citizenship than M4 and M1, with a statistical significance level of .05. M6 had a higher level of digital citizenship than M3 and M2, but the differences were not statistically significant.

As for the M2 class, they had the second highest level of digital citizenship in critical thinking. M2 had a higher level of digital citizenship than M5, at a statistical significance level of .01. M2 had a higher level of digital citizenship than M4, with statistical significance at the .05 level. M2 had a higher level of digital citizenship than M1 and M3, but the differences were not statistically significant.

With regards to the other remaining classes, there were different levels of digital citizenship, and the differences were not statistically significant.

4) Results of the paired analysis for digital citizenship in digital footprint

The results revealed that M2 had the highest level of digital citizenship in terms of digital footprint. M2 had a higher level of digital citizenship than M5, at a statistical significance level of .01. M2 had a higher level of digital citizenship than M4, with statistical significance at the .05 level. M2 had a higher level of digital citizenship than M3, M1 and M6, but the differences were not statistically significant.

For the M6 class, they had the second highest level of digital citizenship in digital footprint. M6 had a higher level of digital citizenship than M5 and M4, with statistical significance at the .05 level. M6 had a higher level of digital citizenship than M3 and M1, but the differences were not statistically significant.

Regarding the other classes, there were different levels of digital citizenship, but the differences were not statistically significant.

5) Results of the paired analysis for digital citizenship in digital empathy

The study found that M6 had the highest level of digital citizenship in digital empathy. M6 had a higher level of digital citizenship than M5, at a statistical significance level of .01. M6 had a higher level of digital citizenship than M4 and M1, with statistical significance at the .05 level. M6 had a higher level of digital citizenship than M3 and M2, but the differences were not statistically significant.

For the M2 class, they had the second highest level of digital citizenship in digital empathy. M2 had a higher level of digital citizenship than M5, statistically significant at the .05 level. M2 had a higher level of digital citizenship than M4, M1 and M3, but with no statistical significance.

Regarding the other classes, there were different levels of digital citizenship, but they were not statistically significant.

4.6 The comparison of digital citizenship levels of Catholic school students in Nakhon Sawan province, Thailand, by the length of smartphone use.

Table 5 Comparison of digital citizenship levels of students, classified according to class levels (N=418)

Aspects	Sources of variance	df	SS	MS	F	p
Digital citizen identity	Between groups	3	1.017	.339	.734	.532
	Within groups	414	191.014	.461		
	Total	417	192.031			
Screen time management	Between groups	3	2.712	.904	1.251	.291
	Within groups	414	299.331	.723		
	Total	417	302.044			
Cyberbullying management	Between groups	3	.613	.204	.389	.761
	Within groups	414	217.425	.525		
	Total	417	218.039			
Cybersecurity management	Between groups	3	2.942	.981	1.776	.151
	Within groups	414	228.551	.552		

	Total	417	231.493			
Privacy management	Between groups	3	3.820	1.273	3.129*	.026
	Within groups	414	168.444	.407		
	Total	417	172.263			
Critical thinking	Between groups	3	.096	.032	.078	.972
	Within groups	414	171.691	.415		
	Total	417	171.788			
Digital footprint	Between groups	3	2.704	.901	2.167	.091
	Within groups	414	172.202	.416		
	Total	417	174.906			
Digital empathy	Between groups	3	3.895	1.298	2.662*	.048
	Within groups	414	201.973	.488		
	Total	417	205.868			
Overall digital citizenship	Between groups	3	1.479	.493	1.560	.198
	Within groups	414	130.836	.316		
	Total	417	132.315			

* $p < .05$ ** $p < .01$

Table 5 shows that, based on the variance analysis, overall, there were different levels of digital citizenship for the duration of smartphone use, but the differences were not statistically significant.

For the comparison of students' digital citizenship by aspect, the results of the variance analysis suggest that there were different levels of digital citizenship in the aspects of digital citizen identity, screen time management, cyber bullying management, cybersecurity management, critical thinking and digital footprint of students with different duration of smartphone use. However, the differences were not statistically significant. On the other hand, there were different levels of digital citizenship in the aspects of privacy management and digital empathy of students with different duration of smartphone use. The differences were statistically significant at the .05 level. The researcher therefore analyzed it further on a pair basis. The results of the paired analysis are as follows:

1) Results of the paired analysis of digital citizenship in privacy management

The study found that students with smartphone use duration of more than 2 hours per day had the highest level of digital citizenship in privacy management. Moreover, they had a higher level of digital citizenship than those with less than 1 hour per day, with a statistical significance level of .01.

In addition, students with a smartphone use duration of 1-2 hours per day had a higher level of digital citizenship in privacy management than those with less than 1 hour per day, with a statically significance level of .05.

Students with other smartphone use durations were found to have different levels of digital citizenship, but the differences were not statistically significant.

2) Results of the paired analysis of digital citizenship in digital empathy

The study found that students with a smartphone use duration of 1-2 hours per day had the highest level of digital citizenship in digital empathy. They had a higher level of digital citizenship than those with less than 1 hour per day, with statistical significance at the .05 level.

Students with a smartphone use duration of more than 2 hours per day had a higher level of digital citizenship in digital empathy than those with smartphone use duration of less than 1 hour per day, with statically significance at the .05 level.

As for students with other smartphone use durations, they had different levels of digital citizenship in digital empathy, but the differences were not statistically significant.

4.7 Methods for elevating students' digital citizenship

The data of methods for elevating the digital citizenship level of Catholic school students in Nakhon Sawan province were elicited from the open-ended section of the questionnaire. It showed that there were suggestions for schools to take measures to improve students' digital citizenship levels. The suggestions can be summarized as follows:

1) There should be training activities for students to utilize digital technology and new applications correctly and for maximum efficiency, both in their daily lives and for self-study, in line with the lifelong learning approach.

2) There should be fast and sufficient equipment and infrastructure for students' access to digital technology with their smartphones.

3) There should be activities to support the acquisition of digital citizenship skills for students or activities that encourage students to utilize digital technology in creating work and providing services, such as setting up clubs, working on projects, presenting their work, etc.

5. Conclusion

The results of the study can be summarized as follows:

5.1 Study of the digital citizenship level of Catholic school students in Nakhon Sawan province

5.1.1 The length of time spent by Catholic school students in Nakhon Sawan province on their smartphones for studying and communicating with friends on social media, could be categorized into 4 groups, arranged from the highest to lowest as follows: 57.9% spend more than 2 hours per day, followed by 33.7% spending 1-2 hours per day, 5.7% spend less than 1 hour per day, and 2.6% hardly used their smartphones each day.

5.1.2 Overall and in every individual aspect, students had a high level of digital citizenship. The top 3 citizenship levels were privacy management, critical thinking and cybersecurity management. The last 3 citizenship levels were cyberbullying management, digital footprint and screen time management.

Students' significant citizenship in relation to privacy management consist of the ability to protect their personal and confidential information, using information in the digital world while taking into account the principles for everyone's privacy, sharing or forwarding information in the digital world while taking into account the privacy of those involved, and protecting the personal and confidential information of others.

Students' significant citizenship in relation to screen time management consist of the ability to allocate their time responsibly in the digital world, the ability to allocate time to use communication tools appropriately, and spending time in the digital world with self-discipline.

5.2 The comparison of the digital citizenship level of Catholic school students in Nakhon Sawan province, by gender, level of education, and duration of social media use

5.2.1 Comparison of students' digital citizenship level by gender

The study found that overall, there was no significant difference between male and female students in digital citizenship. When considering each aspect, it was found that in most aspects, digital citizenship between male and female students did not have statistically significant differences, except for cyberbullying management, where female students had a

higher level of digital citizenship than male students, with a statistical significance level of .01.

5.2.2 Comparison of students' digital citizenship level by class level

1) Results revealed that overall, there was a statistically significant difference at the .01 level among students from different class levels in digital citizenship. The M6 students had the highest level of digital citizenship, with a higher digital citizenship level than M5 and M1 students, with a statistical significance level of .01, and had a higher digital citizenship level than M4 students with statistical significance at the .05 level. As for the other classes, there were no significant differences in digital citizenship.

When considering individual aspects, it was found that there were statistically significant differences in digital citizenship at the .01 level among students from different class levels in 5 aspects: screen time management, privacy management, critical thinking, digital footprint and digital empathy, as follows:

1) Digital citizenship in screen time management: It was found that M6 students had a higher digital citizenship level than students in M1, M5, M3, M4 and M2, at a statistical significance level of .01.

2) Digital citizenship in privacy management: It was found that M3 had a higher level of digital citizenship than M5 and M1 students, with a statistical significance level of .01. As for other class levels, there were no statistically significant differences in digital citizenship.

3) Digital citizenship in critical thinking: It was found that M6 had a higher level of digital citizenship than M5 students, with a statistical significance level of .01, and higher than M4 and M1 students, with statistical significance at the .05 level. As for other class levels, there were no statistically significant differences in digital citizenship.

4) Digital citizenship in digital footprint: It was found that M2 had a higher level of digital citizenship than M5, with statistical significance at the .01 level, and higher than M4 with statistical significance at the .05 level. As for other class levels, there were no statistically significant differences in digital citizenship.

5) Digital citizenship in digital empathy: It was found that M6 had a higher level than M5 with statistical significance at the .01 level, and higher than M4 and M1 at the .05 level. As for other class levels, there were no significant differences in digital citizenship.

5.3 Comparison of students' digital citizenship levels, by duration of social media use The results of the study found that:

5 .3.1 Overall, there were no significant differences in digital citizenship among students with different durations of smartphone use.

5.3.2 With respect to the digital citizenship of Catholic school students in Nakhon Sawan province according to each aspect, it was found that there were two aspects: privacy management and digital empathy, where the durations of smartphone use by students exhibited differences. It was found that students have different levels of digital citizenship, with statistical significance at the .05 level.

1) Digital citizenship in privacy management: It was found that students who used their smartphones for more than 2 hours per day had a higher level of digital citizenship than students with smartphone use duration of less than 1 hour per day, with statistical significance at the .01 level. As for the other durations of use, there were no significant differences in digital citizenship.

2) Digital citizenship in digital empathy: It was found that students who used their smartphones for 1-2 hours per day had a higher level of digital citizenship than students with smartphone use duration of less than 1 hour per day, with statistical

significance at the .05 level. As for the other durations of use, there were no significant differences in digital citizenship.

3) Approaches to elevate the digital citizenship level of Catholic school students in Nakhon Sawan province.

Based on the data collected from the open-ended section of the questionnaire, three important approaches for enhancing students' digital citizenship were found.

1) There should be training activities for students in the proper use of digital technology and new applications, and for maximum efficiency, both in their daily lives and lifelong learning.

2) There should be fast and sufficient equipment and infrastructure, accessible with students' smartphones.

3) There should be activities that support building digital citizenship skills for students or activities that support students' creation, such as establishing clubs, working on projects, etc.

6. Recommendations

6.1 Recommendations for the application

From the study, it was found that the digital citizenship of male and female students were not significantly different, and that the overall digital citizenship of students with different smartphone use durations were not significantly different. Teachers or administrators responsible for learning management for the development of students' digital citizenship skills, and teachers responsible for extra-curricular activities management at each class level, will be able to design the learning management and activities in the same direction without having to be concerned with restrictions on their gender or duration of smartphone use.

According to the study, it was found that the overall digital citizenship of students from different class levels were significantly different at the .01 level, especially in the aspects of screen time management, privacy management, critical thinking, digital footprint and digital empathy. Teachers responsible for learning management for the development of students' digital citizenship skills at different class levels, and teachers responsible for extra-curricular activities management at each class level, must design learning/activity management in accordance with the citizenship of each class level.

The study results revealed that there were three important approaches to enhance students' digital citizenship. Therefore, teachers responsible for extra-curricular activities management and school administrators should encourage the development of students' digital citizenship skills, in the use of digital technology and new applications, and supporting digital devices and infrastructure which will swiftly respond to student needs, and supporting student activities that will build digital citizenship skills, such as various club activities, as deemed appropriate.

6.2 Recommendations for further research

From the study, it was found that overall, there were significant differences in digital citizenship at the .01 level of students from different class levels. When considering each aspect, there were significant differences in digital citizenship at the .01 level of students from different class levels in 5 aspects: screen time management, privacy management, critical thinking, digital footprint and digital empathy. However, this research was a cross-sectional research and was conducted with students during the specified period. In order to validate the results of this study, more research should be conducted to cover both semesters of the next academic year.

According to the study, it was found that students suggested methods to elevate their digital citizenship skills, consisting of three approaches. However, the above proposals emerged from responses to an open-ended questionnaire. To validate these results, more research should be conducted on the needs to further develop students' digital citizenship.

References

Castells, M. (2000). *Materials for an Exploratory Theory of the Network Society.* Retrieved on June 11, 2020, from http://onlinelibraly.willey.com/doi/pdf/10.1111/j.1468-4446.2000.00005.x

Chumpanin, K. (2020). Guideline for Enhancing Digital Citizenship of Students in Secondary School. *Journal of Education Administration, Khon Kaen University, 16*(1), 116-127.

Hussainy, S. S. & Jumalullah, S. R. (2021). A Study of Factors Affecting Digital Citizenship Among College Faculties in India. *International Journal of Teaching, Education and Learning, 4*(3), 49-61.

Isman, A. & Gungoren, O. C. (2014). Digital Citizenship. *The Turkish Online Journal of Educational Technology, 13*(1), 73-77

Ministry of Digital Economy and Society. (2019). *Thailand Digital Economy and Society Development Plan (2019-2037)*. Bangkok: Ministry of Digital Economy and Society

Puncreobutr, V. (2016). Linking Work Integrated Learning and Competency of Graduates Pursuing Graduated Diploma in Teaching Profession. *Journal of Education and Practice, 7*(10), 121-127.

Puncreobutr, V., Dhamacharoen, A., & Tapaneeyakorn, W. (2022). Factors Affecting the Readiness of Thai Universities to Organize Learning Activities in the Metaverse Era. *Webology, 19*(2), 9285-9296.

Puncreobutr, V. & Puncreobutr, B. (2023). Digital Challenges: The Digital Competencies of Educational Institutions. *St. Theresa Journal of Humanities and Social Sciences, 9*(2), 144-160.

Ribble, M. (2011). *Digital Citizenship in Schools*. 2nd ed. Eugene, Oregon: International Society for Technology in Education.

Sadiku, M. N. O., Tembely, M. & Musa, M. S. (2018). Digital Citizenship. *International Journals of Advanced Research in Computer Science and Software Engineering*, 8(5), 18-20.

Wongkitrungruang, W. (2018). *Digital Citizen's Guide.* Bangkok: Digital Economy.

_____. (2015). *Digital Citizenship in Schools: Nine Elements all Students should know.* Eugene, Oregon: International Society for Technology in Education.

_____. (2017). *Nine Themes of Digital Citizenship.* Retrieved June 11, 2020, from http://www.digitalcitizenship.net/nine-elements.html

_____. (2021). Digital Citizenship in the Frame of Global Change. *International Journal of Studies in Education and Science, 2*(2), 74-86.