ความต้องการพัฒนาความเป็นพลเมืองดิจิทัลของนักเรียนโรงเรียนคาทอลิกในจังหวัดนครสวรรค์ ประเทศไทย

The Need for Digital Citizenship Development among Catholic School Students in Nakhon Sawan Province, Thailand

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บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์เพื่อศึกษาความต้องการในการพัฒนาความเป็นพลเมืองดิจิทัลของนักเรียนโรงเรียนคาทอลิกในจังหวัดนครสวรรค์ เพื่อเปรียบเทียบระดับความเป็นพลเมืองดิจิทัลของนักเรียนโรงเรียนคาทอลิกในจังหวัดนครสวรรค์ จำแนกตามระดับชั้นที่เรียน กลุ่มสาระรายวิชาที่เรียน และ ระยะเวลาในการใช้ Smart Phone และเพื่อศึกษากิจกรรมที่ต้องการใช้เพื่อพัฒนาความเป็นพลเมืองดิจิทัลของนักเรียนโรงเรียนคาทอลิกในจังหวัดนครสวรรค์ การวิจัยนี้เป็น การวิจัยเชิงปริมาณ ทำการศึกษากับนักเรียนชั้นมัธยมศึกษาปีที่ 1- ปีที่ 6 จำนวน 418 คน เครื่องมือที่ใช้คือแบบสอบถามที่ผู้วิจัยสร้างขึ้นเอง สถิติที่ใช้ในการวิจัย คือ Mean, S.D., t-Test และ one-way ANOVA ผลการศึกษาพบว่า 1) นักเรียนชั้นมัธยมศึกษาตอนต้น มีสัดส่วนการใช้ Smart Phoneต่อวัน คือ แทบไม่ได้ใช้: น้อยกว่า 1 ชม. : จำนวน 1-2 ชม.: มากกว่า 2 ชม. คิดเป็น 0.6: 1.0: 8.3: 13.2 และนักเรียนชั้นมัธยมศึกษาตอนปลาย มีสัดส่วนการใช้ Smart Phoneต่อวัน คือ แทบไม่ได้ใช้: น้อยกว่า 1 ชม. : จำนวน 1-2 ชม.: มากกว่า 2 ชม. คิดเป็น 0.5: 1.4: 5.8: 11.0 2) ความต้องการพัฒนาความเป็นพลเมืองดิจิทัลของนักเรียนทั้งในภาพรวมและในรายด้านทุกด้าน นักเรียนมีความต้องการพัฒนาความเป็นพลเมืองดิจิทัลอยู่ในระดับสูง 3) การเปรียบเทียบความต้องการพัฒนาความเป็นพลเมืองดิจิทัลของนักเรียนจำแนกตามระดับชั้นที่เรียน พบว่า ความต้องการพัฒนาทั้งในภาพรวม และในรายด้าน ของนักเรียนมัธยมศึกษาตอนต้น กับ นักเรียนมัธยมศึกษาตอนปลาย ไม่แตกต่างกัน 4) การเปรียบเทียบ ความต้องการพัฒนาความเป็นพลเมืองดิจิทัลของนักเรียนจำแนกตามกลุ่มสาระรายวิชา ทั้งในภาพรวมและในรายด้านทุกด้าน พบว่า นักเรียนที่ศึกษาในกลุ่มสาระรายวิชาที่แตกต่างกัน มีความต้องการพัฒนาความเป็นพลเมืองดิจิทัลไม่แตกต่างกัน 5) การเปรียบเทียบความต้องการพัฒนาความเป็นพลเมืองดิจิทัลของนักเรียนจำแนกตามระยะเวลาการใช้ Smart Phone ในภาพรวมและในรายด้าน รวม 5 ด้าน คือ Digital Citizen Identity, Screen Time Management, Cyber Bullying Management, Cybersecurity Management, Digital footprint นักเรียนที่มีระยะเวลาการใช้ Smart Phone ต่างกัน มีความต้องการพัฒนาความเป็นพลเมืองดิจิทัลแตกต่างกัน อย่างมีนัยสำคัญทางสถิติที่ระดับ .05 6) กิจกรรมที่นักเรียนต้องการใช้เทคโนโลยีดิจิทัล และแอปพลิเคชั่นใหม่ๆ มาพัฒนาความเป็นพลเมืองดิจิทัล ประกอบด้วย 3 กลุ่มกิจกรรม คือกิจกรรมในการศึกษาค้นคว้าด้วยตนเอง กิจกรรมในการทำแบบฝึกหัด การบ้าน และ กิจกรรมในการสันทนาการ

คำสำคัญ : ความต้องการพัฒนา; ความเป็นพลเมืองดิจิทัล; โรงเรียนคาทอลิกในจังหวัดนครสวรรค์

Abstract

This research aims to (1) study the needs for digital citizenship development among Catholic school students in Nakhon Sawan province, (2) compare the level of digital citizenship among Catholic school students in Nakhon Sawan province by class level, subject group, and duration of smartphone usage, and (3) study the activities intended to be used for digital citizenship development among Catholic school students in Nakhon Sawan province. This research is a quantitative research, conducted with 418 students from Mathayom 1 – 6 (Grade 7 – 12). The research instrument used was a questionnaire created by the researcher. Statistics used in the research were mean, S.D., t-Test and one-way ANOVA. The results demonstrated that 1) the smartphone usage ratio of junior high school students per day for: hardly used: less than 1 hour: 1-2 hours: more than 2 hours, were calculated as 0.6: 1.0: 8.3: 13.2; and that of senior high school students for: hardly used: less than 1 hour: 1-2 hours: more than 2 hours, were calculated as 0.5: 1.4: 5.8: 11.0, respectively. 2) Overall and in all individual aspects, students had a high level of need for digital citizenship development. 3) For the overall comparison and according to individual aspects, there were no significant differences in the needs for digital citizenship development between junior and senior high school students. 4) In the overall comparison and according to individual aspects, there were no significant differences in the needs for digital citizenship development among students of different subject groups. 5) As a whole and according to five aspects of digital citizen identity, screen time management, cyberbullying management, cybersecurity management and digital footprint, there were statistically significant differences at the .05 level in the needs for digital citizenship development among students with different smartphone usage durations. 6) The activities in which students applied digital

technology and new applications in developing their digital citizenship can be categorized into 3 groups: self-study activities, exercise and homework activities, and recreational activities.

Keywords : Development Needs; Digital Citizenship; Catholic Schools In Nakhon Sawan Province

Background

Currently, the Thai society is changing rapidly due to technological advancements and information which is being developed at a rapid pace, especially digital technology integrated into people's daily lives through smartphone devices (Ministry of Digital Economy and Society, 2019; Puncreobutr et al., 2022). As a result, Thailand as a country had to promptly develop to keep up with the changes by accelerating the use of digital technology as a tool to drive development. This would answer to various challenges, both economic and social, such as the digital society, the aging society etc. (Ministry of Digital Economy and Society, 2016; Puncreobutr & Puncreobutr, 2023).

The use of digital technology as a tool to drive national development, in terms of the digital society, focuses not only on the use for fun or entertainment, but it must also be used to improve the quality of life. This includes access to analysis, synthesis, management, integration, sharing and creation of new information and knowledge, as well as cooperating with others in the digital community to achieve quality digital citizenship (Castells, 2000; Isman and Gungoren, 2014; Ribble, 2017).

Educational institutions such as schools are, therefore, an important force in using digital technology to drive national development. The focus would be on developing the digital workforce to be digital citizens who learn and make use of digital technology intelligently, to be socially responsible, attentive and able to protect themselves from various risks associated with the use of digital

technology (Sadiku et al., 2018; Puncreobutr, 2021). This applies to matters related to digital access, digital commerce, digital communication, digital etiquette, digital law, digital rights & responsibilities, digital health & wellness, digital literacy, and digital security (Ribble, 2011; Ribble, 2015; Ribble, 2017; Thai Health Promotion Foundation, 2019).

A number of schools in Thailand have prioritized the development of digital citizenship. Actions are taken to develop citizenship skills for students, both at the junior and senior high school levels, so that they may have the knowledge, ability, and a positive attitude towards the use of digital technology in their lives, as well as increase their learning potential to keep up with changes (Chumpanin, 2020). Developing students' digital citizenship will also help them to use digital technology appropriately, with respect for themselves and others, to connect their own knowledge and skills to those of others. It also allows students to protect themselves and help protect others (Hussainy & Jumalullah, 2021; Ribble, 2021; Sadiku et al., 2018).

The Catholic schools in Nakhon Sawan province are a group of schools that places emphasis on citizenship skills development for students. The development process is carried out both as part of the teaching and learning management in classroom subjects or learning and through organizing activities to enhance learning. This is a process of developing skills outside of the classroom through various activities organized by teachers or the students themselves. These two types of management have been implemented by the school for quite some time. Therefore, the researcher believed that a study should be conducted on the need for digital citizenship development among Catholic school students in Nakhon Sawan province to benefit teachers, counselors, and those responsible for organizing school activities. Apart from being beneficial to students, teachers, educational institution administrators and those responsible for education management of Catholic schools in Nakhon Sawan province, it may also be beneficial to Catholic schools in other provinces, to apply the research results as

information to further develop their students' digital citizenship on relevant levels.

Research Objectives

1. To analyze the level of need for digital citizenship development among Catholic school students in Nakhon Sawan province.

2. To compare the need for digital citizenship development among Catholic school students in Nakhon Sawan province based on class level, subject group, and duration of smartphone usage.

3. To study activities that can be used to develop digital citizenship among Catholic school students in Nakhon Sawan province.

Research Methodology

This research project is a quantitative study conducted as follows:

1. Population and samples

The population consisted of Mathayom 1 to Mathayom 6 students from Catholic schools in Nakhon Sawan province during the academic year 2022. The sample included 418 students, randomly selected from all schools using a stratified sampling method, with class level as the criterion for stratification.

2. Variables

2.1 Independent variables

2.1.1 Class level, categorized into junior high school and senior high school.

2.1.2 Subject group, the study encompassed three subject groups: the language group, science-mathematics group, and other subject groups.

2.1.3 Duration of smartphone usage, classified into four durations: more than 2 hours per day, 1-2 hours per day, less than 1 hour per day, hardly using it at all.

2.2 Dependent variable

The dependent variable was the need for digital citizenship development among Catholic school students in Nakhon Sawan province, comprising eight aspects: Digital citizen identity, screen time management, cyberbullying management, cybersecurity management, privacy management, critical thinking, digital footprint, digital empathy.

3. Research instruments and statistics used

The instrument employed in this study was a questionnaire developed by the researcher, with a discriminatory index range of .391 to .918, and a reliability index of .92. Statistical analyses conducted included mean, S.D., t-Test, and one-way ANOVA.

4. Data Collection

The researcher collected data by distributing questionnaires to the sample group as specified in the study. Prior to data collection, the researcher clearly explained the objectives of the study and assured the confidentiality of all information provided by the respondents.

5. Data Analysis

The researcher analyzed the data collected from the questionnaires using the statistical software. The analysis included: 1. Basic demographic information of the students 2. Students' needs for developing digital citizenship 3.A comparison of the levels of students' needs in developing digital citizenship

Research duration: June 2022– January 2023.

Research Results

Results from the study yielded the following findings:

1. Need for developing students' digital citizenship

An examination of the necessity for developing digital citizenship among Catholic school students in Nakhon Sawan province encompassed both junior and senior high school students. Comprehensive demographic data concerning students' class levels, subject groups, and smartphone usage durations are detailed in Tables 1 and 2.

1.1 Students' basic information

Tables 1 and 2 present the demographic characteristics of Catholic school students in Nakhon Sawan province, categorized by class level, subject group, and duration of smartphone usage.

Table 1. The sample group, classified by class level and subject group (N=418)

Subject group	Class level		Total
	Junior high school	Senior high school	
Language group	67	61	128
Science-mathematics group	82	61	143
Other subject groups	82	65	147
Total	231	187	418

Table 1 illustrates the distribution of Catholic school students in Nakhon Sawan province included in this study. It indicates a balanced representation of both junior and senior high school students across each subject group.

Table 2. The sample group, classified by class level and duration of smartphone usage (N=418)

Duration of smartphone usage per day	Class level		Total
	Junior high school	Senior high school	
Hardly used	6	5	11
Less than 1 hour	10	14	24
1 to 2 hours	83	58	141
More than 2 hours	132	110	242
Total	231	187	418

The data presented in Table 2 illustrates the smartphone usage patterns among Catholic school students in Nakhon Sawan province, particularly in communication through social media. The findings indicate the following:

Overall, among Mathayom 1-6 students, the sample exhibited the following ratio of smartphone usage per day: hardly used: 1.1, less than 1 hour: 2.4, 1-2 hours: 14.1, and more than 2 hours: 24.2.

For junior high school students, the ratio were as follows: hardly used: 0.6, less than 1 hour: 1.0, 1-2 hours: 8.3, and more than 2 hours: 13.2.

Similarly, for senior high school students, the ratio were: hardly used: 0.5, less than 1 hour: 1.4, 1-2 hours: 5.8, and more than 2 hours: 11.0.

In summary, the majority of both junior and senior high school students in the sample utilized smartphones for communication via social media for more than 2 hours per day, followed by 1-2 hours per day.

1.2 Needs for digital citizenship development among students

Table 3 below presents the level of needs for digital citizenship development among Catholic school students in Nakhon Sawan province across eight different aspects.

Table 3. Level of needs for digital citizenship development among Catholic school students in Nakhon Sawan province (N=418)

Aspects of need	Mean	S.D.	Level of need for digital citizenship development	Ranking
Digital citizen identity	3.90	1.107	High	1
Screen time management	3.74	.998	High	8
Cyberbullying management	3.85	1.135	High	5
Cybersecurity management	3.87	1.156	High	3
Privacy management	3.90	1.168	High	2
Critical thinking	3.86	1.064	High	4
Digital footprint	3.81	1.099	High	6
Digital empathy	3.80	1.163	High	7
Overall development need	3.83	1.011	High	

Table 3 reveals that the level of need for digital citizenship development among Catholic school students in Nakhon Sawan Province was notably high overall, with an average score of 3.83. Upon closer examination of each aspect, it became evident that the need remained consistently high across all categories. The top three aspects with the highest levels of need were digital citizen identity, privacy management, and cybersecurity management, while the bottom three were digital footprint, digital empathy, and screen time management.

The ranking of all eight aspects, from highest to lowest need for digital citizenship development, is as follows: digital citizen identity, privacy management, cybersecurity management, critical thinking, cyberbullying management, digital footprint, digital empathy, and screen time management.

Further details regarding each aspect will be discussed subsequently.

Regarding the aspect of digital citizen identity, the identified needs, ranked from highest to lowest, were as follows. 1) Establishing high-quality personal

identity information in the digital world, 2) identity data management for good digital citizenship.

Concerning privacy management, the significant needs, arranged from highest to lowest, were as follows. 1) Cultivating personal privacy in the digital world, 2) enhancing the safeguarding of others' confidential information in the digital world, 3) strengthening the protection of one's own confidential information in the digital world.

In terms of cybersecurity management, the critical needs, ranked from highest to lowest, were as follows: 1) Enhancing the security of personal information in the digital world, 2) advancing the utilization of new technologies for digital communication, 3) developing strategies to address emerging threats in the digital landscape.

Concerning critical thinking, the pivotal needs for developing digital citizenship, listed from highest to lowest, were as follows: 1) Safely evaluating information and content obtained from the digital world, 2) cultivating a logical decision-making process based on digital data, 3) implementing techniques for categorizing data and content received from the digital world.

With regards to cyberbullying management, the crucial needs for developing digital citizenship, ranked from highest to lowest priority, were as follows: 1) Strategies for safeguarding oneself from digital bullying incidents, 2) measures for exercising caution to avoid inadvertently engaging in cyberbullying, 3) techniques for managing situations when digital bullying occurs within social circles.

Regarding digital footprint, the key needs for citizenship development, prioritized from highest to lowest, were as follows: 1) Strategies for leveraging digital footprint for future benefits, 2) measures for preventing legal repercussions resulting from digital footprint, 3) techniques for establishing a responsible digital footprint that reflects positively on oneself and others.

In the domain of digital empathy, the essential needs for fostering citizenship development, arranged from highest to lowest priority, were as follows: 1) Strategies for expressing congratulations or demonstrating understanding towards others in the digital world, 2) methods for offering assistance to others on the digital world, 3) approaches for safely responding to the needs of others in the digital world.

Regarding screen time management, the significant needs for citizenship development were as follows, prioritized from highest to lowest: 1) Strategies for allocating time for recreational activities in the digital world without compromising academic performance, 2) methods for dedicating time to self-study to enhance academic achievement, 3) approaches for efficiently managing time spent using various digital devices or applications.

2. Comparison of digital citizenship development needs among students

The comparison of the level of needs for digital citizenship development among Catholic school students in Nakhon Sawan province, categorized by class level, subject group, and duration of smartphone usage, yielded the following results:

2.1 Comparison of digital citizenship development needs by class level

The comparison of students' need for digital citizenship development by class level, conducted using t-test, is presented in Table 4.

Table 4. Level of students' digital citizenship development needs by class level (N=418)

Aspects of need	Junior high school (N=231)		Senior high school (N=187)		t	p
	Mean	S.D.	Mean	S.D.		
Digital citizen identity	3.93	1.130	3.86	1.079	.675	.500
Screen time management	3.75	1.031	3.74	.957	.096	.923
Cyberbullying management	3.90	1.160	3.79	1.103	1.012	.312
Cybersecurity management	3.93	1.180	3.80	1.124	1.100	.272
Privacy management	3.98	1.192	3.81	1.133	1.475	.141
Critical thinking	3.90	1.076	3.81	1.050	.802	.423
Digital footprint	3.83	1.099	3.78	1.101	.468	.627
Digital empathy	3.80	1.190	3.80	1.133	.018	.986
Overall development need	3.87	1.021	3.79	.999	.764	.445

* p< .05 ** p< .01

Table 4 indicates that, overall, junior high school students exhibited a higher need for digital citizenship development compared to senior high school students. However, these differences did not reach statistical significance. Similarly, across all aspects examined, junior high school students consistently demonstrated a greater need for digital citizenship development than their senior counterparts, though these differences were not statistically significant.

2.2 Comparison of digital citizenship development needs by subject group

Table 5 presents the comparison of students' digital citizenship development needs across different subject groups, including the language group, science-mathematics group, and other subject group, using one-way ANOVA.

Table 5. Comparison of students' digital citizenship development needs by subject group (N=418)

Aspects of need	Sources of variance	df	SS	MS	F	p
Digital citizen identity	Between groups	2	3.491	1.745	1.427	.241
	Within groups	415	507.682	1.223		
	Total	417	511.172			
Screen time management	Between groups	2	2.384	1.192	1.197	.303
	Within groups	415	413.216	.996		
	Total	417	415.600			
Cyberbullying management	Between groups	2	2.377	1.188	.921	.399
	Within groups	415	535.248	1.290		
	Total	417	537.625			
Cybersecurity management	Between groups	2	2.029	1.014	.758	.469
	Within groups	415	555.308	1.338		
	Total	417	557.337			

Privacy management	Between groups	2	1.663	.832	.608	.545
	Within groups	415	567.632	1.368		
	Total	417	569.295			
Critical thinking	Between groups	2	1.490	.745	.656	.519
	Within groups	415	471.090	1.135		
	Total	417	472.581			
Digital footprint	Between groups	2	3.016	1.508	1.249	.288
	Within groups	415	501.145	1.208		
	Total	417	504.161			
Digital empathy	Between groups	2	1.310	.655	.482	.618
	Within groups	415	563.602	1.358		
	Total	417	564.911			
Overall digital citizenship	Between groups	2	1.683	.841	.822	.440
	Within groups	415	424.973	1.024		
	Total	417	426.656			

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

Table 5 illustrates that, overall, students from various subject groups exhibited different levels of digital citizenship development needs, although these differences did not reach statistical significance.

Similarly, when examining each of the eight aspects individually, students across different subject groups displayed varying levels of digital citizenship development needs, yet these distinctions were not statistically significant.

2.3 Comparison of digital citizenship development needs by duration of smartphone usage

Table 6 presents the comparison, using one-way ANOVA, of students' digital citizenship development needs based on different durations of smartphone usage: more than 2 hours per day, 1-2 hours per day, less than 1 hour per day, and hardly using it at all.

Table 6. Comparison of students' digital citizenship development needs by length of smartphone usage (N=418)

Aspects of need	Sources of variance	df	SS	MS	F	p
Digital citizen identity	Between groups	3	9.743	3.248	2.681*	.046
	Within groups	414	501.429	1.211		
	Total	417	511.172			
Screen time management	Between groups	3	8.937	2.979	3.033*	.029
	Within groups	414	406.662	.982		
	Total	417	415.600			

Cyberbullying management	Between groups	3	12.596	4.199	3.311*	.020
	Within groups	414	525.029	1.268		
	Total	417	537.625			
Cybersecurity management	Between groups	3	15.524	5.175	3.954**	.008
	Within groups	414	541.812	1.309		
	Total	417	557.337			
Privacy management	Between groups	3	10.105	3.368	2.494	.060
	Within groups	414	559.190	1.351		
	Total	417	569.295			
Critical thinking	Between groups	3	7.338	2.446	2.117	.090
	Within groups	414	465.242	1.124		
	Total	417	472.581			
Digital footprint	Between groups	3	9.743	3.248	2.719*	.044

	Within groups	414	494.418	1.194		
	Total	417	504.161			
Digital empathy	Between groups	3	10.182	3.394	2.533	.057
	Within groups	414	554.729	1.340		
	Total	417	564.911			
Overall digital citizenship	Between groups	3	9.349	3.116	3.092*	.027
	Within groups	414	417.306	1.008		
	Total	417	426.656			

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

Table 6 compares students' digital citizenship development needs based on various durations of smartphone usage. The results of the analysis of variance revealed that, overall, students with different durations of smartphone usage exhibited varying levels of need to develop digital citizenship. These differences were found to be statistically significant at the .05 level. Furthermore, the researcher conducted additional pairwise comparisons to delve deeper into these findings. The results of the pairwise analysis are presented in Table 7.

Moreover, the analysis of variance results indicated that students with different durations of smartphone usage displayed varying levels of need to develop digital citizenship, specifically in the 3 aspects of privacy management, critical thinking, and digital empathy. However, these differences were not statistically significant.

However, concerning the need to develop digital citizenship in the aspects of digital citizen identity, screen time management, cyberbullying management, and cybersecurity management, and digital footprint, students with different durations of smartphone usage exhibited varying levels of need, which were statistically significant at the .05 level. The researcher proceeded to conduct pairwise analyses to further investigate these differences. The results of the pairwise analysis are detailed in Tables 8 - 12.

1) Pairwise analysis results of the need to develop digital citizenship among catholic school students in Nakhon Sawan province as a whole, based on duration of smartphone usage.

Table 7. Pair analysis of students' digital citizenship development needs as a whole, by duration of smartphone usage (N=418)

Duration of usage per day		Hardly used	Less than 1 hour	More than 2 hours	1-2 hours
	Mean	3.1987	3.4769	3.8396	3.9485
Hardly used	3.1987	-	-.2782	-.6409*	-.7498*
Less than 1 hour	3.4769	-	-	-.3627	-.4716*
More than 2 hours	3.8396	-	-	-	-.1089
1-2 hours	3.9485	-	-	-	-

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

The pairwise analysis results revealed that students who used their smartphones for 1-2 hours per day demonstrated a higher need to develop digital citizenship compared to those who used their phones for less than 1 hour per day or hardly used them at all, with statistical significance at the .05 level. Similarly, students who used their smartphones for 1-2 hours per day exhibited

different needs compared to those who used them for more than 2 hours per day, also with statistical significance at the .05 level.

Furthermore, students who used their smartphones for more than 2 hours per day showed a significantly higher need to develop digital citizenship than those who hardly used their smartphones at all, with statistical significance at the .05 level.

However, for students with other durations of smartphone usage, differences in their needs for digital citizenship development were not statistically significant.

2) Pairwise analysis results of digital citizenship development needs in terms of digital citizen identity.

Table 8. Pair analysis of digital citizenship development needs among students, specifically regarding digital citizen identity, by duration of smartphone usage (N=418)

Duration of usage per day		Hardly used	Less than 1 hour	More than 2 hours	1-2 hours
	Mean	3.3636	3.5000	3.8905	4.0390
Hardly used	3.3636	-	-.1363	-.5268	-.6753
Less than 1 hour	3.5000	-	-	-.3905	-.5390*
More than 2 hours	3.8905	-	-	-	-.1485
1-2 hours	4.0390	-	-	-	-

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

The results of the pairwise analysis revealed that students who used their smartphones for 1-2 hours per day exhibited a higher need to develop digital citizenship in the aspect of digital citizen identity compared to students with smartphone usage of less than 1 hour per day, a difference found to be statistically significant at the .05 level. However, their need for development was higher compared to other groups, although this difference was not statistically significant.

On the other hand, students with other durations of smartphone usage showed a differing need to develop digital citizenship in the aspect of digital citizen identity, but these differences were not statistically significant.

3) Pairwise analysis results for the need to develop digital citizenship in screen time management.

Table 9. Pair analysis of students' needs for digital citizenship development in screen time management, by duration of smartphone usage (N=418)

Duration of usage per day		Hardly used	Less than 1 hour	More than 2 hours	1-2 hours
	Mean	3.2545	3.5000	3.6934	3.9177
Hardly used	3.2545	-	-.2454	-.4388	-.6632*
Less than 1 hour	3.5000	-	-	-.1933	-.4177
More than 2 hours	3.6934	-	-	-	-.2243*
1-2 hours	3.9177	-	-	-	-

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

The results of the pairwise analysis revealed that students who used their smartphones for 1-2 hours per day demonstrated a higher need to develop digital citizenship in screen time

management compared to students who hardly used their smartphones per day and those who used them for more than 2 hours per day. This difference was statistically significant at the .05 level. Moreover, students who used their smartphones for 1-2 hours per day exhibited a higher need for development compared to those who used them for less than 1 hour per day, although this difference was not statistically significant.

On the other hand, students with other durations of smartphone usage showed differing needs to develop digital citizenship in the aspect of screen time management, but these differences were not statistically significant.

4) Pairwise analysis results for the need to develop digital citizenship in cyberbullying management.

Table 10. Pair analysis of students' needs to develop digital citizenship in cyberbullying management, by duration of smartphone usage (N=418)

Duration of usage per day		Hardly used	Less than 1 hour	More than 2 hours	1-2 hours
	Mean	3.2361	3.3939	3.9077	3.9078
Hardly used	3.2361	-	-.1578	-.6716**	-.6717**
Less than 1 hour	3.3939	-	-	-.5137	-.5138
More than 2 hours	3.9077	-	-	-	-.0001
1-2 hours	3.9078	-	-	-	-

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

The results of the pairwise analysis revealed that students who used their smartphones for 1-2 hours per day and those who used them for more than 2 hours per day exhibited a higher need to develop digital citizenship in cyberbullying management compared to students who used their smartphones

for less than 1 hour per day. This difference was statistically significant at the .01 level.

However, students with other durations of smartphone usage showed varying needs to develop digital citizenship in cyberbullying management, but these differences were not statistically significant.

5) Pairwise analysis results for the need to develop digital citizenship in cybersecurity management.

Table 11. Pair analysis of students' needs to develop digital citizenship in cybersecurity management, by duration of smartphone usage (N=418)

Duration of usage per day		Hardly used	Less than 1 hour	More than 2 hours	1-2 hours
	Mean	2.9091	3.4722	3.9063	3.9645
Hardly used	2.9091	-	-.5631	-.9972**	-1.0554**
Less than 1 hour	3.4722	-	-	-.4341	-.4923
More than 2 hours	3.9063	-	-	-	-.0582
1-2 hours	3.9645	-	-	-	-

* p < .05 ** p < .01

The results of the pairwise analysis indicated that students who used their smartphones for 1-2 hours per day and those who used them for more than 2 hours per day displayed a greater need to develop digital citizenship in cybersecurity management compared to students who hardly used their smartphones per day. This difference was statistically significant at the .01 level.

Students with other durations of smartphone usage exhibited varying needs to develop digital citizenship in cybersecurity management, but these differences were not statistically significant.

6) Pairwise analysis results for the need to develop digital citizenship in digital footprint management.

Table 12. Pair analysis of students' needs to develop digital citizenship in the aspect of digital footprint, by duration of smartphone usage (N=418)

Duration of usage per day		Hardly used	Less than 1 hour	More than 2 hours	1-2 hours
	Mean	3.0909	3.5208	3.8099	3.9309
Hardly used	3.0909	-	-.4299	-.7190*	-.8399*
Less than 1 hour	3.5208	-	-	-.2890	-.4100
More than 2 hours	3.8099	-	-	-	-.1209
1-2 hours	3.9309	-	-	-	-

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

The results of the pairwise analysis revealed that students who used their smartphones for 1-2 hours per day and those who used them for more than 2 hours per day demonstrated a greater need to develop digital citizenship in terms of digital footprint compared to students who hardly used their smartphones per day. This difference was statistically significant at the .01 level. Students with other durations of smartphone usage showed varying needs to develop digital citizenship in terms of digital footprint. These differences, however, were not statistically significant.

4. Desirable activities for students' digital citizenship development

Based on the insights gleaned from the open-ended section of the questionnaire, Catholic school students in Nakhon Sawan province expressed a keen interest in engaging in the following activities to enhance their digital citizenship.

1) Participating in activities utilizing digital technology and new applications for self-study, aligning with the lifelong learning approach.

2) Engaging in activities leveraging digital technology and new applications for completing exercises, homework, or various tasks assigned by teachers.

3) Utilizing digital technology and innovative applications for communication with peers, showcasing personal work, or sharing narratives, serving both recreational purposes and facilitating integration into digital society.

Conclusion

The findings of the current research can be summarized as follows.

1. Study on the need for digital citizenship development among Catholic school students in Nakhon Sawan province.

1.1 Profile of Catholic school students in Nakhon Sawan province:

The ratio of daily smartphone usage among junior high school students were as follows: hardly used, less than 1 hour, 1-2 hours, and more than 2 hours, with proportions of 0.6, 1.0, 8.3, and 13.2 respectively. Similarly, for senior high school students, the ratio were as follows: hardly used, less than 1 hour, 1-2 hours, and more than 2 hours, with proportions of 0.5, 1.4, 5.8, and 11.0 respectively.

1.2 Students' need for digital citizenship development.

The overall need for digital citizenship development among students was high, and across all individual aspects. Notably, the highest need was observed in the aspect of digital citizen identity, while the lowest need was identified in the aspect of screen time management.

The essential needs for developing citizenship in the aspect of digital citizen identity among students included: 1) Techniques for establishing quality digital identity information, 2) strategies for effectively managing digital citizen identity information, respectively.

In terms of developing citizenship in the aspect of screen time management, students expressed the following needs: 1) Strategies for allocating time for recreational activities, 2) methods for allocating time for self-study, 3) approaches for managing time spent on various devices or applications effectively.

2. Comparison of digital citizenship development needs among Catholic school students in Nakhon Sawan province, by grade level, subject group, and duration of smartphone usage.

2.1 Comparison of digital citizenship development needs by grade level.

Upon comparing the level of needs to develop digital citizenship among students by grade level, it was determined that there were no discernible differences between junior high school students and senior high school students. This finding held true both overall and across each individual aspect examined.

2.2 Comparison of digital citizenship development needs by subject group.

When examining the level of needs for developing digital citizenship among students across subject groups, including the language group, science-mathematics group, and other subject groups, no significant differences were observed. This pattern persisted overall and across all aspects studied.

2.3 Comparison of digital citizenship development needs by duration of smartphone usage.

Analysis of students' digital citizenship development needs based on duration of smartphone usage – categorized as more than 2 hours per day, 1-2 hours per day, less than 1 hour per day, and hardly used at all – revealed varying levels of need across all groups, both overall and in 5 individual aspects. These differences were statistically significant at the .05 level. Further details are provided below.

2.3.1 Digital citizenship development needs by duration of smartphone usage

On the whole, it was observed that the group using smartphones for 1-2 hours per day exhibited higher development needs compared to those using them for less than 1 hour per day and those who hardly used them. This difference was statistically significant at the .05 level. Additionally, the group using smartphones for more than 2 hours per day demonstrated a higher need for development compared to those who hardly used them, also statistically significant at the .05 level.

2.3.2 In terms of digital citizen identity, students using smartphones for 1-2 hours per day showed higher development needs compared to those using them for less than 1 hour per day, with statistical significance at the .05 level.

2.3.3 Regarding screen time management, students using smartphones for 1-2 hours per day exhibited a greater need for development compared to those who hardly used them and those who used them for more than 2 hours per day, with statistical significance at the .05 level.

2.3.4 In the context of cyberbullying management, it was found that students using smartphones for 1-2 hours per day and those using them for more than 2 hours per day demonstrated a higher need level compared to those using them for less than 1 hour per day, with statistical significance at the .01 level.

2.3.5 Regarding the development of digital citizenship needs among students based on the duration of smartphone usage in terms of cybersecurity management, it was noted that both the group using smartphones for 1-2 hours per day and the group using them for more than 2 hours per day exhibited higher needs compared to the group that hardly used smartphones at all. This difference was statistically significant at the .01 level.

2.3.6 In the context of developing digital citizenship needs among students based on the duration of smartphone usage in terms of digital footprint, it was observed that both the group using smartphones for 1-2 hours per day and the group using them for more than 2 hours per day displayed higher needs

compared to the group that hardly used smartphones at all. This difference was statistically significant at the .01 level.

3. Activities desired by students for digital citizenship development.

Students expressed a desire to utilize digital technology and new applications for digital citizenship development through three primary categories of activities: self-study and research activities, exercises and homework, and recreational activities.

Discussion

1. The Study of the Level of Needs in Developing Digital Citizenship among Catholic School Students in Nakhon Sawan Province

The findings revealed that students in Catholic schools in Nakhon Sawan, at both lower and upper secondary levels, exhibited a relatively high level of daily smartphone usage. This finding is consistent with the research conducted by the **Brand Buffet Team (2014)**, which reported that *Mindshare Thailand*, a marketing and communication agency, conducted a qualitative study titled *"*Growing Up as Digital Natives*."* The study involved in-depth interviews and behavioral observations of internet users aged 9–24 years. Its objective was to explore online usage behaviors and understand the impact of the digital world on digital natives. The study revealed that a subgroup known as **"Evolving Digizen"**, aged 18–24, used the internet continuously via smartphones and tablets, with their daily routines heavily relying on the internet for information searching and digital engagement (Brand Buffet Team, 2014).

2. The Level of Needs in Developing Digital Citizenship Based on Grade Level, Subject Group, and Smartphone Usage Duration The research showed that students had a high overall need for developing digital citizenship, particularly in the area of **Digital Citizen Identity**, indicating awareness and responsibility toward their roles in the digital world. Additionally, students

demonstrated an understanding of **screen time management**, reflecting the ability to balance digital engagement with offline activities. This finding aligns with **Pijitra Petchparee (2020)**, who emphasized that digital citizens must possess screen time management skills, including the ability to manage digital device usage effectively and maintain a healthy balance between the online and real worlds. Similarly, the **Thai Media Fund (2018)** highlighted digital intelligence in time management as the ability to control oneself and allocate time efficiently when using digital and technological devices (Pijitra Petchparee, 2020).

3. Open-Ended Question Insights and Suggestions From analyzing the responses to the open-ended questions, the researcher found that students desired to use digital technology in three main areas to develop their digital citizenship: **self-directed learning**, **homework and exercise completion**, and **recreational activities**. This reflects the students' recognition of the importance of digital citizenship and their intention to improve their skills in line with the increasing integration of technology in modern life. These findings are supported by the study of **Thuanthong Chaowakeeratikul (2020)** on digital citizenship development strategies for students at the Faculty of Education, Kamphaeng Phet Rajabhat University. His study proposed development guidelines such as **media and information literacy**, **ICT skills**, and **self-directed learning**. He emphasized that most students had a strong understanding of technology and sufficient access to digital media and devices, while instructors incorporated technology into their teaching practices. This suggests that the development of digital citizenship among students is consistent with the enhancement of quality of life in the digital era and promotes the effective and appropriate use of digital technology.

Recommendations

Recommendations for applying the research results

The study revealed that there is a significant need to enhance students' digital citizenship overall, particularly in the area of digital citizen identity, which emerged as a priority for development. Consequently, advisors and subject teachers are encouraged to prioritize activities that emphasize role-playing tasks or simulate hypothetical scenarios. These exercises enable students to cultivate skills in establishing digital identity information safely across diverse contexts. Furthermore, consistent emphasis should be placed on nurturing techniques for effective management of digital citizen identity across various situations.

The study revealed that there were no discernible differences in the need for digital citizenship development between students of different class levels or among students of various subject groups. In light of these findings, school administrators and those responsible for student affairs are encouraged to consider digital citizenship development as an extracurricular activity. Such activities could be organized collaboratively, involving both junior and senior high school students, or could be arranged collectively for students across different subject groups.

The study revealed varying needs for digital citizenship development among students with different durations of smartphone usage, particularly in the areas of digital citizen identity, screen time management, cyberbullying management, cybersecurity management, and digital footprint. Notably, students who used smartphones for 1-2 hours per day demonstrated a higher need for development compared to other groups, indicating their readiness to evolve into responsible digital citizens. Therefore, those responsible for organizing extracurricular activities should consider arranging diverse initiatives to foster their official development. This may include training sessions, workshops, or promoting formal development through club formations, organizing work presentation activities, or hosting related skills competitions.

Recommendations for further research

The study identified three categories of activities where students expressed a desire to utilize digital technology and new applications for their digital citizenship development: self-study, exercises and homework, and recreation. However, it is important to note that the data utilized in this study were obtained from an open-ended questionnaire. Therefore, to validate the findings conclusively, further quantitative research should be conducted.

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