THE DKAP PROJECT

THE COUNTRY REPORT OF VIET NAM

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Executive Summary

Viet Nam is at the beginning of the Fourth Industrial Revolution. In order to grasp the opportunities that the revolution has brought about, and to successfully build the society of digital citizens, there must be the demand of enhancing the capacity and capability for students to meet international standards in terms of Information and Communications Technology (ICT) skills. Viet Nam was selected as one of the four countries (Viet Nam, Bangladesh, Fiji, and the Republic of Korea) to join UNESCO Bangkok's "Digital Kids Asia Pacific (DKAP)" project, a comparative cross-national study with the aim to seek the understanding and address children's ICT practices, attitudes, behaviors, and competency levels within an educational context. Thanks to the project, the Vietnamese research team completely conducted the survey in twenty (20) schools from five (5) provinces in Viet Nam. With the data on the digital citizenship competency levels of 1,061 10th grade students, the research team discovered the valuable findings to draw an initial big picture for Vietnamese policy makers, educators, and teachers about digital citizenship competencies of 15-year-old Vietnamese students.

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Acronyms

DKAP	Digital Kids Asia-Pacific
DOET	Department of Education and Training
ICT	Information and Communications Technology
ISVP	Institute of School Violence Prevention
IT	Information technology
MOET	Ministry of Education and Training
NGO	Non-Governmental Organization
NRT	National Research Team
OECD	Organisation for Economic Co-operation and Development
SDG	Sustainable Development Goal
SERU	Safe, Effective, and Responsible Use of ICT
STEM	Science Technology Engineering and Mathematics
SS&H	Social Sciences & Humanities
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
VIA	Viet Nam Internet Association
VNIES	Viet Nam Institute of Educational Sciences
VNPT	Viet Nam Posts and Telecommunications Group

Chapter 1: Introduction

1.1. Objectives

Since 2014, UNESCO Bangkok has implemented the "Fostering Digital Citizenship through Safe and Responsible Use of ICT" Project (hereafter referred to as "Project"). The overall goal of this project is to promote and sustain policy dialogue in the Asia-Pacific on the issues of the safe, effective and responsible use of ICT and to build the education sector's capacity to foster digital citizenship competencies among children.

As a part of the Project, the "Digital Kids Asia Pacific (DKAP)" project component seeks to conduct a comparative cross-national study to address the Asia-Pacific region's knowledge gap regarding children's ICT practices, attitudes, behaviors, and competency levels within an educational context. Specifically, the objectives of the DKAP project are to:

o Contribute to the evidence-based understanding of digital citizenship competencies of children in Asia-Pacific by obtaining and comparatively analyzing quantitative and qualitative data on children's actual attitudes, behaviors, competency levels, and use of ICT within an educational context.

o Gain evidence-based insights into children's safe, effective and responsible use of ICT in Asia-Pacific by developing and validating a framework that can measure children's attitudes and behaviors, competency levels, and use of ICT within an educational context.

The expected output of this project is a comparative cross-national study that:

o Sets out a reliable and comprehensive framework based on the four pilot Asia-Pacific countries' data of children's actual attitudes, behaviors, competency levels, and use of ICT within an educational context that will inform relevant education policies and practices.

o Assesses whether the framework's domains and competencies are valid, based on the data gathered from pilot countries, for measuring children's attitudes and behaviors, competency levels, and use of ICT within each of the researched educational contexts.

1.2. Scope

The final report includes analysis of the correlations between students' personal features gathered from contextual questionnaires such as gender, ICT familiarity, family background, school and community living standards,and their digital citizenship competencies. In addition, this project would seek to promote resulting evidence-based information that would provide the big picture of students' competencies in each participated country. Accordingly, the scope of what DKAP measures is expanded from the knowledge and skills acquired by students to the potential competencies required for future global citizens. This encompasses not only the identification of students' cognitive and non-cognitive competencies but also an in-depth exploration of how personal, social, cultural and educational factors are associated with student digital competencies.

1.3. Methodology

Working closely with UNESCO Bangkok, research teams in the pilot countries strived to create an accessible research tool that provides data/evidence that guides recommendations and policy implications for educators, policy makers and other stakeholders. The project obtained quantitative and qualitative data from four pilot countries in Asia-Pacific including Viet Nam, Bangladesh, Fiji, and the Republic of Korea.

- **Theoretical research (Literature Review) and Instrument Development**

  Survey questionnaires for target participants were designed and developed by members of the Institute of School Violence Prevention (ISVP) research team at Ewha Woman's university of the Republic of Korea. After initial development, the ISVP team conducted an expert review and field tests for ensuring item reliability and validity using small sized samples in the Republic of Korea.

- **Quantitative Study**

  Data was utilized to validate the survey questionnaire and to further revise and develop the research toolkit by synthesis of the key findings from the pilot countries (Viet Nam, Bangladesh, Fiji, and the Republic of Korea). The target age group is secondary aged children (15 years old) to ensure that the research findings can be used by Ministries of Education to inform

digital citizenship curriculum development and contribute to the knowledge-base relevant to Sustainable Development Goal (SDG) 4 indicators. The expected audience includes policymakers, various stakeholders from the ICT and education sectors, civil society, UNESCO Bangkok and other regional and local organizations in the Asia-Pacific region.

o **Completing the adaptive instrument aligned with the country's context**

The Viet Nam Institute of Educational Sciences (VNIES) was selected to conduct a survey in Viet Nam and a contract between UNESCO and VNIES was signed in May 2019. The following steps for adapting the survey instrument into Vietnamese context were carried out:

(1) **Establishing National Research Team (NRT):** VNIES assigned members for the project from VNIES and ICT Department of MOET in May 2018.
(2) The research team held a **series of meetings** for the translation of the survey questionnaire and planning the project implementation in May, June and July 2018.
(3) **Experts' review**: A consultation workshop was held in August 2018. There were a number of valuable comments from experts on making the best adaptive toolkit.
(4) **An online meeting** among NRT, ISVP and UNESCO Bangkok was organized in August 2018 to clarify the confusing terms, questions, and comments.
(5) **Piloting the toolkit**: The process of validating the survey questionnaire was finalized with the last step of piloting and analyzing the pilot result in2 schools in Hanoi.
(6) Surveying process was implemented in September 2018 by the project's administrators and school coordinators.

1.4. Research Framework

Bronfenbrenner (1994)'s bio-ecological model is applied in the study as the main research framework. The model explains a child's development within the context of the system of relationships that form his or her environment. An individual child is located within specific socio-demographic contexts, shaped in turn by a range of cultural and societal factors at the national and trans-national levels.
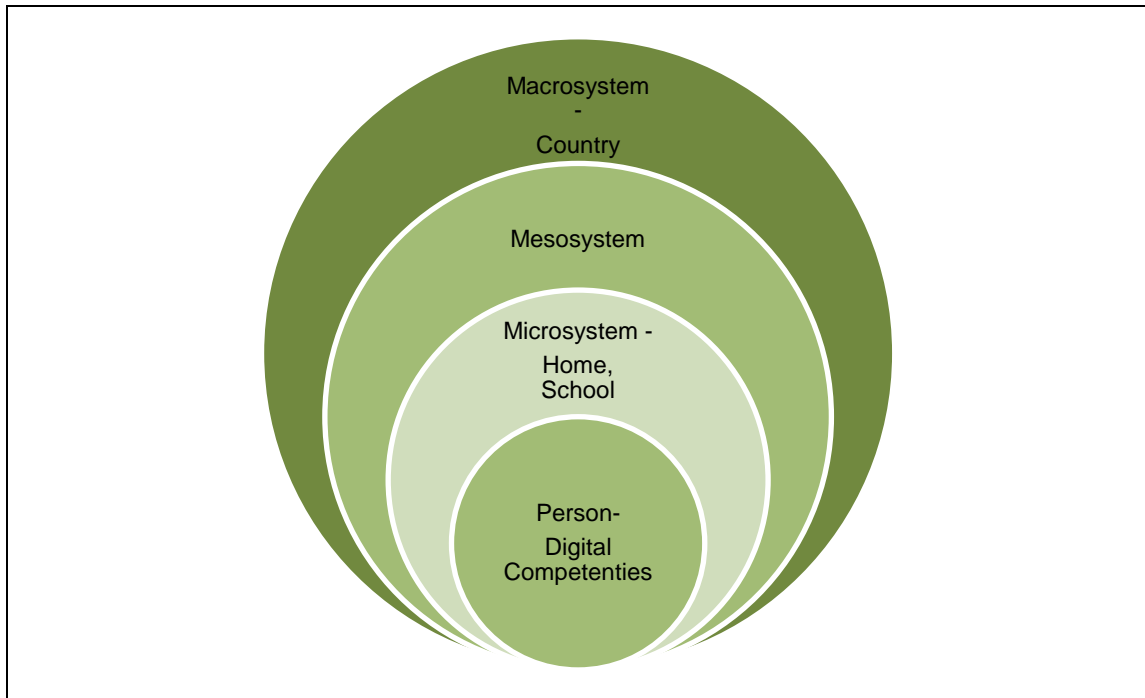
Specifically, the model defines complex layers of environment, each having an effect on a child's development. First, a *microsystem* refers to the relationships between the developing person and their direct and immediate environment. Second is a *mesosystem* involving inter-relationships between two or more microsystems in which the developing person actively participates (e.g. the child's inter-relationship between home and school). The third is an *ecosystem* comprising one or more settings that do not involve the developing person as an active participant, but which have a bearing on the subject. Fourth is a *macrosystem* in the form of structural consistencies across the subculture or culture along with relevant belief systems or ideologies that underpin this structure.

While theoretical analysis of children's development of digital competencies as well as the experience of new digital technologies remains under-developed, Bronfenbrenner's bio-ecological framework provides a useful basis for a child-centered approach to children's behaviors, knowledge, or attitudes relating to ICT, contextualized within the structuring social influences, represented as concentric circles of family, schools or community and culture.

The model (Figure 1) applied in this study acknowledges three sets of interdependencies:

- o At the level of the individual within the microsystem;
- o At the level of social mediations, principally related to home, school system, and peer cultures within mesosystem; and
- o At the national level where the country is the unit of analysis and where macrosystem phenomena of socio-economic stratification, systems of regulation and cultural values act as shaping factors.

Figure 1: Research Framework of the Study

1.5. Research Questions

The overall research question in this project is: "Is DKAP measuring the "digital citizenship competency" of Asia Pacific students?"

To answer this question, more specific sub-research questions are established as below:

(1) What are the criteria for measuring digital citizenship competency?
(2) Is the validity of DKAP appropriate?
(3) Is the reliability of DKAP appropriate?
(4) Are there any differences in 15-year-old students' digital citizenship competency associated with the individual and contextual characteristics such as gender, family background, schools, and local communities within a country?
(5) Are there any differences in 15-year-old students' digital citizenship competency across countries?

1.6. Sample Design and Procedure

(1) Vietnamese NRT sampled students at two schools in Ha Noi and made some adaptations in August 2018.
(2) Vietnamese NRT and school coordinator agreed on the availability of sampled data.
(3) Administrator should be kept in a secure room until the measurement is done.
(4) School coordinators and survey administrators prepared for the survey administration.
(5) Survey administrator conducted the survey with the support of School coordinators from 08 to 18 September 2018.
(6) Vietnamese NRT cleaned and coded data from 18 September to 01 October 2018.

1.7. Sample Locations in Map.

In total, the survey covered 1,061upper secondary school students from 20 schools located in 5 provinces and cities in Viet Nam: Lao Cai, Ha Noi, Da Nang, Lam Dong, and Can Tho. The geographical locations of these provinces and cities can be seen in Figure 2.

Figure 2: The geographical locations of the five provinces and cities that participated in the survey: Lao Cai, Ha Noi, Da Nang, Lam Dong, and Can Tho.

1.8. Information about 5 surveyed provinces

Province no. 1: Lao Cai

Figure 3: The geographical location of Lao Cai

Overall information of Lao Cai
- Lao Cai is a border province located in northern midland and mountainous of Viet Nam, bordering with the northwest and the northeast. The north of Lao Cai is bordered by China, adjacent to the west of Lai Chau Province, with Ha Giang Province in the east, and Yen Bai Province in the south. Lao Cai City is 330 km from Hanoi. The population of Lao Cai is nearly 700,000.
- Lao Cai is a province with many ethnic groups living together.
- Lao Cai Province includes a municipality and eight districts. There are four areas selected forthe survey:
  - Lao Cai City: 12 wards and five communes.
  - Bac Ha District: 1 town and 20 communes.
  - Bao Thang District: 3 towns and 12 communes.
  - Si Ma Cai District: 13 communes.

Information about the four surveyed schools:
- Representatives of urban areas: Lao Cai City No 1. High School, Bao Thang High School
- Representatives of rural areas: Si Ma Cai High School; Bac Ha High School

Province no. 2: Ha Noi

Figure 4: The geographical location of Ha Noi

Overall information of Hanoi:
- Ha Noi is the capital of Viet Nam and the country's second largest city by population. The population in 2015 was estimated at 7.7 million people. The city lies on the right bank of the Red River. Ha Noi is 1,760 km (1,090 mi) north of Ho Chi Minh City and 120 km (75 mi) west of Hai Phong.
- Ha Noi is the country's political, cultural, scientific and technological center, and plays an important role in the economy and international trade.

Information about the four surveyed schools:
- Representatives of urban areas: Nguyen Trai High School, Ba Dinh District; Thang Long High School, Hai Ba Trung District.
- Representatives of rural areas: Hop Thanh High School, My Duc District; Dai Cuong High School, Ung Hoa District.

Province no. 3: Da Nang

Figure 5: The geographical location of Da Nang

Overall information of Da Nang:
- Da Nang is a municipality, located in the south central coast of Viet Nam, and a center of economics, finance, politics, culture, tourism, society, education, training, science and technology, intensive medical of the south central coast - central highlands and the whole country.
- By 2015, the population of Da Nang reached 1,028,838; of which 897,993 lived in urban areas and 130,845 in rural areas.
- Da Nang defines information technology as a key business, a breakthrough in the future economic development strategy, builda smart city and gain tremendous development.

Information about the four surveyed schools:
- Representatives of urban areas: Tran Phu High School, Hai Chau District; Thai Phien High School, Thanh Khe District
- Representatives of rural areas: Ong Ich Khiem High School, Hoa Vang District; Ngu Hanh Son High School, Ngu Hanh Son District

Province no. 4: Lam Dong

Figure 6: The geographical location of Lam Dong

Overall information of Lam Dong:
- Lam Dong is a province located in the central highlands (Tây Nguyên) region of Viet Nam. Its capital is Da Lat. Lam Dong borders Khanh Hoa Province and Ninh Thuan Province to the east. It is the only central highlands province, which does not share its western border with Cambodia.
- The economy is based largely on agriculture, with tea, coffee and vegetables being the main agricultural products. Lam Dong Province is also famous for its main city, Da Lat (the province welcomed 6.5 million tourist arrivals in 2018).
- The population is mainly composed of Kinh (Viet) people, Co Ho, Ma, Hoa, Nung, Tay, and Chu Ru ethnic minorities.

Information about the four surveyed schools:
- Representatives of urban areas: Tran Phu High School, Da Lat City; Duc Trong High School, Duc Trong District.
- Representatives of rural areas: Don Duong High School, Don Duong District; Langbiang High School, Langbiang District.

Province no. 5: Can Tho

Figure 7: The geographical location of Can Tho

Overall information of Can Tho:
- Can Tho is a large city in Viet Nam, the most modern and developed city of the Mekong Delta. It is the fourth largest city in Viet Nam in population size, the fifth largest in terms of the role and position as well as economic size. Can Tho is also a class I urban, a municipality.
- Can Tho is known as Tay Do, as the economic, cultural, social, medical and educational capital of the Mekong Delta.
- Can Tho province is divided into nine administrative units including five urban districts and four rural districts. There are 28 ethnic groups living in Can Tho area, of which the Kinh (Viet) is the majority, followed by the Khmer and Hoa ethnic groups. As of October 2017, the total population of Can Tho is nearly 1,450,000, with a population density of 1,008 people per square meter. Of this figure, the population in urban areas is nearly 1,050,000, accounting for 70% of the city's total population, 400,000 live in rural areas, accounting for 30% of the population.

Information about the four surveyed schools:
- Representatives of rural areas: Tran Dai Nghia High School, Cai Rang District, and Thuan Hung High School, Thot Not District.
- Representatives of urban areas: Luu Huu Phuoc High School, O Mon district, and Nguyen Viet Hong High School, Ninh Kieu District.

1.9. Data cleaning and coding process

Vietnamese NRT team strictly followed the instruction of documentation, data cleaning and coding process with following steps:

(1) NRT entered the data into excel files after collecting the survey results from 5 provinces following the codebook provided by UNESCO Bangkok.
(2) NRT used files of csv format for the cleaning process of the data.
(3) NRT sent the data to UNESCO Bangkok and ISVP in early October 2018.

Chapter 2: A Literature Review

2.1. ICT Usage Pattern in Viet Nam

The development of technology has significantly changed the way we live. Many areas that used to belong solely to human skills and experiences have faced the unexpected rise of the machine and artificial intelligence. Moreover, the cheap and easily accessible computational power and the fast and ever-present Internet connection have changed the familiar entrepreneurial ventures into a new mode: computational entrepreneurship (Vuong, 2019). However, significant changes in daily life always come along with new problems. Gawande (2018) told a story of how computers and new applications have cost doctors more time just to fill up forms.

Similarly, Newport (2019) discussed the burden of e-mail to the ability to think clearly for professors. One of the worst aspects of technological advancement is the mental struggle that young people are facing while surfing social media (Moreno, 2015). Hence, the current development requires citizens to understand and use technology responsibly. In a developing context like Viet Nam, the impacts of technology and the Internet are even more crucial to the development of the economy.

With the attention of the Government and the education sector, the infrastructure and ICT equipment of pre-school, primary and secondary education institutions have gradually been strengthened. Most of the schools are invested and equipped with computers, projectors for teaching and learning. According to local educational departments' reports, the total number of computers in general schools is 487,889 units, of which:

- There are approximately 175,381 units in primary education, equivalent to 7,015 computer labs (25 units each). By 2020, the number of primary schools will be 15,362. That means, on average, every 2.1 primary schools has one computer lab. To meet at least one computer lab per school, there are about 8,347 computer labs (equivalent to 208,669 units) lacking.
- There are 198,877 units in lower secondary schools, or about 7,955 computer labs with the current scale of about 10.697 schools. On average, every 1.3 junior secondary schools have 01 computer lab. To meet at least one computer lab per school, about 3,031 computer labs (equivalent to 75,773 units) are lacking.

- There are about 113,631 units in upper secondary schools, equivalent to about 4,545 computer labs. With the current size of about 2,349 schools, the average rate of computer lab per school is 1.9. To meet the standards of at least two computer labs per school, about 385 computer labs (equivalent to 9,619 units) are needed.
- Based on reports from Provincial Departments of Education and Training (DOETs), 100% of schools from pre-school to upper secondary education already have Internet connections, in which 85% of schools have been connected to fiber Internet.

Many educational institutions have developed e-learning materials. Provincial DOETs organize competitions annually to build a database of e-learning resources with the objective to gradually enrich the quality and diversity of the resources. ICT is a constant tool to help teachers reduce their efforts and time, but students have more time to choose better access to a variety of knowledge and various learning methods.

At present, the rate of teachers in pre-school, primary and secondary education who can apply ICT to renovate teaching methods in the class is about 76%. The rate of teachers who have the ability to design the e-Learning lecture is about 28%. The training programmes by MOET and DOET to enhance the ability to use ICT for an educational managers and teachers have been shifted from face-to-face method to online training model so that the teacher training programmes' results have been satisfactory, even in remote and difficult areas. Training programmes are modularized so that teachers and managers can flexibly organize them.

According to a report from SECDEV foundation about teaching Internet and online safety in schools (SECDEV, 2017), most students in Viet Nam start to use Internet very early, mainly from the age of 9-12 years old (42%) as the time when students begin to learn ICT subject in the school, and from between 12 and 15 years old (28%), very few students started accessing the Internet from age 15 (3%). In large cities, students tend to start using the Internet sooner than students from other provinces. In Ha Noi, Ho Chi Minh City and Hai Phong, the proportion of the students who started using the Internet from the age of 5-9 accounted for the majority (37%). Meanwhile, most students from other provinces (Thai Nguyen, Hoa Binh, Lam Dong, Soc Trang, Kien Giang) used the Internet from 9-12 years old (45%).The majority of students use personal devices to access the Internet, such as personal computers (34%) and personal telephones (25%). Only 14% of

students use their relatives' devices. This result is relatively consistent with the teacher's assessment that about 30% of students use a computer at home. In large cities, students tend to use personal telephones more than other devices. Specifically, most students from Ha Noi, Ho Chi Minh City and Hai Phong city use their personal phone to connect to the Internet (38%). Regarding teaching or introducing about the Internet and online safety at schools, most teachers (66%) responded that the implementation of content on Internet safety for students at school is of nature. Deep discussions and classroom activities about Internet safety were conducted,but only 34% of teachers implemented the lessons in the form of classroom activities to ensure that students understand and practice their knowledge, and skills.

In terms of teaching and learning ICT skills in the community, Informatics programmes for children after school at school or at training centers set up by both public and private educational organizations and social enterprises is developing strongly in major cities across the country due to the increasing demand from parents who want their children to have access to new technologies. This trend is like a kind of educational service that appeared very early with the school informatics programme. Along with the development of technology, the computer teaching programme for children at training centers is constantly changing, meeting the actual needs of learners. Compared with the school curriculum at the school, the teaching programmes in training centers are more advantageous when continuously updating new content to help students immediately approach the development of technology. Thanks to this strong development, children in many big cities in Viet Nam have the opportunity to access quality informatics teaching programmes to keep pace with the development of technology.

However, training centers' programmes are often based on the level of knowledge and competence of training centers so the contents tend to focus on the strengths of the center, lack of links with other contents as a whole programme for full capacity development. Besides, the teaching contents provided by training centers are considered as often being underestimated and monitored by professional authorities.

2.2. Review on scientific literature

According to an exclusive database on Vietnamese Social Sciences & Humanities (SS&H) scientist (Vuong et al., 2018), the number of research articles about information technology from SS&H is limited. Nine research articles have been found using simple keywords such as 'digital' or 'information technology.' Most of the research studies evaluate the impact of technological advancement to a specific area such as universal service, marketing or health care (see Table 1), while the connection between technology and human is unexplored.

Table 1: Vietnamese Social Sciences & Humanities research studies about Information Technology

Topic	Number of research articles	Citation
Library, Information Storage	1	(Phan, 2013)
Culture and society	1	(Sharbaugh & Nguyen, 2014)
Universal service	1	(Do, Falch, & Williams, 2018)
Marketing and advertisement	3	(Parker, Nguyen, & Brenna, 2017; Crawford, Brennan, Nguyen, & Parker, 2017; de Ruyter, Keeling, & Ngo, 2018)
Health Care	3	(Vuong, 2016; Nguyen et al., 2018; Vuong et al., 2019)

In the field of education, the most notable research study about information technology estimated the possibility of turning virtual reality into a study method (Shen, Ho, Pham, & Kuo, 2018). Besides that, most of the research studies investigate a variety of skills, information technology skills included, that are crucial for university students to find jobs. A study surveyed 257 recent graduates who are working and 525 last-year students about the importance of 35 different skills. It showed that students are good with a computer when they leave school, and they consider computer skills as one of the most important skills for working (Tran, 2018). However, there are still problems such as the lack of skills when

students graduate (Tran, 2018), or the university needs more skill development programme for students (Tran, 2017a, 2017b).

Thus, ICT competence is crucial at both society and individual levels. The young generation of Viet Nam must embrace the opportunity as a "digital citizen." The term refers to a person who can search, access and use information efficiently, and connects and interacts with others on the Internet safely (UNESCO, 2016).

Viet Nam lacks substantial research studies that focus on human and technology. Among the available research results, Vietnamese university students do not have access to many skill development programmes, which eventually result in the lack of skills when they graduate (Tran, 2017a, 2017b, 2018). The DKAP project and its objectives to contribute a foundational data on the attitude, behavior and ICT knowledge of Vietnamese children will help Viet Nam produce sound and evidence-based educational policies and plans.

2.3. Review of Policy and Regulations

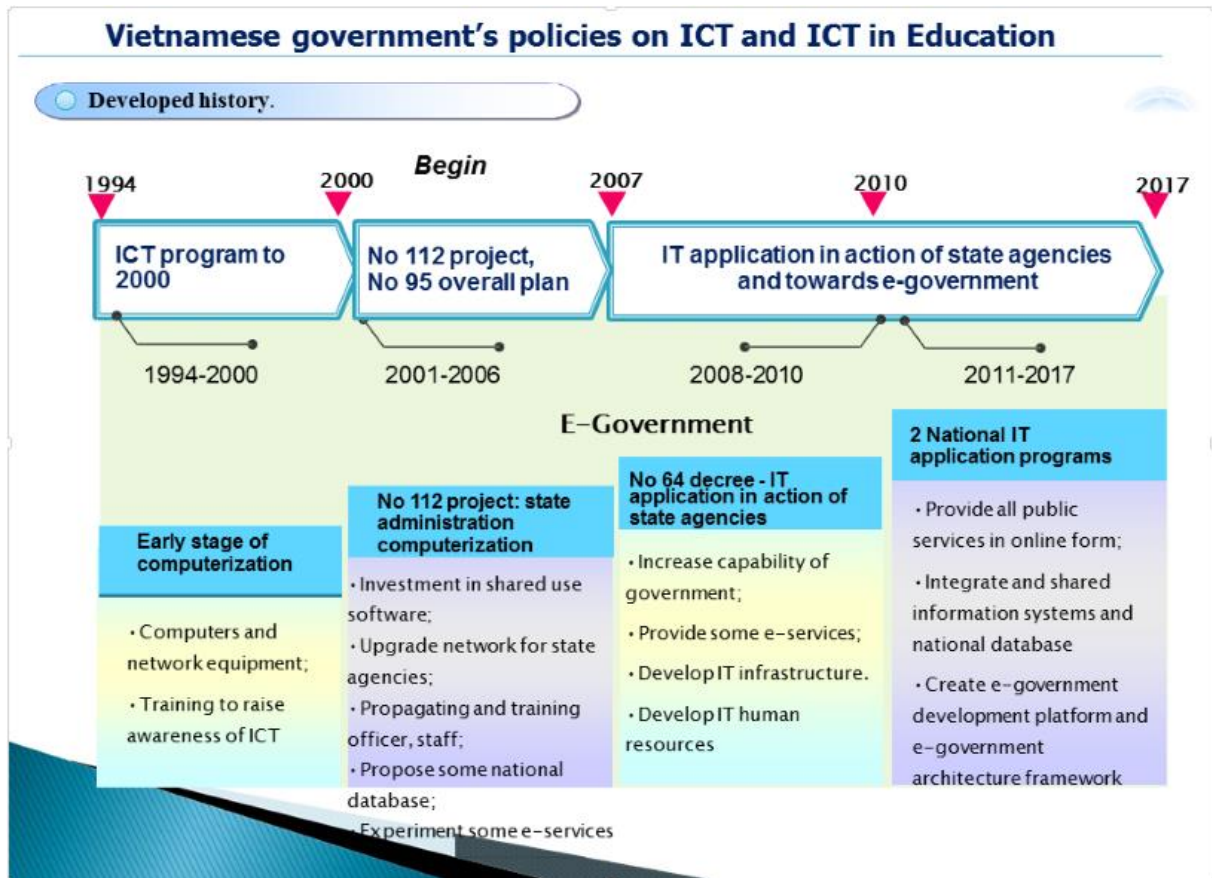**Strategies, Action Plans and National Programmes for ICT in Viet Nam**

- Legal documents for e-Government development in Viet Nam: Law on E-transaction (2005), Law on Information Technology (2006), Law on Cyber Information Security (2015), Law on Access to Information (2016).
- The focus on the integration of ICT in education is on the enhancement of teaching, training and applying IT in education with Directive 55 of the MOET (MOET, 2008b).
- National strategy on "Transforming Viet Nam into an advanced ICT country" (Prime Minister's Decision No. 1755/QD-TTg dated Sep 22sd, 2010).
- A national programme on IT application in the operations of state agencies during period 2011-2015 (Prime Minister's Decision No.1605/QD-TTg dated Aug 27th, 2010).
- A national programme on IT application in the operations of state agencies during period 2016-2020 (Prime Minister's Decision No.1819/QD-TTg dated Oct 26th, 2015).
- Action Plan of the Government promoting application and development of information technology to meet the requirements of sustainable

development and international integration (Resolution No. 26 / NQ-CP dated 15/04/2015 of the government).

- This year, In Instruction No.16/CT-TTG, Viet Nam Prime Minister asked all heads of central and local government offices nationwide, from now until 2020, to focus efforts on preparing the human resources and developing the infrastructure needed to implement the fourth Industrial Revolution.

- The focus on the integration of ICT in education is on the enhancement of teaching, training and applying IT in education with Directive 55 of the MOET (MOET, 2008b).

Figure 8: Vietnamese government's policies on ICT and ICT in Education

Promoting digital literacy is one of the skills mentioned in the educational innovation programme to help young people prepare for the labor market in the digital age. Over the past time, there have been many projects implemented actively by social organizations and achieved certain successes.

Information security is one of the top concerns of the government in the IT development in Viet Nam. Many policies and guidelines of the state have been issued to manage and orient the development of this field.

In recent years, there have been many initiatives and activities related to the promotion and enhancement of digital skills as well as information security. Among them, many initiatives are organized according to the policy of the government, many activities come from the community, from the needs of enterprises, from the education environment, etc. Synthesis, assessment initiatives will help with visualizing parts of the overall picture of the on-going activities in developing the capacity and skills for citizens as well as the formation and development of society's common perceptions on the issue of digital information security. It would help lawmakers develop appropriate policies that promote the development of teaching and learning necessary skills about information technology and empower children in the digital age.

In December 2018, the Ministry of Education and Training approved the new general education curriculum in which there are many changes compared to the current programme in terms of structure and content distribution.

Under the new general education programme, from grade 3 at the primary level, the subject of ICT will be compulsory. Apart from being a separate subject, ICT subject is expected to help students shape and develop the application of ICT as a tool to open the ability to receive knowledge and creativity in the context of information explosion, meet the requirements of the digital age and globalization and help to transform the training process into a process of self-training.

There are three main target groups to clarify and differentiate contents in the new ICT subject corresponding according to future career orientations: digital literacy, ICT, and computer science. Contents are divided by grade level, avoiding duplication of content as some current books, which are in circulation. For primary school, students will be taught basic computer use such as:

- Recognizing and knowing the usage function of universal information technology devices;
- Having basic knowledge about text editing;
- Being capable of typing with ten fingers;
- Searching, sorting, organizing, and presenting information;
- Using the Internet to find information for learning and playing;

- Distinguishing information which should and should not be viewed; and
- Self-perception on the digital environment and having empathy for others in the digital environment.

Also, the goal of ICT subject in primary school is to help students, to first understand and learn the problem-solving techniques by implementing steps to set up simple algorithms.

At the lower secondary level, students will learn the role of computer and Computer Science in the development of modern society. They should have the ability to select and use common software and equipment; be able to conduct their study in accordance with the regulations and cultural ethics when participating in digital society. For students with interest in Computer Science, they will have the opportunity to use problem-solving skills when solving problems with the help of computers; the ability to transfer algorithms to computers is accomplished through some intuitive programming tools or simple programming languages.

For upper secondary students, they will know how to use the software and services available to perform common tasks; know the software to exploit information to support learning; know and comply with the basic law provisions in information mining; comply with regulations on health protection in exploitation and use of ICT equipment. The upper secondary school students also have to know to distinguish, recognize the basic groups in the field of ICT. For students who love this subject, they will learn problem-solving processes in the computer through modeling the problem in a programming language and transfer the solution to the computer. They will learn about repairing, maintaining a computer system and learn how to create simple products for learning and real life.

In some places, some teaching and content testing activities have taken place. However, according to the schedule set by the Ministry of Education and Training, the new general education programme will begin in 2020. Only after the ICT subject of the new general education curriculum is fully implemented to teach in schools, it would be fully evaluatedto assess the effectiveness of the new curriculum adequately. Moreover, according to the current guiding documents of the Ministry of Education and Training, local educational departments are now able to take the initiative in selecting the content and methods of teaching to replace for the old Informatics subject that has not been updated for many years. This innovation in teaching Informative subjects should be implemented right from each school.

Chapter 3: Findings from the Survey

Chapter Highlights

- Regardless of country, the domain of Digital Creativity and Innovation shows the lowest mean-level among the five domains.
- Among the countries studied, Korea shows the highestmean-level of competency in Digital Literacy, Digital Safety and Resilience, Digital Emotional Intelligence, and Digital Creativity and Innovation domains; yet has the lowest mean-level in Digital Participation and Agency domain.
- The range of mean-level of competency is relatively large for Digital Literacy (from 3.01 to 3.31) and Digital Emotional Intelligence (from 2.96 to 3.22) and relatively small for Digital Participation and Agency (from 2.98 to 3.04) domain.
- Among five domains of Vietnamese digital citizenship competencies, the domain of Digital Creativity and Innovation shows the lowest mean level of 2.74, the second lowest is Digital Emotional Intelligence domain with the mean score of 2.96, the highest mean score is 3.35 of Digital Safety and Resilience domain.
- Among all components of each domain, Digital Safety and Resilience and Personal Data, Privacy and Reputation have highest mean-level of 3.68 and 3.33 respectively. In contrast, empathy and creative literacy have the lowest mean-level of 2.66 and 2.28 respectively.

Figure 9: Means of Each Competency-domain

This chapter presents the key findings from the survey analysis. It starts with the key findings about access to and use of the Internet and digital devices, following the key findings according to the five domains of Digital Literacy, Digital Safety and Resilience, Digital Participation and Agency, Digital Emotional Intelligence, and Digital Creativity and Innovation. More details about the five domains and competencies in the UNESCO Digital Kids Asia-Pacific Framework for Education are described in Annex 1.

Total 1,061 Vietnamese 10th grade students (i.e. the first grade students in upper secondary education) participated in the survey. 53% of the students were female. Most respondents were born in 2003 (99%).

Table 2: Descriptive Analysis on Each Domain of Vietnamese students

Domain	Mean	S.D
Digital Literacy	3.10	.32
Digital Safety and Resilience	3.35	.33
Digital Participation and Agency	3.00	.32
Digital Emotional Intelligence	2.96	.33
Digital Creativity and Innovation	2.74	.37

The average Vietnamese students score the highest competence score in Digital Safety and Resilience (M=3.35, S.D=.33) and the lowest in Digital Creativity and Innovation (M=2.74, S.D=.37) (see Table 2).

Table 3: Descriptive Analysis on Each Competency

Domain	Competency	Mean	S.D
Digital Literacy	ICT Literacy	3.19	.33
	Information Literacy	2.93	.41
Digital Safety and Resilience	Understanding Child Rights	3.68	.44
	Personal Data, Privacy and Reputation	3.33	.43
	Digital Resilience	3.16	.49

Digital Participation and Agency	Interacting, Sharing and collaborating	3.15	.38
	Civic Engagement	2.60	.49
	Netiquette	3.26	.42
Digital Emotional Intelligence	Self-Awareness:	2.96	.45
	Self-Regulation	3.12	.46
	Self-Motivation	3.19	.42
	Interpersonal Skills	2.86	.48
	Empathy	2.66	.57
Digital Creativity and Innovation	Creative Literacy	2.68	.45
	Expression	2.80	.49

3.1. Access and Use of ICT, Usage of Digital Devices and the Internet

3.1.1. Access to ICT

Regardingthe accessibility to ICT, the questionnaire inquired as follows: *"Do you have access to any of these things at your home (at school, at local community)? Please check all that apply."* Multiple answers were accepted. The results are displayed in percentage in Table 4.

Table 4: Distribution of Internet access by locations (%)

	Desktop computer	Laptop	Smartphone	Tablet PC	Printer	None of the above
At home	41.2	47.7	92.1	31.4	11.7	0.8
At school	64.8	5.1	38.0	3.0	5.2	14.6
At local community	27.2	12.8	46.2	7.5	5.6	32.7

At home, regardless of country, smartphones are the most accessible to students, out of all ICT devices (72.2 to 95.7%). For Viet Nam, the percentage is 92.1%.

More than 40% of students have access to a desktop computer (41.2%) or a laptop (47.7%), and only less than 1% of students reported having no access to any of these digital devices at home.

Concerning the accessibility of digital devices at school, in Viet Nam, a desktop computer is the most accessible digital device (64.8%). The accessibility of desktop computers in Vietnamese schools ranked the second just after Korea. In Viet Nam, over 38% of students have access to smartphones at school. 14.6% of Vietnamese students answered that they can access none of these digital devices while at school.

Regarding the accessibility of digital devices in the local community, smartphones turned out to be the modal category at 46.2%, followed by desktop computers (27.2%), and laptops (12.8%). It is worth noting that nearly one third of the Vietnamese samples reported not having access to any of the ICT devices at their local community. Regarding the accessibility of wired/wireless Internet, the question in the survey was: *"Which of the following can you access at home (school or local community)? Please check all that apply."* and accepted multiple answers. The results are reported as follows (see Table 5). In general, in Viet Nam, wireless Internet is used more widely than wired Internet regardless of access location. 24.3% of students do not have access to any Internet connection at school, and 18.7% have no access to the Internet at the local community and local district. Compared to other countries, Viet Nam ranked rather high – only after Korea – in providing Internet access to students.

Table 5: Types of Access to Internet by locations (%)

	Wired Internet	Wireless Internet	None
At home	38.6	80.6	2.9
At school	31.6	55.0	24.3
In local community or local district	24.3	66.3	18.7

To clarify this quite outstanding result, we need to look at the numbers and the policies of Vietnamese government for Internet development for the last 20 years. According to statistics (MOET, 2017), Viet Nam has more than 50 million Internet users, accounting for 54% of the population, higher than the global average at 47%. With that number, Viet Nam is the country with the highest percentage of the

population using the internet in Asia. That is a dramatically increasing number comparing to more than 31 million users in 2012;17 million 10 years ago, and 205,000 people in the early days of the Internet in Viet Nam in early 2000's (VIA, 2017). The Ministry of Information and Communications is a key player for this development. And there is an effective collaboration between state telecommunication companies (such as Viet Nam Posts and Telecommunications Group (VNPT) and Viettel) and Ministry of Education and Training to bring Internet to school with subsidized price. Moreover, the Internet price at home is also reasonable for average Vietnamese households.

3.1.2. Use of ICT

The focus of the following section is to describe students' ICT-related experience.

Viet Nam shows a relatively higher level of digital device use compared to Bangladesh and Fiji. According to the answers to the question "*How long have you been using digital devices (e.g., desktop/laptop, smartphones, tablet PC)?*", 44.4% have been using digital devices for more than five years, 31.6% for 3-4 years, 17% for 1-2 years, and 5.7 % for less than one year (see Table 6). In other words, nearly half the students in the Vietnamese sample has had access to ICT devices for a long time. Given the assumption that there is a certain cost associated with accessing ICT, it could be inferred from the above results on student experience with ICT that the economic status of many households in Viet Nam has been improving and the digital devices' cost has been reduced in recent years. The number of Vietnamese having a mobile phone is around 28.5 million, approximately one third of the Viet Nam's population (Hanoi's Party Cells).

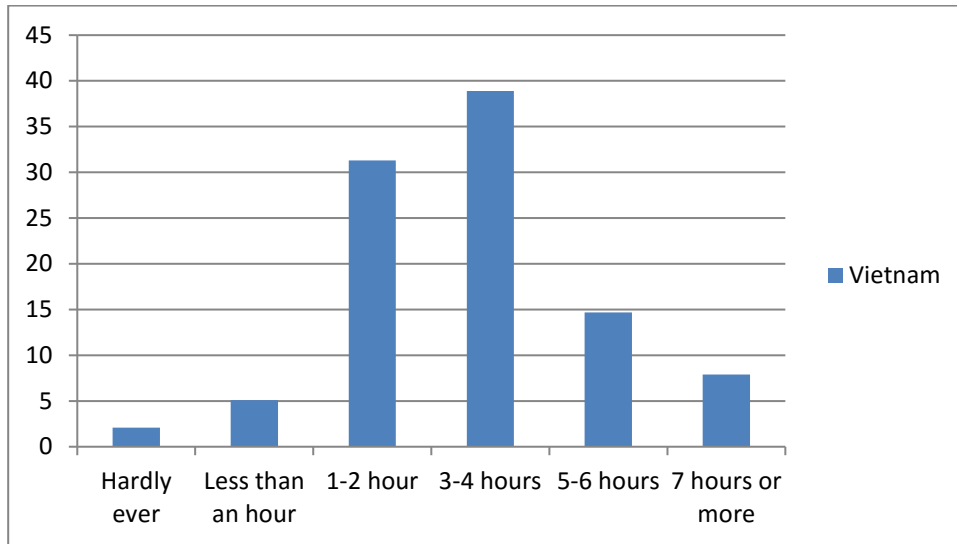**Table 6: Experiences on using digital devices (%)**

	Never	Less than one year	1-2 years	3-4 years	More than 5 years
Viet Nam	1.2	5.7	17.0	31.6	44.4

In the same manner, the amount of time spent using the Internet using digital devices per day varied across countries. By asking student a question *"How often do you go online or use the Internet using digital devices (e.g., smart phone, desktop/laptop, tablet PC) per day? "*Vietnamese students use the internet more often than those in Bangladesh and Fiji: 38.9% of Vietnamese students use the Internet for 3-4 hours a day and 14.7% for 5-6 hours per day (see Figure 11). This

is telling of how prevalent the internet has become in the life of Vietnamese students. As a suggestion for future research, it would be interesting to study what students actually do while surfing the Internet.

Figure 10: Students' time spent online or using digital device per day

Regardingthe source of education ofstudents on computer usage, it shows similar patterns: the majority of students learned how to use a computer by themselves. In particular, nearly 47% of Vietnamese students reported having learned how to use a computer by themselves, whileonly 30% of students ever learned in the classroom from their teachers (see Table 7). This implies that attention should be paid to teachers' guidance on students' learning.

Table 7: Sources where students learned to use internet and computers (%)

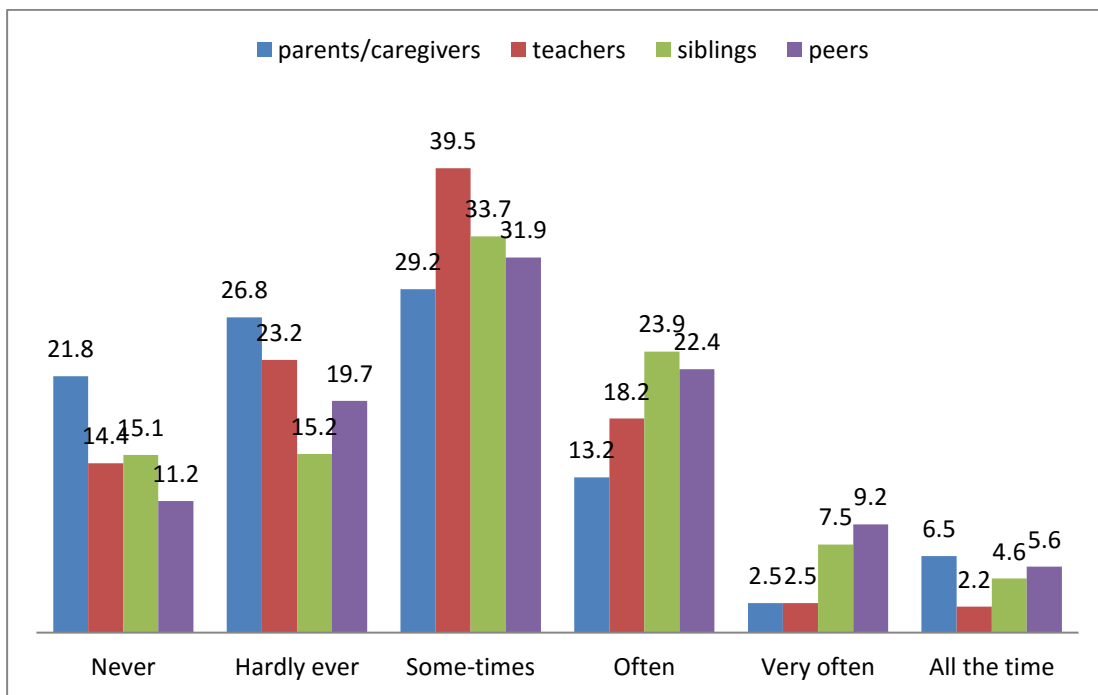|	My teachers	My friends	My family	I learned myself	My local community	Others
Who taught you most about how to use Internet?"	9.0	12.2	9.3	67.9	0.9	0.8
"Who taught you most about how to use computers?"	29.5	10.5	12.3	46.9	0.2	0.6

Concerning the source of education of students on Internet usage, a similar pattern is observed: the majority of Vietnamese students answered they learned how to use the Internet by themselves (approximately 68%). Only 9.0% of students reported having learned how to use the Internet from their teachers, the lowest percent compared to all other sources of education. This implies that teachers do not have a big role in the education of Internet usage of the students.

Information on the role of influential others in education on Internet safety is as follows. By the question *"When you use the Internet, how often do the following person/people suggest ways to use the Internet safely"*, we received the result:

Approximately, 22% of Vietnamese students never received parents' guidance, 15% never received the teachers' guidance, another 15% never received siblings' guidance, and 11% never received peers' guidance to use Internet safely and to learn the Internet safely (see Figure 13). It raises big concerns on the issue of Internet safety and prompts for more thorough dissemination of information on Internet safety to all concerned actors (namely parents, teachers, and students) through workshops and training programmes.

Figure 11: Distributions of suggesting students to use Internet safely

Information on the role of influential others in encouraging students to explore or learn things on the Internet is as follows. By asking the question *"When you use the Internet, how often do the following person/people encourage you to explore or learn things on the Internet?"* We received the result of the following table. Students have not received much encouragement from parents, teachers, siblings and peers to explore and learn things on the Internet. Nearly 51% of students never or hardly ever receive the encouragement from parents (see Table 8). Viet Nam scores the lowest among all countries in terms of students being encouraged to explore and learn through the Internet all the time.

Table 8: Encouragement to explore and learn things on the Internet (%)

	Never	Hardly ever	Some-times	Often	Very often	All the time
parents/care givers	21.4	29.9	30.8	11.2	2.9	3.8
Teachers	6.7	18.0	32.9	30.2	6.5	5.7
Siblings	11.1	18.7	33.1	22.9	9.5	4.6
Peers	7.6	15.5	30.5	27.6	12.1	6.6

Concerning education on basic coding skills, with the question *"Have you ever learned basic coding skills at school?",* Vietnamese shows the highest rate of educational experience on basic coding skills at school (41.8%). Regarding experience on website or application development, by asking students the question *"Have you ever developed websites or applications?",* Viet Nam reports the lowest rate (13.2%) among 4 countries. In fact, students who are interested in web/app development in Viet Nam make up quite a small percentage as they spend more time using websites and mobile applications rather than developing them.

Table 9: Experience on basic coding skills, developing websites or applications (%)

	Yes	No
Coding	41.8	58.0
Developing a website or applications	13.2	86.8

The current situation tells us that there is a big gap between learning and applying knowledge into practice. It might also be inferred that the curriculum in school is out of date or does not respond to the rapid development of computer technology.

3.2. Digital Literacy

Digital Literacy means the ability to seek, critically evaluate and use digital tools and information effectively to make informed decisions. Viet Nam scores 3.10 in terms of mean competency in Digital Literacy, the second lowest among all countries in the dataset.

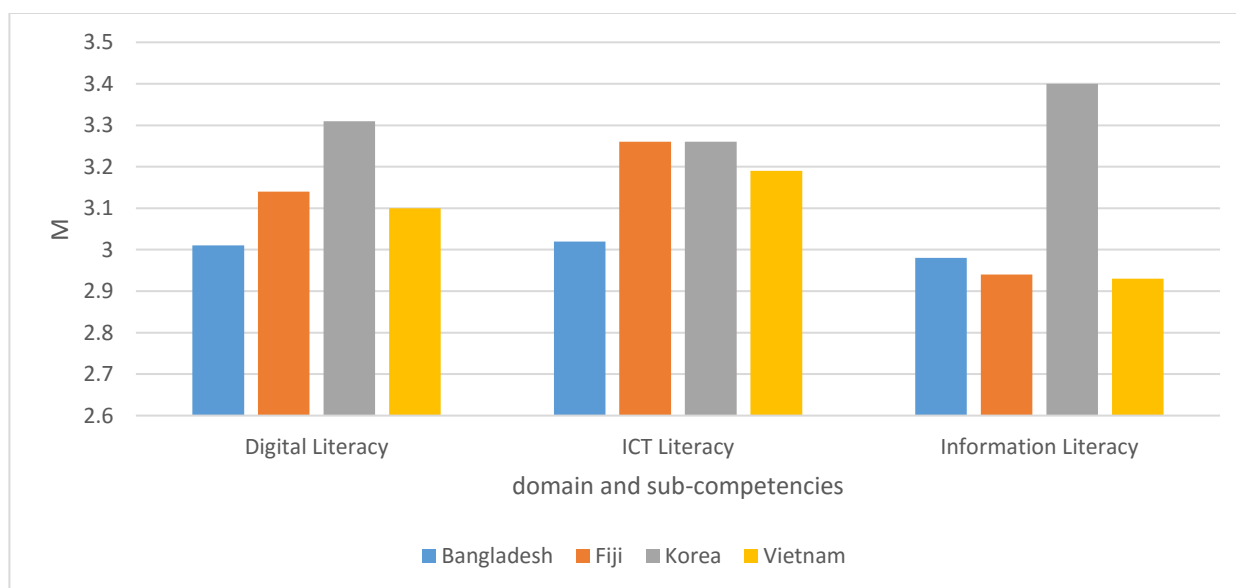**Figure 12: Cross-national comparison on Digital Literacy**

Table 10: Descriptive Statistics of Digital Literacy of Viet Nam

	N	Mean	S.D
Digital Literacy	1,061	*3.10*	*0.32*
ICT Literacy	1,061	3.19	0.33
Information Literacy	1,061	2.93	.41

Digital Literacy consists of two sub-competencies. First, ICT Literacy means the ability to manage and operate ICT hardware and software responsibly in digital environments to access and search for data, information, and content, and to utilize them. We found that the mean scores of ICT literacy are in the following order: Korea (3.26) = Fiji (3.26) > Viet Nam (3.19) > Bangladesh (3.02).

Second, Information Literacy means the ability to seek, critically evaluate and effectively use digital information to make informed decisions. We found that the mean score of Information Literacywas in the following order: Korea (3.40) > Bangladesh (2.98) > Fiji (2.94) > Viet Nam (2.93). Viet Nam has, in fact, the lowest mean-score in this competence. In order to have more understanding of the low mean score of Vietnamese students' digital literacy domain, we should look at the current curriculum of Informatics subject in Table 11 (released 2007) (MOET, 2006). In Viet Nam, the subject of Informatics has been officially included in the curriculum as a compulsory subject in upper secondary school and as an elective subject in lower secondary school and primary school. Because of timing in school, the property of Informatics as an elective subject, the contents taught in lower secondary school, 15-years-old Vietnamese students have not had a lot of experiences in learning to manage and operate ICT hardware and searching for data, information, content, and to utilize them. The fact that coping with problems relating to data to make informed decisions is quite new for Vietnamese students.

Table 11: Distribution of Informatics contents by grade

Contents	Primary			Lower Secondary				Upper Secondary		
	3	4	5	6	7	8	9	10	11	12
Some basic concepts of Informatics	Elective			Elective				Compulsory		
Operating system				Elective				Compulsory		
Text composing	Elective	Elective	Elective	Elective				Compulsory		
Calculator					Elective					
Graphics	Elective	Elective	Elective						Compulsory	
Presentation software							Elective		Compulsory	
Multimedia							Elective		Compulsory	
Algorithm						Elective		Compulsory	Compulsory	
Programming						Elective			Compulsory	

Database and Database management system					Elec tive					Com puls ory
Computer network and Internet							Elec tive	Com puls ory		
Informatics and Society							Elec tive	Com puls ory		

3.3. Digital Safety and Resilience

3.3.1. Definition

Digital Safety and Resilience means the ability to understand how to protect oneself and others from harm in digital space. Viet Nam scores the second lowest in mean competency of Digital Safety and Resilience. This means students in Viet Nam need to be equipped with a better understanding of the risks of digital space and the skills to avoid them.

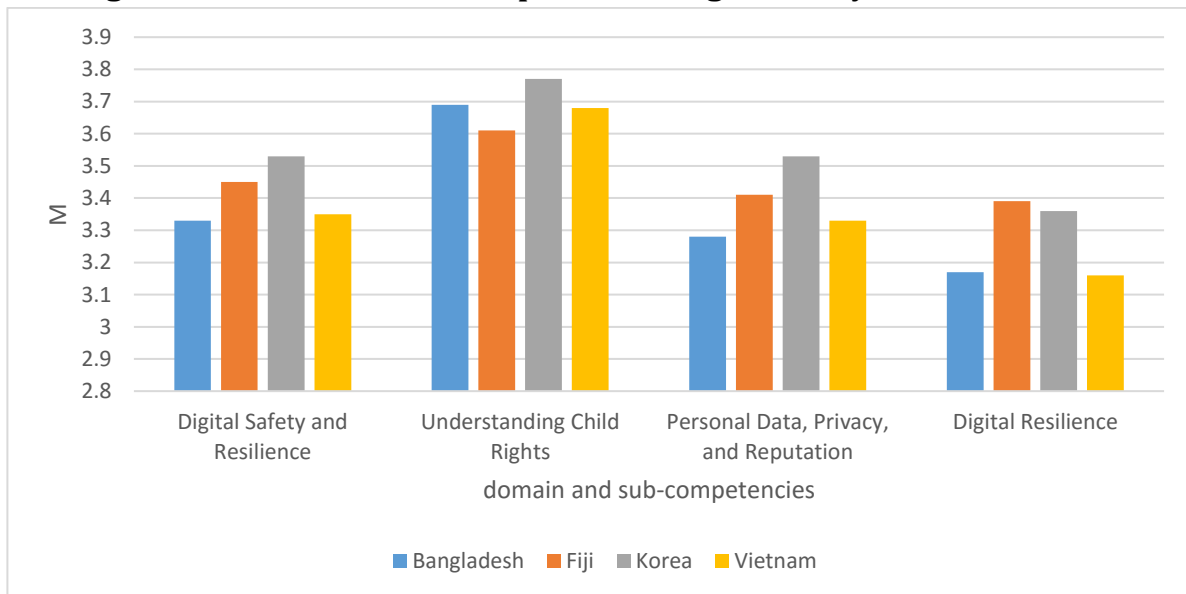**Figure 13: Cross-national comparison of Digital Safety and Resilience**

Table 12: Descriptive Statistics of Digital Safety and Resilience

	N	Mean	S.D
Digital Safety and Resilience	1,061	3.35	.33
Understanding Child Rights	1,061	3.68	.44
Personal Data, Privacy and Reputation	1,061	3.33	.43
Digital Resilience	1,061	3.16	.49

Digital Safety and Resilience consists of three sub-competencies. First, Understanding Child Rights means the student's knowledge and understanding of their legal rights and obligations within the global and local context. The mean scores of Understanding Child Rights arein the following order: Korea (3.77) > Bangladesh (3.69) > Viet Nam (3.68) > Fiji (3.61).

Second, Personal Data, Privacy, and Reputation means the ability to understand how to use and share personally identifiable information while being able to protect oneself and others from harm. For this competency, the mean scores are in the following order: Korea (3.53) > Fiji (3.41) > Viet Nam (3.33) > Bangladesh (3.28).

Third, Digital Resilience means a set of preventative, reactive and transformative competencies that allow young people to avoid or cope with risky situations online and improve themselves. We found that the mean scores of Digital Resilience arein the following order: Fiji (3.39) > Korea (3.36) > Bangladesh (3.17) > Viet Nam (3.16). Viet Nam scores the lowest among the four countries in this component, which means the students need to improve their activeness, flexibility, and problem-solving skills.
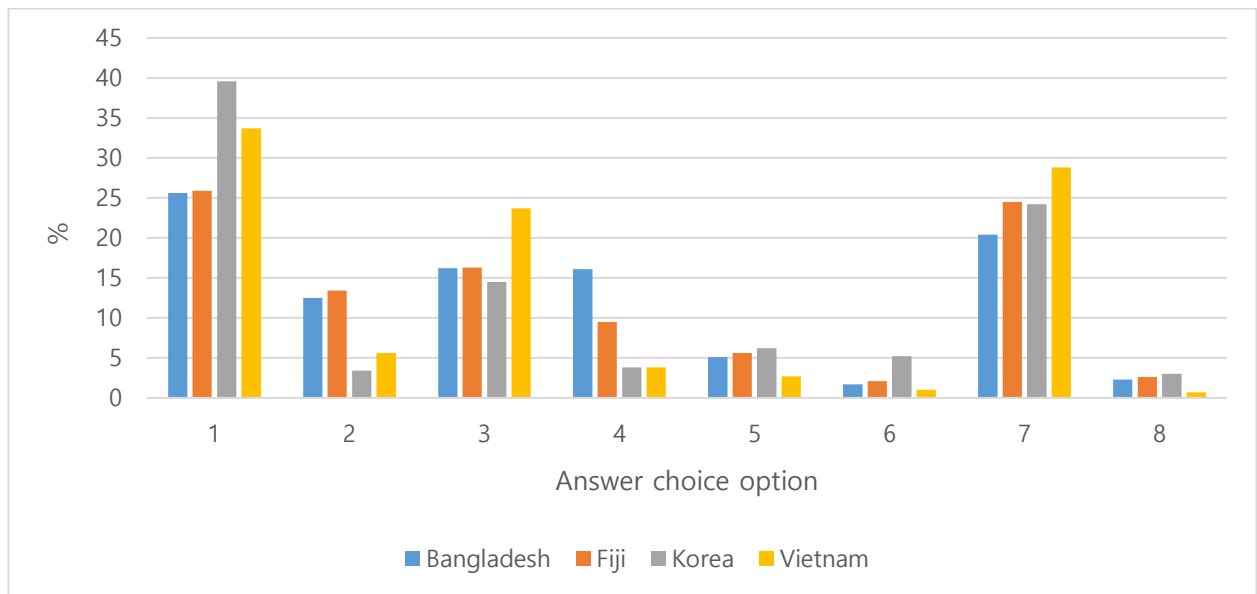
3.3.2. Answers on Behavior-Related Questions

In the domain of Digital Safety and Resilience competency, self-reports of students' behaviors when faced with certain situations online are included. Unlike the rest of the questionnaire, which investigates students' attitudes toward digital technologies, the four following questions are behavior-related and developed to measure how students think they ought to behave in a specific digital situation.

3.3.2.1. Answer on question B15 by country and cross-national comparison on B15 results

B15 asks, "*How will you react when you are exposed to unwanted, disturbing file or website (e.g., a pornography website, violent media)?*" and students were allowed to choose one or multiple options from the list of possible answers. On average across all four countries, 31.3% of students reported that they would get rid of it immediately by closing the page, deleting the file, or scrolling away. In the case of Viet Nam, 33.7% of students answered they would get rid of the malicious content immediately. Other 24% chose to use a programme to prevent such situations from happening again, and nearly 29% would block the website or webpage. Only 1% chose to keep looking at the unwanted content. It shows that Vietnamese students have quite strong minds in dealing with malicious digital content.

Figure 14: Cross-national comparison on B15

For Viet Nam, it shows the following result:

Table 13: Actions students do while receiving unwanted files or websites

	Percentage (%)
① Get rid of it immediately by closing the page, deleting the file, or scrolling away	33.7
② Talk about it with parents/caregivers	5.6
③ Use a programme that prevents it from happening again	23.7
④ Talk about it with a friend	3.8
⑤ Look away or close my eyes	2.7
⑥ Keep looking	1.0
⑦ Block the webpage or website	28.8
⑧ Don't know what to do	0.7

3.3.2.2. Answer on question B16 by country and cross-national comparison on B16 results

B16 asks, "*How will you react when you receive unwanted, disturbing messages including annoying messages or embarrassing pictures from someone on your contact list?*" and students were allowed to choose one or multiple options from the list of possible answers. On average across countries, 26.1% of students reported that they would block and report the person. 29.8% of Vietnamese students would proceed with this option. The choice of answer option 2 ("Delete the contact") also takes up quite a high percentage: 20.7% of Vietnamese students. Interestingly, a large percentage (24.4%) of Vietnamese students reported that they would ask the person to stop sending these messages or pictures when they receive unwanted, disturbing messages.
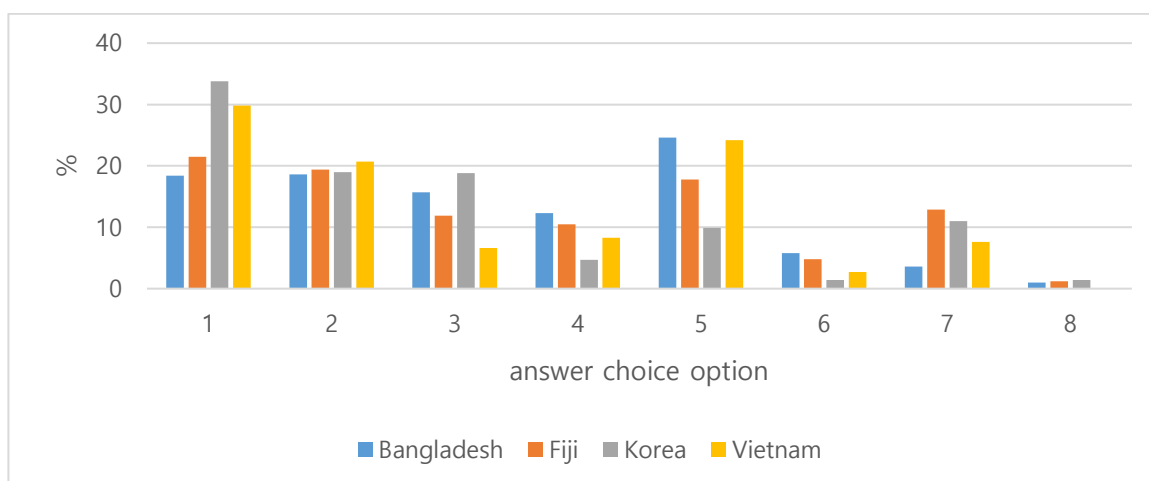
Figure 15: Cross-national comparison on B16

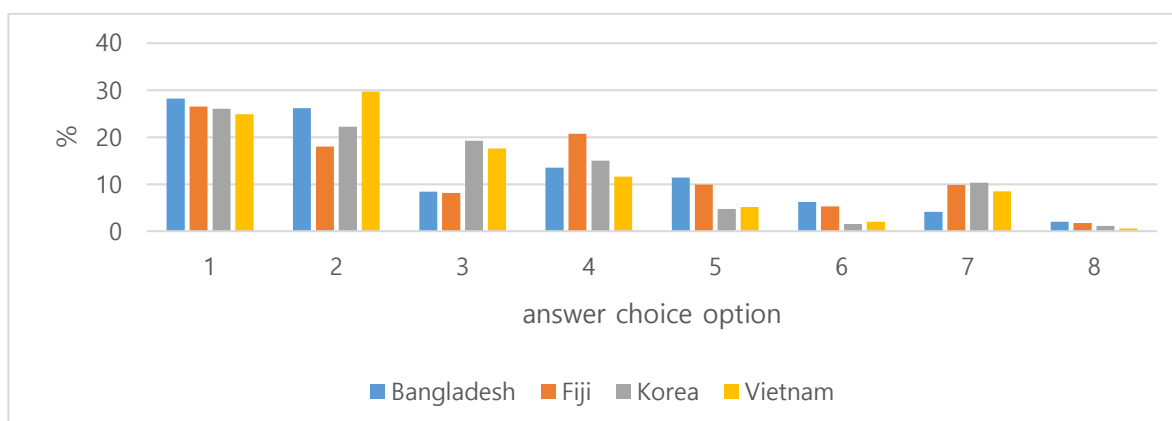**Table 14: Actions students do while receiving unwanted messages**

	Percentage (%)
① Block and report the person	29.8
② Delete the contact	20.7
③ Ignore the messages and the person	6.6
④ Talk with parents/caregivers about what to do	8.3
⑤ Ask the person to stop sending these messages or pictures	24.2
⑥ Talk with teachers about what to do	2.7
⑦ Report the issue to the police and show them what happened	7.6
⑧ Don't know what to do	0.1

3.3.2.3. Answer on question B17 by country and cross-national comparison on B17 results

B17 asks, "*How will you react when you find that your personal information is misused, compromised or acquired without permission online?*" and students were allowed to choose one or multiple options from the list of possible answers.

On average across countries, 26.3% of students reported that they would change their password. 24.9% of Vietnamese students choose this answer. Next, a high percentage (29.7%) of Vietnamese students also chose the answer option 2.

Figure 16: Cross-national comparison on B17

For Viet Nam, it shows the following result:

Table 15: Actions students do while discovering the misuse of personal information and data or websites

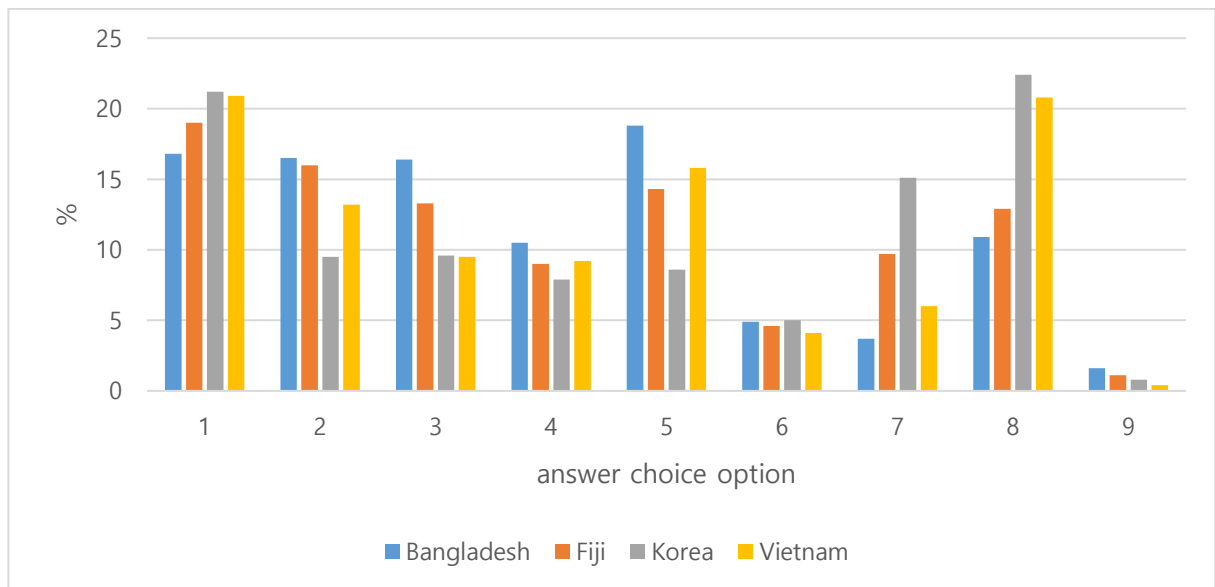|	Percentage (%)
① Change password	24.9
② Review privacy settings and choose a more secure password	29.7
③ Use a report button	17.6
④ Disable or delete the account and make a new account	11.6
⑤ Ask parents/caregivers to help	5.1
⑥ Ask teachers to help	2.0
⑦ Report the issue to the police and show them what happened	8.5
⑧ Don't know what to do	0.6

3.3.2.4. Answer on question B18 by country and cross-national comparison on B18 results

Lastly, B18 asks, "*How will you react when you are bullied online by friends or others?*" and students were allowed to choose one or multiple options from the list of possible answers.

The modal answer option is the first: "Block and report the persons." Across all countries, 19.6% of all respondents and 20.9% of Vietnamese students chose this option. Next, a high percentage of Vietnamese students (20.8%) also chose the answer option "Keep the evidence of bullying (e.g., screenshot)." It supports the statement that Vietnamese students have quite a strong awareness of how to react to cyberbullying.

Figure 17: Cross-national comparison on B18

For Viet Nam, it shows the following result:

Table 16: Distribution of actions students do while having bullied online

	Percentage (%)
① Block and report the persons	20.9
② Delete the contact	13.2
③ Show the persons I am not bothered by their behavior by ignoring them	9.5
④ Ask the persons to stop sending annoying messages or pictures	9.2
⑤ Ask the persons to stop sending annoying messages or pictures	15.8
⑥ Talk with teachers about what to do	4.1
⑦ Report the issue to the police and show them what happened	6.0
⑧ Keep the evidence of bullying (e.g., screenshot)	20.8
⑨ Don't know what to do	0.4

According to Table 11 about the distribution of Informatics contents by grade, there is no content that directly mentions the appropriate actions students should do as they face certain situations online relating to Internet safety. Also, there is no clear guidance from MOET and other Ministries on that issue. However, schools and teachers have quite actively organized activities and lessons to provide information for students in this aspect. For example, a survey of 420 participating students conducted by Vietnet-ICT company (2019) shows that 95% of the Informatics teachers have integrated the knowledge of Internet safety in Informatics lessons, 41% of schools held extracurricular classes and 33% of schools invited experts to share at school on this topic. However, there was just 11% of the surveyed students thought that they were taught enough information for surfing online.

3.4. Digital Participation and Agency

Digital Participation and Agency means the ability to interact, engage and positively influence society through ICT equitably. Viet Nam scores the second lowest in mean Digital Participation and Agency.

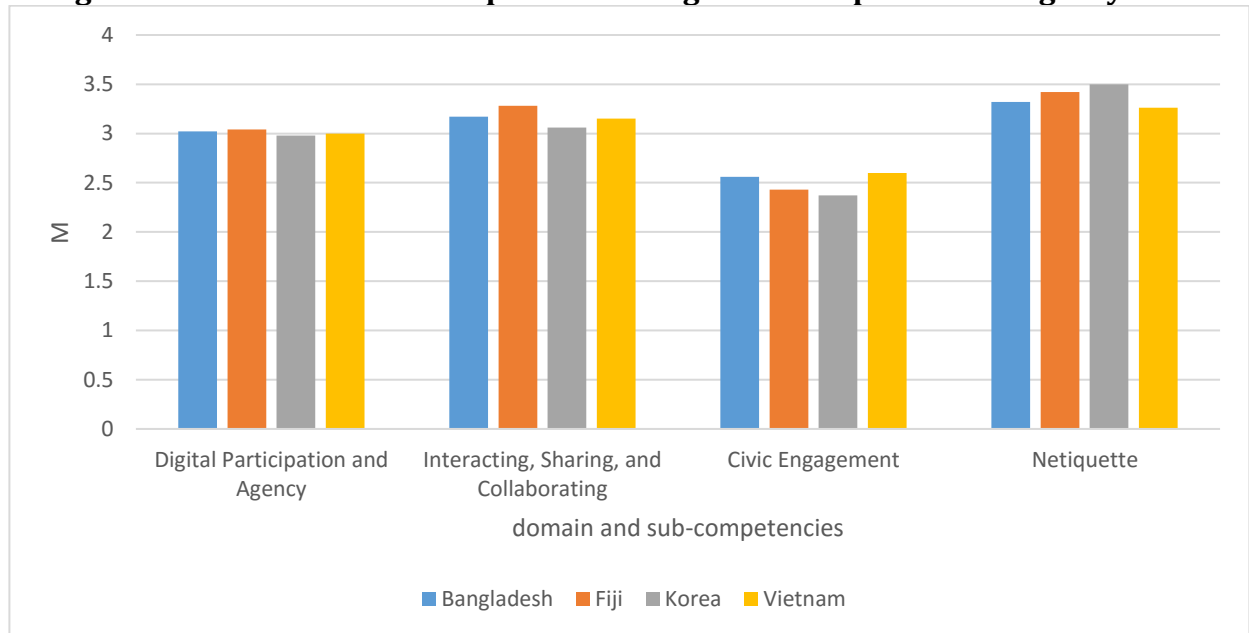**Figure 18: Cross-national comparison on Digital Participation and Agency**

Table 17: Descriptive Statistics of Digital Participation and Agency

	N	Mean	S.D
Digital Participation and Agency	1,061	3.00	.32
Interacting, Sharing, and Collaborating	1,061	3.15	.38
Civic Engagement	1,061	2.60	.49
Netiquette	1,061	3.26	.42

Digital Participation and Agency consists of three sub-competencies. First, Interacting, Sharing and Collaborating means the ability to interact, share data and information, and collaborate with others using suitable digital technologies to achieve shared goals. The mean score of Interacting, Sharing, and Collaborating of Viet Nam is quite low (3.15) compared to other countries.

Second, Civic Engagement means the ability and willingness to and act on opportunities to positively influence local and global communities online and offline through appropriate digital technologies. The mean score of Civic Engagement of Viet Nam of 2.60 is quite low compared to other countries, as well as relatively low compared to Viet Nam's mean scores in other competencies.

Third, Netiquette means the ability to demonstrate ethical and courteous behavior and to make informed choices in interacting and engaging in different digital environments with different audiences. The mean score of Netiquette of Viet Nam is 3.26, the lowest among all countries.

3.5. Digital Emotional Intelligence

Digital Emotional Intelligence means the ability to recognize, navigate and express emotions in one's digital intrapersonal and interpersonal interactions. In this domain, Viet Nam has the lowest mean score of 2.96.

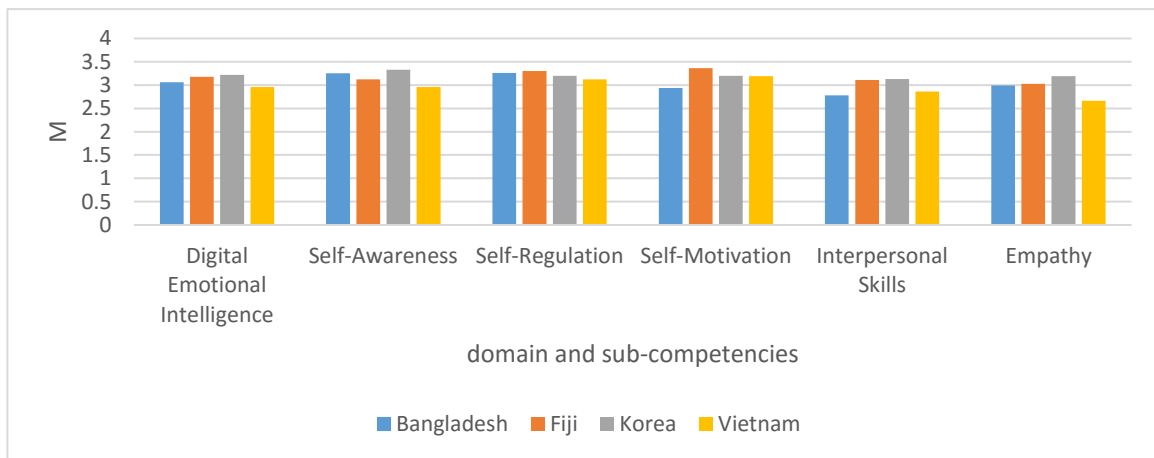**Figure 19: Cross-national comparison on Digital Emotional Intelligence**

Table 18: Descriptive Statistics of Digital Emotional Intelligence

	N	Mean	S.D
Digital Emotional Intelligence	1,061	2.96	.33
Self-Awareness	1,061	2.96	.45
Self-Regulation	1,061	3.12	.46
Self-Motivation	1,061	3.19	.42
Interpersonal Skills	1,061	2.86	.48
Empathy	1,061	2.66	.57

Digital Emotional Intelligence consists of five sub-competencies. First, Self-awareness means the ability to explain one's moods, emotions, drives, and how these affect oneself and others in the digital world through introspection. The mean score of Self-awareness in Viet Nam is 2.96, the lowest among all countries.

Second, Self-regulation means the ability to manage one's emotions, moods and impulses during online engagements. The mean score of Self-regulation in Viet Nam is 3.12, also the lowest among all countries. Self-regulation competencies were, however, relatively high compared to other competencies.

Third, Self-motivation means the ability to demonstrate initiative, commitment to attain internal or external goals despite setbacks in the digital sphere. The mean score of Self-motivation of Vietnamese students is 3.19, the second lowest. That means educational institutions must find a way to help students understand the importance of digital competence and organize school activities accordingly to develop self-motivation of students.

Fourth, Interpersonal Skills means the ability to build positive online relationships to communicate, build rapport and trust, embrace diversities, manage conflicts and make sound decisions. The mean score of Interpersonal Skills of Vietnamese students of 2.86 is the second lowest among all countries, which means Vietnamese students need to improve their ability to build trust in online relationships.

Empathy means the ability to demonstrate awareness and compassion for the feelings, needs, and concerns of others during digital interactions. Vietnamese students are quite weak at this competency. The table shows that Viet Nam's mean score is just 2.66, ranking the lowest among all countries in the dataset.

Vietnamese students are indeed quite lacking in Empathy compared to those in other countries. Empathy score is also quite significantly lower than the three other competencies, for Viet Nam. Students in Viet Nam had the lowest score for Empathy, with about 50% to 65% agreeing (selected "agree a little" or "agree on a lot") that they were able to empathize with friends online in various situations. 64% agreed withthe statement "When I meet friends online, I easily empathize with their emotions," whereas only 49% could agree with the statement "when I meet friends on the Internet, I easily recognize what they want to talk about." However, they are also the most engaged in supporting other people's feelings. In Question D12, "I help other people feel better when they are not feeling well on the internet," 87% of the students in Viet Nam agreed that they do so, the highest among the surveyed countries. As such, no definite conclusions could be drawn from the low Empathy score of Vietnamese students. This suggests more in-depth research on the subject in the future.

3.6. Digital Creativity and Innovation

Digital Creativity and Innovation means the ability to express and explore oneself through the creation of content using ICT tools. In this domain, Korea scores the highest, while Bangladesh scores the lowest. Also, Digital Creativity and Innovation show relatively low mean scores compared to the other four domains of digital citizenship competencies.

Figure 20: Cross-national comparison on Digital Creativity and Innovation
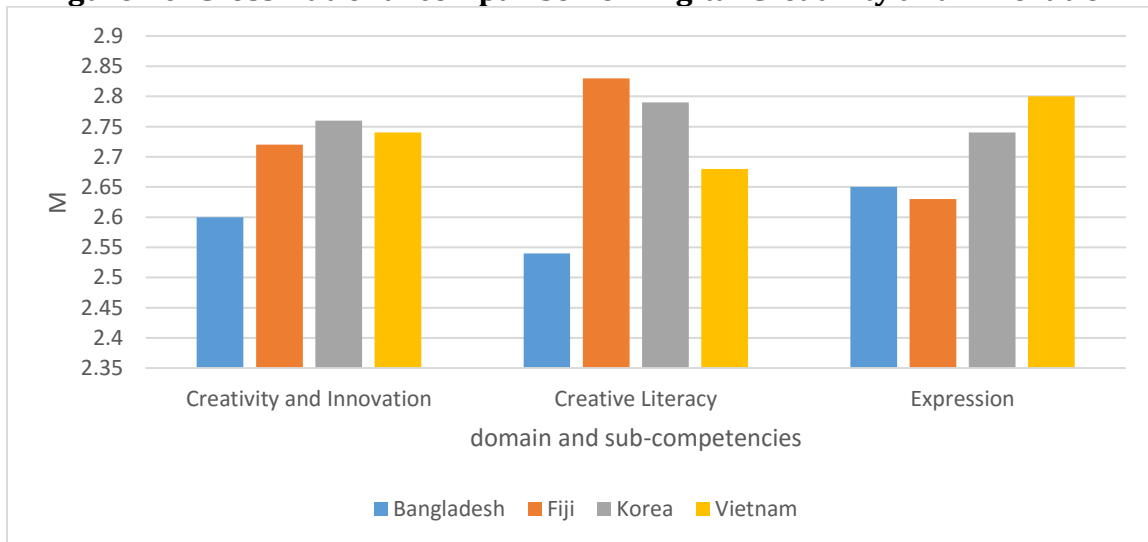
Table 19: Descriptive Statistics of Digital Creativity and Innovation

	N	Mean	S.D
Digital Creativity and Innovation	1061	2.74	.37
Digital Creative Literacy	1061	2.68	.45
Expression	1061	2.80	.49

Digital Creativity and Innovation consists of two sub-competencies. First, Digital Creative Literacy means the ability to apply skills and use tools to create, adopt, or curate digital content. The mean score of Digital Creative Literacy of Viet Nam amounts to 2.68 as the second lowest mean score. It implies that Vietnamese students should focus more on the ability to explore the ways they could apply their digital skills into solving authentic problems.

Second, Expression means the ability to use technology to represent one's identities creatively and to exercise their right to fun and relaxation. The mean score of Expression of Viet Nam is 2.80, the highest among countries, yet low relatively to Viet Nam's scores in other domains and competencies. Therefore, it would be beneficial to support and give students more chances to develop this sub competency.

3.7. Contextual Characteristics

3.7.1. Gender and regional differences on five domains

This section builds on analyses illustrating gender and regional differences or disparities in five domains of digital citizenship competencies. The t-test was conducted to determine if two sets of data (female/male data, rural/urban data) are significantly different from each other in terms of mean values.

Concerning gender differences, interestingly, females show higher scores than males in all four domains. That is, statistically and respectively, females have higher levels of Digital Literacy, Digital Participation and Agency, Digital Emotional Intelligence, and Digital Creativity and Innovation, compared to males.

Table 20: Gender difference in five (5) domains

		N	Mean	S.D	t
Digital Literacy	Male	493	3.09	.32	-.530
	Female	558	3.10	.31	
Digital Safety and Resilience	Male	493	3.33	.34	-2.216*
	Female	557	3.37	.33	
Digital Participation and Agency	Male	492	2.98	.34	-2.259*
	Female	558	3.02	.30	
Digital Emotional Intelligence	Male	492	2.97	.34	1.032
	Female	558	2.95	.33	
Digital Creativity and Innovation	Male	492	2.75	.39	.283
	Female	558	2.74	.35	

First, based on the t-value, the gender difference in Digital Literacy is not significant. Second, there is a slight difference in the mean score of Digital Safety and Resilience between females and males. Third, the average Vietnamese females score higher level of Digital Participation and Agency across Viet Nam.

Next, in the domain of Digital Emotional Intelligence, there are no significant differences between the two genders.

Lastly, while on average a femalescores higher than males in Digital Creativity and Innovation among all pilot countries, the difference is not significant in Viet Nam.

With regard toregional differences, expectedly, students in urban areas score higher than those in rural areas in all four domains. That is, regardless of countries, students in urban areas have higher levels of Digital Literacy, Digital Participation and Agency, Digital Emotional Intelligence, and Digital Creativity and Innovation.

Respectively, in Viet Nam, students in urban areas have a significantly higher level of Digital Literacy compared to those in rural areas, as shown in the following table:

Table 21: Regional difference in five (5) domains

		N	Mean	S.D	t
Digital Literacy	Rural	540	3.07	0.32	-3.069**
	Urban	511	3.13	0.32	
Digital Safety and Resilience	Rural	540	3.33	0.35	-2.169*
	Urban	510	3.37	0.32	
Digital Participation and Agency	Rural	539	3.01	0.31	.464
	Urban	511	3.00	0.33	
Digital Emotional Intelligence	Rural	540	2.95	0.31	-.894
	Urban	510	2.97	0.35	
Digital Creativity and Innovation	Rural	540	2.71	0.35	-3.100**
	Urban	510	2.78	0.38	

Students in urban areas have a higher level of Digital Safety and Resilience compared to those in rural areas.

Regarding Digital Participation and Agency, the difference in score of Digital Participation and Agency between the average student in urban areas and rural areas in Viet Nam is very small. Next, in the domain of Digital Emotional Intelligence, in Viet Nam, students in urban areas have slightly higher scores than those in rural areas. Lastly, on average, students in urban areas show a statistically higher level of Digital Creativity and Innovation than those who in rural areas, a pattern which is similar to that across all pilot countries.

3.7.2. Out-of-school activities

The problem of mere consumption reflects the larger issue of social pressure for students. Figure 23 shows how Vietnamese students spend time outside of school. Notably, 13.57% of students spend 5 to 6 hours a day to doing housework, which is equivalent to the working hours of an adult. Moreover, 18.57% of students also spend the same amount of time studying at test preparation centers or doing homework. In total, a student spends up to 14 hours a day studying at school and home; meanwhile, the amount of time for voluntary or creative activities is usually less than an hour a day.

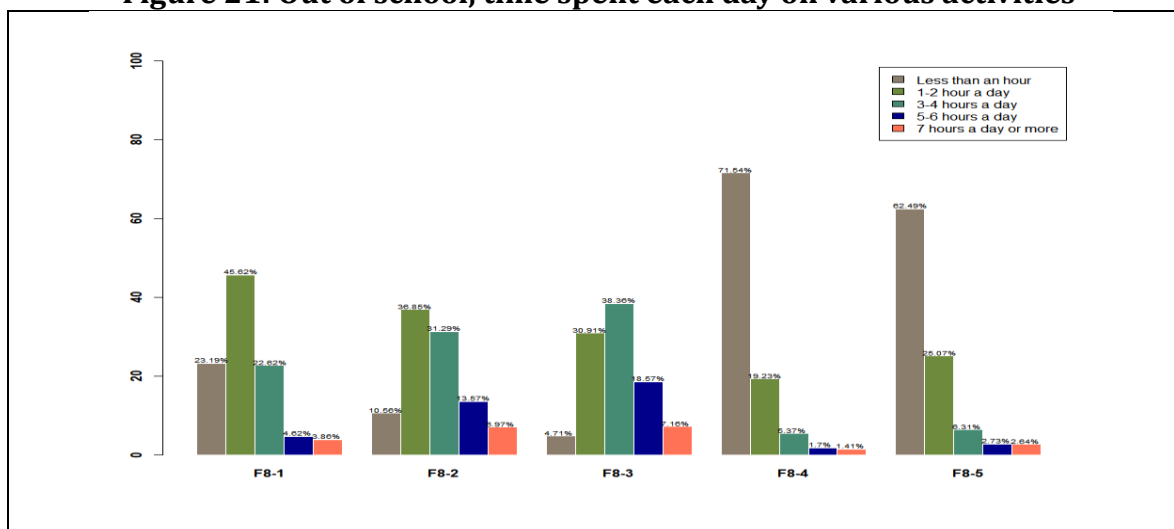**Figure 21: Out of school, time spent each day on various activities**

**Table 22: Outside of school, time spent each day on activities
of Vietnamese students (%)**

	Less than an hour	1-2 hour a day	3-4 hours a day	5-6 hours a day	7 hours a day or more
F8-1) Having fun with friends	23.19	45.62	22.62	4.62	3.86
F8-2) Helping my family with work, housework or looking after somebody	10.56	36.85	31.29	13.57	6.97
F8-3) Doing homework or other study activities (e.g., private education)	4.71	30.91	38.36	18.57	7.16
F8-4) Participating in volunteer work	71.54	19.23	5.37	1.7	1.41
F8-5) Doing fine arts activities (e.g., drawing or playing an instrument)	62.49	25.07	6.31	2.73	2.64

A large amount of time spent studying suggests the amount of social pressure on students to perform well academically. In the heavily-influenced Confucianism context of Viet Nam, studying is considered one of the only ways for young people to advance in life, which makes passing high school a crucial obligation; also, studying hard at pre testing centers is considered to be almost imperative to perform well for high school students. Outside of studying, students are also expected to help with the housework, especially for rural households.

Understandably, whatever time left will be allocated to hanging out with friends: 68.24% of students spend from 1 to 4 hours a day. This time allocation for each activity suggests students not only need school-organized programmes but also social activities to develop their skills.

Chapter 4: Recommendations and Conclusion

4.1. Limitation and Challenges

To develop the digital citizenship competencies of students, we face the following challenges:

- Lack of financial support allocated for the infrastructure and facilities. The current budget given to digital education fails to amend this issue.
- Inadequate ICT curriculum in colleges for pre-service teachers and training programmes for in-service teachers.
- Lack of qualified human resources (educational managers at all level; teachers' inertia, teachers' awareness for the innovation). The gap in ICT training between Viet Nam and other countries in the world, or even in the region, is still large.
- The gap between rural areas and urban areas.

4.2. Implications and recommendations

The findings of DKAP in the previous section present us with an initial big picture of the understanding of digital citizenship competencies to current issues, causes, and some ideas to enhance digital citizenship competencies for Vietnamese students.

Accordingly, one of the important issues in strengthening digital citizenship competencies for Vietnamese students is to have appropriate measuresand policies.

Based on the research results, some key solutions have been proposed by the research team and will be presented in this section.

The findings show that Vietnamese youth's digital citizenship competencies have recently been formed and enhanced both within and beyond school context. At school, this is mainly incorporated in the curriculum, especially through the subject of Informatics education which is obligatory for upper secondary school students. Despite having been widely implemented in Viet Nam, its effectiveness still also depends on the awareness and work ethics of teachers and learners. Outside school context, digital citizenship competencies' development relies mainly on students' self-studying; there may also be support from parents or other family members. On the other hand, since the approach of the subject is

predetermined by the curriculum with its own goals, not much attention has been paid to the essential contents of digital education for students. Therefore, this topic may not be taught thoroughly and systematically. Moreover, the content of digital citizenship competencies is not reflected clearly in evaluation and testing criteria, especially competencies related to interpersonal interactions online.

The research team would like to propose to MOET the following recommendations:

(1) The need of conducting more research on digital citizenship competencies at other ages.

There needs to be more comprehensive research further addressing the topic. Particularly, the reproduction of findings is expected for samples of the different age range to provide an overall approach to assess digital citizenship competencies of schoolstudents. Therefore, the sample size should also be expanded. Potential research areas might include creativity ability, the role of teachers, and assessment standards.

(2) Guiding documents providing legal foundations for school to strengthen students' digital citizenship competencies should be established.

Currently, there have been no official guidelines to date for strengthening the digital citizenship competencies for students. Therefore, it is necessary to have a holistic approach to incorporate this content into the school year and annual tasks. Also, the examination and supervision of strengthening student digital citizenship competencies should be carried out regularly.

On that basis, the research team has some suggestion and recommendation to the MOET as below:

   (i) Developing a general plan and roadmap to guide the strengthening of student digital citizenship competencies suitable for each educational level and regional characteristics;
   (ii) Developing a set of tools for assessing digital citizenship competencies of school students;
   (iii) Fostering key school teachers and key management staff in terms of developing student digital citizenship competencies;
   (iv) Developing a database for methods and techniques for self-studying and self-training of the teachers and educational managers at all levels to

enhance students' digital citizenship competencies and educational managers at all levels; and

(v) Finalizing professional teacher standards to meet the requirements of developing student digital citizenship competencies.

(3) Raising the awareness of teachers and other stakeholders for enhancing students' digital citizenship competencies

Our findings show that improving student digital citizenship competencies is not sustainable as this task largely relies on students' self-study ability.

Besides, strengthening students' digital citizenship competencies is a relatively new issue for teachers. Moreover, the facilities of schools have not met the requirements of increasing digital citizenship competencies for students, especially for schools in disadvantaged areas.

Therefore, the research team would like to propose and recommend to the MOET the following:

(i) Teachers' awareness, as well as specific methods and techniques to enhance student digital citizenship competencies, should be paid attention as one of priorities;

(ii) Policies of ensuring the sustainable strengthening of students' digital citizenship competencies should be developed;

(iii) Policies of encouraging the investment into students' digital citizenship competencies development should be developed; and

(iv) Strengthening communication and propaganda to raise awareness of the necessity of students' digital citizenship competencies in schools. Raising awareness on the meaning and importance of strengthening students' digital citizenship competencies in schools. In order to raise awareness, create the consensus and mobilize the cooperation of party committee, authorities, unions, communities, parents, students, as well as teachers and educational managers at all levels.

4.3. Conclusion

The descriptive statistics of the dataset has shown significant insights into the children's attitude, behaviors, competency levels, and use of ICT within the Viet Nam educational context. Thus, UNESCO and VNIES should consider the potential for international scientific publications using the analysis of the data. Currently, SS&H research community in Viet Nam has not paid much attention to the topic of information technology and digital citizenship. Research that focuses on upper secondary school students is also scarce. Therefore, the knowledge potentially derived from the DKAP dataset will be valuable to Viet Nam and other developing countries.

Currently, students are the subject of the survey and related studies. However, as the above statistics suggested, Vietnamese students lack the opportunities to get involved in voluntary activities and develop their skills and creativity. Hence, it is suggested the students should also actively participate in this study and develop their project-based, product-oriented learning. For instance, under the guidance of the teachers, students can have access to the database of the Ministry of Education and Training, design every aspect of their study, and commit to producing a report or research article at the end. The process will provide the students with various opportunities to enhance their skills, and improve the final product, which would be published, will help them learn about the copyrights issue in the course of doing their works.

The DKAP project hopes to provide knowledge about Asia Pacific children's attitude, behaviors, competency levels, and use of ICT; and to support the education policy planners in their decision-making process through the country report and further scientific publications. The current results of DKAP show significant insights for the future development of Viet Nam's education sector in the age of Industry 4.0.

The research on specific index/criteria of children's digital citizenship competencies should be implemented for Vietnamese students.

The tools developed based on the DKAP instruments should pay attention to assessing/testing Vietnamese students' digital citizenship competencies (students' learning outcomes after each educational school level).

Annex 1. UNESCO Digital Kids Asia-Pacific Framework for Education

Principles	Rights-based, child-centred approach
Prerequisite	Equity in quality of access to ICT
Domain 1: Digital Literacy Digital Literacy refers to the ability to seek, critically evaluate and use digital tools and information effectively to make informed decisions.	
Competencies	1.1 **ICT Literacy**: The ability to manage and operate ICT hardware and software responsibly in digital environments to access and search for data, information and content, and to utilize them.
	1.2 **Information Literacy**: The ability to seek, critically evaluate and use digital information effectively to make informed decisions.
Domain 2: Digital Safety and Resilience Digital Safety and Resilience refers to the ability of children to protect themselves and others from harm in the digital space.	
Competencies	2.1 *Understanding Child Rights*: The ability to understand legal rights and obligations within the global and local context.
	2.2 **Personal Data, Privacy and Reputation**: The ability to understand how to use and share personally identifiable information while being able to protect oneself and others from harm. Be able to implement strategies for information and device security and personal security protocols.
	2.3 **Promoting and Protecting Health and Well-Being**: The ability to identify and manage health risks, and use digital technology in order to protect and improve the physical and psychological well-being of oneself and others.
	2.4 **Digital Resilience**: The ability of being preventative, reactive and transformative, allowing young people to avoid or cope with risky situations they face, and improve themselves.
Domain 3: Digital Participation and Agency Digital Participation and Agency refers to the ability to equitably interact, engage and positively influence society through ICT.	
Competencies	3.1 **Interacting, Sharing and collaborating**: The ability to interact, share data and information, and collaborate with others using suitable digital technologies to achieve shared goals.
	3.2 **Civic Engagement**: The ability and willingness to recognize, seek out, and act on opportunities to positively influence local and global communities online and/or offline through appropriate digital technology use.

	3.3 **Netiquette**: The ability to demonstrate ethical and courteous behavior to inform choices in interacting and engaging with other people in different digital environments and with diverse audiences.
Domain 4: Digital Emotional Intelligence Digital Emotional Intelligence refers to the ability to recognize, navigate and express emotions in intrapersonal and interpersonal digital interaction.	
Competencies	4.1 **Self-Awareness**: The ability to use introspection to explain one's moods, emotions, drives, and how these affect oneself and others in the digital context.
	4.2 **Self-Regulation**: The ability to manage emotions, moods and impulses during online engagements.
	4.3 **Self-Motivation**: The ability to demonstrate initiative, and a commitment to attain internal or external goals despite setbacks.
	4.4 **Interpersonal Skills**: The ability to build positive online relationships to communicate, build rapport and trust, embrace diversity, manage conflicts and make sound decisions.
	4.5 **Empathy**: The ability to demonstrate awareness and compassion for the feelings, needs and concerns of others during digital interactions.
Domain 5: Digital Creativity and Innovation Digital Creativity and Innovation refers to the ability of children to express themselves and explore through the creation of content using ICT tools.	
Competencies	5.1 **Creative Literacy**: The ability to apply skills and use tools to create, adapt and curate digital content.
	5.2 **Expression**: The ability of a young person to use technology to represent or creatively express their identity.

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