សាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ
ROYAL UNIVERSITY OF PHNOM PEN

ការយល់ឃើញរបស់គ្រូ និងសិស្សលើការដាក់បញ្ចូលបច្ចេកវិទ្យាព័ត៌មាន និងសាគមនាគមន៍ក្នុងកម្រិតអនុវិទ្យាល័យៈ ករណីសិក្សានៅសាលារៀនជំនាន់ថ្មីខេត្តកំពង់ចាម

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A Thesis
In Partial Fulfillment of the Requirement for the Degree of
Master of Education in Educational Study

SAR SOPHANAK

April 2018

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Examination committee: Dr. Tao Nary

Mr. Sot Visal

April 2018

មូលន័យសង្ខេប

ករណីសិក្សាជាលក្ខណៈគុណភាពនេះ (Qualitative Case Study) មានគោលបំណង ស្វែងយល់ពីទស្សនៈយល់ឃើញរបស់គ្រូ និងសិស្សអំពីការដាក់បញ្ចូលបច្ចេកវិទ្យាព័ត៌មានវិទ្យា និងសារគមនាគមន៍ ក្នុងសកម្មភាពរៀន និងបង្រៀន នៅវិទ្យាល័យ ហ៊ុន សែន កំពង់ចាម ដែលជាសាលារៀនជំនាន់ថ្មី (NGS) ក្នុងខេត្តកំពង់ចាម។ ករណីសិក្សានេះបានជ្រើសរើសអ្នក ចូលរួមចំនួន ៩នាក់ដោយមានគោលបំណងច្បាស់លាស់ ដែលក្នុងនោះមាន ៣នាក់ជាគ្រូមុខ វិជ្ជាវិទ្យាសាស្ត្រ និង ៦នាក់ជាសិស្សថ្នាក់ទី៧ ដល់ ទី៩។ ការប្រមូលទិន្នន័យបានធ្វើឡើងតាម រយៈការសម្ភាសន៍ទល់មុខគ្នាជាមួយអ្នកចូលរួម និងប្រើប្រាស់ទម្រង់សំណួរ Semi-structured interview ដោយប្រើពេលប្រមាណពី ៣០ ទៅ ៤៥នាទីសម្រាប់អ្នកចូលរួមម្នាក់។ ទិន្នន័យ សម្ភាសន៍ត្រូវបានកត់ត្រា និងវិភាគបាន ៣ប្រធានបទរួមសំខាន់ៗ រួមជាមួយប្រធានបទរងរួម មួយចំនួន។

លទ្ធផលនៃការសិក្សានេះបានបង្ហាញឱ្យឃើញថា (ក) អ្នកចូលរួមភាគច្រើនមានការ យល់ឃើញរួមមួយដែលមិនមានលក្ខណៈស៊ីជម្រៅអំពីបច្ចេកវិទ្យាព័ត៌មានក្នុងការអប់រំ, (ខ) អ្នកចូលរួមទាំងអស់បានយល់ថាបច្ចេកវិទ្យាព័ត៌មាន បានដើរតួនាទីយ៉ាងសំខាន់ក្នុងការអភិវឌ្ឍ គុណភាពរៀន និងបង្រៀន ក្នុងន័យវិធីសាស្ត្របង្រៀនបែបថ្មី រួមទាំងបានបង្កើនចំណេះដឹង ទូទៅរបស់គាត់ថែមទៀតផងៗ។ ម្យ៉ាងវិញទៀត ករណីសិក្សានេះបានរកឃើញថា អ្នកចូលរួម ទាំងអស់បានជួបបញ្ហាប្រឈមមួយចំនួនក្នុងការរៀន និងអនុវត្តផ្ទាល់ចំពោះមុខវិជ្ជាបច្ចេកវិទ្យា ព័ត៌មាន ដោយសារតែ ពេលវេលាមិនគ្រប់គ្រាន់ ឈៀនអ៊ីនធឺណេតមិនមានលំនឹង ឧបសគ្គ ភាសាអង់គ្លេស និងកង្វះខាតជំនាញមួលដ្ឋានផ្នែកបច្ចេកវិទ្យាព័ត៌មាន។ សរុបមក បើទោះបីជា បច្ចេកវិទ្យាព័ត៌មានក្នុងការអប់រំបានផ្តល់ប្រយោជន៍យ៉ាងច្រើនដល់គ្រូបង្រៀន និងសិស្សានុ សិស្ស ក៏វានៅតែមានបញ្ហាប្រឈមមួយចំនួនដែលត្រូវពិចារណា។

លទ្ធផលនៃការសិក្សានេះ បានផ្តល់អនុសាសន៍ដល់ក្រុមគាំទ្រសាលារៀនជំនាន់ថ្មីគួរ តែយកចិត្តទុកដាក់បន្ថែមលើ ការចងក្រងកម្មវិធីសិក្សាបច្ចេកវិទ្យាព័ត៌មានសម្រាប់គ្រូ ការ បណ្ដុះបណ្ដាលផ្នែកបច្ចេកវិទ្យាព័ត៌មានដល់គ្រូ និងការគាំទ្របច្ចេកទេសដល់គាត់។ សាលា រៀនគួរតែ បន្ថែមម៉ោងសិក្សាសម្រាប់មុខវិជ្ជាបច្ចេកវិទ្យាព័ត៌មាន លើកទឹកចិត្តសិស្ស និងគ្រូឱ្យ ប្រើប្រាស់បច្ចេកវិទ្យាព័ត៌មានក្នុងន័យវិជ្ជមាន និងរួមទាំងរៀបចំទីកន្លែងមួយចំនួនដើម្បីធ្វើឱ្យការ ប្រើប្រាស់អ៊ីនធឺណេតបានប្រសើរឡើង។ គ្រូបង្រៀនគួរតែពង្រឹងសមត្ថភាពបច្ចេកវិទ្យាព័ត៌មាន របស់គាត់ឱ្យកាន់តែប្រសើរឡើងតាមរយៈ ចំណាយពេលវេលាមួយចំនួនដើម្បីស្វ័យសិក្សា ធ្វើ ការអនុវត្តជាប្រចាំ និងគួរតែស្វែងរកបមច្បៀាបាយផ្សេងៗដើម្បីបង្កើនសមត្ថភាពភាសាអង់គ្លេស របស់គាត់ផងដែរ។ សិស្សគួរតែប្រើប្រាស់បច្ចេកវិទ្យាក្នុងន័យវិជ្ជមាន អនុវត្តឱ្យបានច្រើនតាម

ដែលគេអាចធ្វើបានមុននិងក្រោយការបង្រៀនរបស់គ្រូ   និងបង្កើតក្លឹបព័ត៌មានវិទ្យាដើម្បីចែក
វែលកចំណេះដឹង និងគន្លឹះមួយចំនួនទៅវិញទៅមក។

ABSTRACT

This qualitative case study aimed to explore the perception of teachers and students towards the integration of Information and Communication Technology (ICT) in teaching and learning activities at Hun Sen Kampong Cham High School, known as a New Generation School (NGS), in Kampong Cham Province. Nine participants included three science subject teachers and six students from grade 7 to 9 were purposefully selected to participate in this study. Data was collected through face to face semi-structured interview individually around 30-40 minutes. The interview data was transcribed and analyzed into three main themes followed by several subthemes.

The result of this study suggested that: (a) most participants had a common understanding only about the surface of ICT in education; (b) teachers and students were able to use different kinds of technological devices more frequently in their daily classroom activities; (c) all participants understood that ICT played an important role in enhancing both teaching and learning quality in terms of innovative teaching methods, as well as improving their general knowledge. Besides, the study found that all participants faced difficulties in learning and practicing ICT courses due to time limitation, unstable internet speed, English language barrier, and lack of ICT foundation skills. To sum up, although ICT in education provided teachers and students with numerous benefits, it still had some challenges to take into account.

The finding of this study recommended that NGS support teams should focus more on ICT curriculum development for teachers, ICT training, and technical support. School should allocate more time for ICT subjects, encourage students and teachers to use ICT in a positive way, and also allocate some budget to improve the internet service. Teachers should improve their own ICT skills by spending some time for self-study, keep practicing regularly, and find alternative way to improve their English as well. Students should use technology in a positive way, practice as much as they can before and after teachers' instruction and create their own ICT club to share ideas and tips.

SUPPERVISOR'S RESEARCH SUPERVISION STATEMENT

TO WHOM IT MAY CONCERN

Name of program: Master of Education
Name of Candidate: Sar Sophanak

Title of thesis: Perceptions of Teachers and Students on Integration of Information and Communication Technology (ICT) in Secondary Education: A Case Study in New Generation School (NGS) at Kampong Cham Province.

This is to certify that the research carried out for the above titled master's thesis was completed by the above-named candidate under my direct supervision. I played the following part in the preparation of this thesis. I worked with Sophanak after he passed his research proposal defensed. I assisted him to redefine the research questions, help him to extend the literature review, discuss the sampling and data collection methods, as well as his analysis and discussion.

Supervisor (sign): ……………………

Date: …………………………………

CANDIDATE'S STATEMENT

TO WHOM IT MAY CONCERN

This is to certify that the thesis that I (Sar Sophanak) hereby present entitled "Perceptions of Teachers and Students on Integration of Information and Communication Technology (ICT) in Secondary Education: A Case Study in New Generation School (NGS) at Kampong Cham Province"

for the degree of Master of Education at the Royal University of Phnom Penh is entirely my own work and, furthermore, that it has not been used to fulfill the requirements of any other qualification in whole or in part, at this or any other University or equivalent institution.

Signed by: …………………………………………………

Date: …………………………………………………

Countersigned by the Chief Supervisor: ……………………………………

Date: ………………………………………………….

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List of Abbreviations

ADBI   Asian Development Bank Institute

BSI   Beacon School Initiative

ICT   Information and Communication Technology

KAPE   Kampuchean Action for Primary Education

MOEYS   Ministry of Education, Youth and Sport

NGS   New Generation School

OECD   Organization for Economic Co-operation and Development

SITES   Second Information Technology in Education Study

STEM   Science Technology Engineering Mathematics

UNESCO   United Nation Educational, Scientific and Culture Organization

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CHAPTER 1
INTRODUCTION

1. 1   Background of the study

The global digital divide, the information age, provides an innovative way for global citizen to get knowledge, experiences, new ideas, and creativities in terms of information and communication technology (ICT) access from individuals, communities, states, and nations (Rodriguez & Wilson, 2000; Tinio, 2003; Wilson, 2004). This is the meaning of the general use of ICT to connect and make the information usable and reachable.

As many developed countries in the world become more digitalized in terms of "Information Age", technological devices are increasingly used in their society as the tools to modernize and improve people's living standard and educational perspective as well. Over the past decade, many schools in those countries have been using information and communication technology (ICT) in different ways to enhance and support their teaching and learning systems. Technology based learning such as computers, educational software, interactive multimedia, audio communication system, projectors, tablets and video conference have become a crucial part of education (SITES, 2005; Brodin, 2010).

Information and communication technologies are affecting many aspects of society improvement including education. They are giving a better way of communication in terms of working condition, teaching and learning styles, and so on. One important point in which significant is that ICT has a good impact in education. ICTs are producing prominent differences in teaching techniques and learning activities inside the classroom. Mikre (2011) states that ICT improved educational environment include collaborative, active, interactive, and creative. ICT provides a good combination of constructivist

pedagogy in terms of self-directed from students which mean they are more responsible for their learning outcome. Kullberg (2011) states that ICT helps Swedish teachers and students in the variation of learning and teaching improvement as well as students' result. ICT makes students more motivative and it works as a tool to help students, especially weaker students, to a certain extent in terms of providing a positive effect on not only teachers' work but also students' performance. It is clear that Swedish students and teachers believe in ICT as a good tool for students learning improvement in the schools.

The rapid growth of ICT around the world has affected not only the human lifestyle but the quality and effectiveness of basic education in both positive and negative ways as well. Sometimes students spend a lot of times using technology in useless purpose rather than education purpose. It brings bad habit to students and also affects their performance. However, technologies, especially computers, can help students to transform their learning activities from inactive into active in terms of self-directed, lifelong learning and also improve their knowledge in technology literacy as well as the 21st-century skills (Vong, 2010).

In Cambodia, the Ministry of Education Youth and Sports has promoted the use of computers in secondary schools to improve the quality of teaching and learning in terms of STEM Subjects (Science, Technology, Engineering, Maths) along with the policy and strategies on ICT in education (MoEYS, 2004). In addition, the policy provides a chance to not only for the teachers but also the students to advance equitable access to educational technology and training (Virak, 2007). Hence, the use of ICT in Cambodian secondary school level is better than before in terms of infrastructure, facilities, and capacity development. However, it still needs to take a collaborative consideration among development partners, private sectors, and government in order to improve and enhance

the use of ICT in teaching and learning activities as well as the quality of education in terms of the 21st-century skills.

1. 2 Problem statements

Traditional teaching approaches, underused ICT, lack of ICT materials and training for teachers are considered as the main issue for ICT integration in education (Groff & Haas, 2008; Cuban, 2001). Mullan (2008) found that students viewed their comfort of using technology in the classroom with social networking, such as Facebook and texting; while teachers responded to email and face to face discussion would be better. Teachers and students, in general, used ICT in diverse ways and had an inconsistent view of using ICT in teaching and learning activities (Speak Up, 2009). In other words, inappropriate technology use in the classroom between teachers and students causes barriers to learning and student's engagement. Frequently, the use of technology in classrooms do not reflect outside school use (Groff & Haas, 2008). The challenges of ICT integration in education, such as lack of training, resources, and time, are the major problems for teachers and students in terms of increasing students' achievement (Li, 2007).

1. 3 Research objectives

The objectives of this research were to identify the perception of teachers and students at New Generation School (NGS) on ICT integration in teaching and learning process. At the same time, this research mainly focused on the challenges and opportunities of using ICT tools in terms of educational technology in teaching and learning activities at New Generation School (NGS).

1. 4 Research question

This research was framed to answer the below research question:

1. What are the perceptions of teachers and students on ICT integration in teaching and learning activities at NGS?

1. 5 Significance of the study

This study was conducted with a small convenient sample of students and teachers at one high school known as New Generation School (NGS) in Kampong Cham Province. So, the result of this study had a limitation in terms of educational perspectives. However, it provided a bunch of useful information of ICT in general education and keys barriers from the perspective of students and teachers in gaining access to, being taught about and using computers within the special innovative educational system in NGS. It also allowed us to identify the key barriers of ICT integration in education in NGS regarding 21st-century skills and showed the potential evidences related to ICT integration in teaching and learning process along with the policy implementation with the aim of helping to improve the access, quality, competency, and efficiency of ICT implementation into public education.

The findings from this study would be useful to researchers, policy makers, educators and technological system developers to increase the concentration and resources of ICT in education in less developed countries. In addition, it brought the potential evidences related to ICT in teaching and learning process from NGS to fulfill the further needs of the 21st-century skills for the next generation.

1. 6 Definition of key terms

ICT stands for Information and Communication Technology. ICT refers to technologies that provide access to information through telecommunications (Christensson, 2010). The term of ICT, in this research, refers to technological devices that can store, transmit, and access or share the information which includes computers, smart TV, digital camera, software, LCD projectors, mobile phones, and printers.

ICT Integration refers to the act of combination or consolidation of ICT into one particular part or section.

NGS stands for New Generation School. The term NGS refers to a public school "autonomy" with official accreditation which contains new standards of governance with strict accountability, high professional standard, innovation, and rationalized resources allocation (MoEYS, 2016). NGS is a new innovative project to enhance education quality in terms of 21st-century skills that implemented by Kampuchean Action for Primary Education (KAPE).

CHAPTER 2
LITERATURE REVIEW

In this chapter, the researcher provided a review of empirical literature including 2.1 definition of information and communication technology (ICT); 2.2 New Generation School (NGS); 2.3 ICT in general education; 2.4 ICT policy in Cambodia; 2.5 overall summary section and conceptual framework.

2. 1   Definition of Information and Communication Technology (ICT)

UNESCO (2005) defined the term, information and communication technology (ICT), as the forms of technologies that are used to transmit, store, create, share or exchange information. This includes radio, television, video, DVD, telephone, computer, hardware, and software. ADBI (2001) mentioned that ICT refers to the process of transferring information and provide communication capability. ICT tools are often used to refer to newer technologies such as a laptop, modems, network, phone, CD, wireless, etc.

MoEYS (2004) mentioned that ICT refers to the technologies that enable the communication, the processing, and the transmission of information through electrical means. It includes a wide variety of different technological devices such as a computer, email, the internet, radio, and television.

2. 2   New Generation School (NGS)

2. 2. 1   Background of New Generation School (NGS)

New Generation School (NGS) is a prototype or a transformation of Beacon School Initiative (BSI) project. BSI is a project that bring innovation technology in terms of ICT in education from private school standards to state schools which is implemented by Kampuchean Action for Primary Education (KAPE) and funded by Oaktree

Foundation, Breteau Foundation, and Apple Corporation from Oct 2011 to Sep 2016 for three target schools located in Kampong Cham and Tboung Khmom Province ("Beacon School Initiative (BSI)", 2017). BSI is aimed to demonstrate high learning standards, strong governance and continual professional development of teachers.

MoEYS (2016) has defined a number of core principles that express what a New Generation School (NGS) is. NGS has five main core values such as (1) new standards of governance with strick accountability for performance, (2) high professional standards, (3) operational autonomy, (4) accreditation as a pre-condition for operational autonomy and high investment, and (5) rationalized resources allocation framework. To sum up, NGS is a public school "autonomy" with official accreditation which contains new standards of governance with strict accountability, high professional standards, innovation and rationalized resources allocation (MoEYS, 2016). It is considered as an innovative project to enhance education quality in terms of the 21st century learning skills.

2. 3   ICT in general education

2. 3. 1   Upper secondary school

ICT in education plays a potential role in improving the quality of educational programe and educaitonal enrolment for all children in terms of 21st century skills to meet Millennium Development Goals. Several researchers have raised up the positive impact of ICT in an educaitonal setting in developing countries based on their perception with previous studies in terms of students' achievement (Brown, McCormac & Zimmermann, 2009).

Light (2009) found that the integration of ICT in classroom activities have positive impacts and contributions to students' understanding and learning outcomes in terms of ICT integration process in the schools of developing countries. The main key

success of this research was the creation of change. Educators developed new beliefes, knowledge, and attitudes about learning and new practices, new ways for students to involve with content, changing relationships among students, parents, and teachers, and the use of new ICT tools to promote student's learning.

Some researches concluded that most developed contries have completed huge public investments in the process of ICT integration in teaching and learning activities. Accordingly, the majority of developed countries have reached high rates of ICT integration in an educational setting (Comi et al. 2016). However, some studies find negative or null effects in terms of the accessibility of ICT process is not sufficient to improve student outcomes (Angrist & Lavy 2002; Goolsbee & Guryan 2006; Leuven et al. 2007; OECD 2015). On the other hand, some researches claimed that there is a link between ICT in education and higher students' attainment, especially in the computer-based instruction in developing countries and for math (Bulman & Fairlie 2015)

2. 3. 2 Lower secondary school

Information and communication technology in education, especially in lower secondary school, provides a good impact on educational quality in Netherland due to its specification and functions effect on students and the opportunities it suggests for coordinating distinction and individualization purpose. A particular ICT tool is determined as the way how students' experiences, their interests, attitudes, and learning approaches with ICT outside school are influenced by gender and socio-cultural background (Heemskerk, Volman, Admiraal & Dam, 2012).

The integration of ICT in public secondary school in Kuala Lumpur, through the latest Education Blueprint (2013-2025) which is integrated ICT-based teaching and learning into schools' national curriculum, has been proved in more effectively with the

students' interests, engagement, creativity or imagination, confidence, and outcomes. More than that, teachers and students also agreed that ICT integration in teaching and learning activities have provided new knowledge and information in terms of effectiveness. However, teachers in this targets schools have mentioned that they were not given enough time to learn and be comfortable with ICT tools. In addition, most teachers claimed that ICT tools, training or professional development, technical supports, computer lab, and facilities were somehow not enough, not adequately, not update nor in a good condition (Ertmer, 2005; Prestridge, 2007; Ghavifekr & Rosdy, 2015; Ghavifekr, Kunjappan, Ramasamy & Anthony, 2016).

2. 3. 3   Primary School

ICT integration in teaching and learning activities provided a variety of instructional practices to teachers and students in primary and secondary education to engage them in learning on a daily basis. More than that, ICT, especially computers, are used as a supplement for teaching and learning in all subjects as about half of students in the research raised up. On the other hand, ICT in education software is used somewhat more to search for information rather than for improving skills and strategies in reading and science (Isac, Araújo, Dinis da Costa, Calvo & Albergaria-Almeida, 2015).

Another research of ICT integration in education, especially in primary education, in Malaysia indicated that most of the teachers participated in this study are more passionate to use ICT software and resources for educational drives, such as the internet, computer, projector system, PowerPoint presentation, and word processor program during teaching and learning process. However, the teacher training and development program was not adequate provided by the Malaysia's Ministry of Education with only 21.3% of teachers responded that they received ICT training, 21.3% responded that they received

training from State Office of Education, and 41.0% responded that they received training from District Office of Education (Ghavifekr, Razak, Fhani, Ran, Meixi & Tengyue, 2014).

UNESCO (2014) indicated that although ICT plays a crucial way to enhance teaching and learning in primary education, it still needs to be devoted and capable teachers to deliver such a potential system to students. So, the lack of human resources in terms of good in-depth knowledge and skills in ICT are the root cause of ICT illiteracy in the educational innovation for sustainability and survivability.

2. 4   Perception of ICT in education

2. 4. 1   Benefits

Richardson (2011) found that ICT plays an important role in helping teachers to get update information, and also improves teaching and learning activities in the modern way and better than before. In addition, this study also indicated that ICT has positive impacts on teachers' administrative work including developing interesting lesson plans and learning materials, sending and receiving information through email, saving time, and teachers are able to use Microsoft Office software in an effective way.

Another study of ICT in education revealed that the key factor which motivates students and energizes classrooms is technology. In this regard, students are empowered to use technology in various classroom activities. By doing so, students can make the classroom more interactive and effectively study in a stimulating learning environment (Hawkins, 2002).

2. 4. 2   Challenges

Both teachers and students found it difficult to integrate ICT in their teaching and learning activities due to some main key barriers, such as limited ICT resources or not

enough time to integrate ICT in classroom (Bingimlas, 2009). The ICT integration in education is often perceived to be a complicated approach which demands specific skills from teachers. In this regard, teachers faced some challenges and barriers, which prevent them to adequately employ ICT in classrooms, namely lack of technical support, training opportunities and ICT facilities. Moreover, lack of competent teachers also contributes to ineffectively implement the ICT integration in education (Amuko, Miheso, & Ndeuthi, 2015).

Richardson (2011) concluded that although ICT provides numerous benefits on enhancing education quality, there seem to have some confusion over technical issues due to lack of troubleshooting skills which may lead to data losing. In addition to this, the study indicated that teachers shared their passionate desire for ICT integration in education but they encountered various obstacles to carry out, such as no incentives, unreliable electricity supply and not enough computers and projectors which led to lack of practice.

2. 5   ICT policy in Cambodia

MoEYS (2004) has developed the long-term goals for strategies on ICT to ensure equal access to quality basic education for all citizens such as below:

1. *Increased access to basic education for all, both formal and non-formal, using ICT as one of the major tools for learning, teaching, searching and sharing information.*

2. *Improved quality of basic education and promote independent and lifelong learning, especially for post-primary education,*

3. *Availability of workforce with the ICT skills needed for employment and use in a knowledge-based society; to ensure that Cambodia can compete and cooperate in an increasingly interconnected world* (MoEYS, 2004, p. 4).

Similarly, the Ministry of Education Youth and Sport has set the policy of ICT in education with focused on four main areas such as 1). Provide access to ICT for all teachers and students, especially at secondary level, to encourage ICT usage between Cambodian schools and other schools in neighboring countries in terms of reducing digital gap. 2) The functionality of ICT in education as a teaching and learning tool in different subjects. Access to information on the internet and growth communication between schools and individuals regarding the use teaching and learning tools, especially computer, for professional development of educators. 3) Promote education for all in terms of age, gender, ethnicity, disability or location through distance education and self-learning, especially for children, youth, and adult who lack access to basic education, literacy, and skill training by ICT integration with radio, television, printed materials, and other media. 4) To improve productivity, efficiency, and effectiveness of education management using ICT integration in education. Through the use of information management system, ICT will be extensively used to generate the processing of students and teachers records, lesson planning, assessment and testing, financial management, communication between schools and government or teachers and teachers, and maintenance of inventories (MoEYS, 2004, p. 4-5).

Moreover, Master Plan for ICT in Education 2009-2013 has many areas of interventions in terms of the specific objectives such as general education, higher education, teacher training, non-formal education and informal education, ministry administration and ICT in education support. The specific goal of this Master Plan for

general education is to equip all secondary students with the necessary ICT technical skills and the critical knowledge and thinking skills regarding to a long-term vision (10 years) which will enable them to integrate quickly with confidence for the next journey to a university career (MoEYS, 2010).

2. 6 Summary and discussion of the previous studies in the literature

The earlier studies and researches referred in the literature review of this study shown that the ICT integration in education, especially in general education, has not yet been fully implemented in many developing countries including Cambodia. Moreover, it still had some blocks which mad ICT integration into teaching and learning activities were hard to be accomplished. Many barriers that made ICT integration in general education was not fully successful, such as lack of ICT necessary skills, knowledge and experiences for teaching staff, limitation of facilities, not enough technical support or capacity development, not up to date for ICT infrastructure and software, and not enough time for teachers to learn more about ICT. More than that, the Cambodia Master Plan of ICT in Education 2009-2013 has not been entirely implemented for general education, especially in lower secondary schools, in terms of limitation of human resources and teachers' knowledge on ICT, lack of times for practice or preparations, and not enough facilities in schools.

On the other hand, there were few studies of ICT integration in general education in Cambodia in the literature review above. The most important thing was that no any studies have been conducted in New Generation Schools (NGS) project to identify the perspective of teachers and students of ICT integration in teaching and learning activities. Therefore, this study aimed to identify the possible challenges and benefits of ICT integration in general education in such a good innovative educational enhancement

project which equipped with modern technology, educational software, capacity development and facilities of ICT in terms of the 21ˢᵗ century learning skills. Also, the perspective of students and teachers toward ICT integration in NGS project.

2. 7   Conceptual Framework

The literature review facilitated to offer the analytical roadmap for this study to get better understanding in order to reach its objectives. This study figured out the perception   of   students   and

on

teachers

ICT

integration
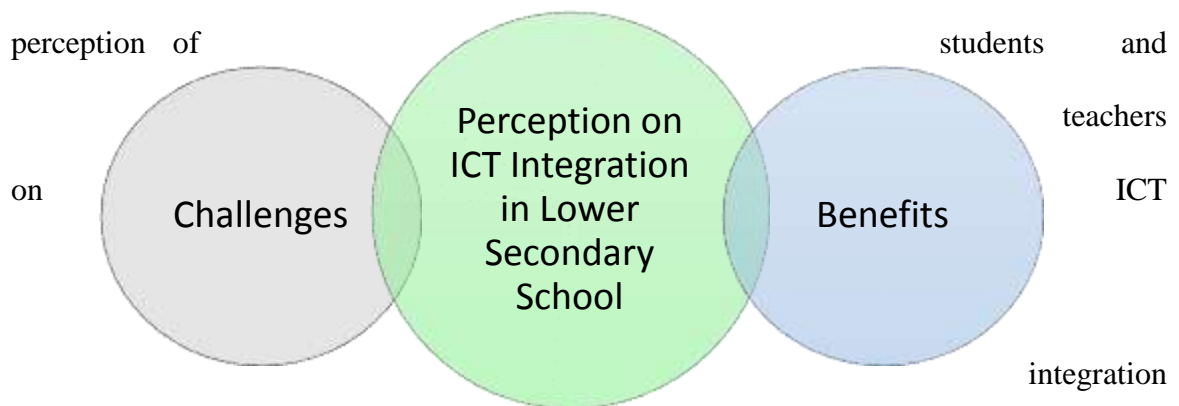
in general education, especially in lower secondary school, the specific challenges, and the relevant and precise benefits, in New Generation School (NGS) project at Kampong Cham Province.

Figure 2.1: Conceptual framework of the study

CHAPTER 3
METHODOLOGY

This chapter discussed the outline of methodology that was used in this qualitative case study. It included seven sections. Section 3.1 is about the research design. Section 3.2 describes about a case study. Section 3.3 focuses on the research area. Section 3.4 addresses about the sampling and sample. Section 3.5 emphasizes the research instrument. Section 3.6 and 3.7 provide the method of data collection and data analysis. Section 3.8 is about the ethical consideration.

3. 1   Research Design

A qualitative research design was selected to carry out this study in order to respond to its objectives and research questions. Based on Dawson (2007), the qualitative research design discovered in-depth concepts from the participants in terms of attitudes, experiences, behavior and performance. Additionally, the qualitative researchers took more concentration to understand the real circumstances and actions from the participants; they had a greater mindset with flexibility in the methods, strategies, and the overall research procedure (Fraenkel, Wallen & Hyun, 2012).

The qualitative research approach concerns fundamentally with process rather than results. It also focuses on the way in which people think and act in their natural setting, as well as it involves with field work which allows researchers observe participants' behavior and interview them in the natural manner in order to get in-depth information (Taylor, Bogdan, & Devault, 2016). Hence, the most appropriate method for this study was the qualitative research design.

3. 2   Research Area

This research was conducted at Hun Sen Kampong Cham High School, known as a New Generation School (NGS), located in 6th Village, Vealvong Commune, Kampong Cham Town, Kampong Cham Province. As it was a case study using qualitative research design, this site was selected in the purposive way which was convenient and accessible for doing such a study regarding sample selection, many ICT facilities have been used in this school, and a lot of capacity development for teachers related to ICT. Moreover, this area was the first model of NGS since it was a prototype of Beacon School Initiative (BSI) project which was implemented from Oct 2011 to Sep 2016 by Kampuchean Action for Primary Education (KAPE).

3. 3   Sampling and Sample

The purposeful sampling was used in this study in order to get in-depth and rich information about the real situation of the research area or site. The samples consisted of nine participants. Three participants were science-subject teachers (taught grade 7 to 9) and they were all female due to the majority of teachers in the school were females. One teacher was responsible for teaching mathematics around six years and she got bachelor degree as well. Another one was a teacher who has taught physics and chemistry for seven years and she also got bachelor degree. The last one was a teacher who has taught biology and earth science for around eleven years and she finished only high school. Other six participants were students from grade 7-9, which five of them were female and one was male (grade 8). They were asked for the agreement to do the interview with respect and responsible. All of samples were working and studying at Hun Sen Kampong Cham High School.

The participants selection was followed some criteria:

- All participants must be Cambodian as the interview was conducted in Khmer.
- All teachers must be the science-subject teachers who were teaching in the lower secondary level.
- All students must be in the lower secondary level.
- Both male and female participants were encouraged to take part in this study.

Table 3.1

Overview number of participants attended the interview

Participant	Sex(M/F)	Age(year)	Subject taught/Grade	Education background	Teaching experiences (year)
Teacher 1	F	27	Mathematics	Bachelor	6
Teacher 2	F	25	Physics/Chemistry	Bachelor	7
Teacher 3	F	35	Biology/Earth Science	Upper Secondary	11
Student 1	F	13	7		
Student 2	F	13	7		
Student 3	F	13	8		
Student 4	M	15	8		
Student 5	F	14	9		
Student 6	F	15	9		

3. 4   Research Instrument

The main research instrument, which was used in this study, was a semi-structured interview that comprised of open-ended questions in order to provoke the perception and experiences of the participants, as well as led to the achieve the objectives of the research. The interview protocol was divided into four parts. The first part was the general information, while the second part required the respondents to indicate their knowledge on ICT in education and ICT usage. The third section contained the items of benefits and challenges of using ICT in secondary education. The last part required the participants

express their opinion regarding to the ICT professional development, technical support, and facilities.

3. 5   Data Collection

The researcher asked for consent letter from the rector of Royal University of Phnom Penh before staring the data collection process. The interview was conducted in Khmer language in order to get better understanding and communication. The interviewees were informed about the purpose of this study, asked for permission to use voice recorder with note taking, confidentiality and anonymity were informed as well. All the designed questions in the interview protocol were asked to individual teacher participants with flexibility in terms of additional useful clarification during the interviews. Students were interviewed individually in the different time setting. Each interview spent around 30 to 40 minutes.

3. 6   Data Analysis

Creswell (2012) stated that to analyze the qualitative data needed a researcher to in-depth understand on how to generate the information from text and images to compliance with his/her research objective. The qualitative data analysis required to transfer the information from spoken or written words to the typed files to be analyzed whether by hand or computer. In this regard, all the information, that has been provided by participants during the interviews, was transcribed into Khmer, then translated into English, and then the data was analyzed. Totally, the result was analytically acknowledged and classified into different themes as the findings have shown.

3. 7   Ethical Consideration

With respect to this study, all participants were informed to participate in this research voluntarily in terms of the ethical consideration. All respondents' information was kept confidentially and they had rights to answer or not to respond to any questions during the interviews whenever they thought it was inconvenient to reply. It was a very important thing for researchers to think about before conducting a research because they needed to make sure that the findings did not contribute a bad effect to the participants and other stakeholders, such as teachers and students who involved in this study.

CHAPTER 4
RESULTS AND DISCUSSION

This chapter illustrated the findings from the interview with all participants. The study investigated the perception of teachers and students towards ICT integration in teaching and learning, and benefits and challenges of using ICT in teaching and learning. Five main themes were distinguished from transcribing and coding the data of the individual interview. The themes included: (1) knowledge of ICT in education; (2) ICT usage in teaching and learning and (3) perception towards ICT integration in secondary education.

The interview was conducted at Hun Sen Kampong Cham High School, known as a New Generation School (NGS) in Kampong Cham province. There were nine participants attended the interview which three of them were science teachers (lower secondary), with different teaching experiences ranking from six to eleven years of experiences. The other six were students from grade seven to nine.

4. 1   Findings

4. 1. 1   Knowledge of ICT in education

All participants were asked to explore their understanding about ICT in education. They provided a different point of view with supported examples. Among of them there was only one teacher had deeper understanding in terms of defining the definition of ICT in education while the other two were able to know the surface for ICT meaning. Two of them understood that ICT was a tool to help improve their knowledge and get more information from outside. However, one teacher explained that ICT in education was an innovative teaching technique that allowed teachers and students to easily interact in classroom instructions. Moreover, she was more likely to know how to employ the

electrical devices, such as laptops or LCD projectors in an appropriate way. As T1 stated that:

> ICT in education was a new model of teaching technique that used ICT to assist teaching and learning activities such as using LCD, computers, or the internet and so on. (T1)

Besides these, there were some students also provided similar definition of ICT in education. They also illustrated that ICT in education was a tool to help them get information from the internet easily and improve their general knowledge better than textbooks as well. In addition, ICT in education also played a crucial role in assisting students' learning and researching. According to S2, she mentioned that:

> ICT in education was a tool to search more information easily, broader my knowledge and faster than textbooks, we also knew more about information outside country and it was a modern technology too. (S2)

In short, the answers were not quite far different between teachers and students. ICT in education was a tool to assist their teaching and learning using technological devices, such as computers, tablets, LCD projectors and so on. Besides, it also was a way which allowed them to get a lot of useful information was available online and to broader their knowledge more easily.

4. 1. 2   ICT usage in teaching and learning

This section illustrated different settings in discovering participants' ability to use ICT facilities both hardware and software. It also gave some information of how they allocated or spent time to practice or learn ICT in order to improve their competencies. There were four elements to address included: ICT facilities, frequency of using ICT in teaching and learning, ICT competency, and ICT training.

4. 1. 2. 1 ICT facilities

There were many ICT facilities which can be used in education sector but this study found that some of them were used in NGS, such as a computer lab, laptops, tablets, a smart TV, a TV, iMacs, Printers, Photo copy machines, LCD projectors, Wi-Fi, Speakers, and Smartphones.

4. 1. 2. 2 Frequency of using ICT in teaching and learning

All participants expressed their ideas in a similar way in terms of using ICT in teaching and learning. All teachers mentioned that they used ICT in their teaching very often (more than 60 per cent), especially LCD projectors and iMac in the library because they always brought their laptops with and used it as an assistance to improve students' understanding not only in a specific topic but also in general contexts. For instance, T2 stated:

> I can say that I used it more frequently because I always brought it with me every day. (T2)

Moreover, all students shared the same opinions to using ICT in learning activities. All of them said that they frequently learned through ICT devices, especially LCD projectors for power point slide presentation or videos show time because their teacher often gave them presentation assignments to do or search information on the internet. As S6 highlighted that:

> I used ICT in my learning very often because teachers usually used a LCD projector in their teaching and let us search information in the library or the computer lab. (S6)

4. 1. 2. 3   ICT competency

The ability to use ICT tools to enhance teaching and learning activities is one of the main parts of the 21st century learning skills. All teachers highlighted that the most popular software that they were able to use included: Open Office (Khmer Application), Microsoft Word, Excel, Power Point and Google search. Moreover, teachers added that they felt familiar with using some other useful programs, such as Gmail, Facebook group chat, YouTube, IXL (Math Software), 3D Classroom (a visualized learning software for science subjects) and Literatu (a learning assessment software for science subjects). Beside these, all teachers stated that they were able to use some ICT facilities, such as printers, photo copy machines, scanners, tablets, LCD projectors and smart TV as well. As T1 mentioned:

> I was able to use some useful software, such as Microsoft Office (word, excel, power point), Open Office, Gmail, Facebook, YouTube, 3D classroom, Literatu, and IXL. (T1)

However, students were accustomed with some simple programs included Open Office, Microsoft Office (word, excel, power point), Facebook group chat, Google search, YouTube and Literatu. They stated that their ability to use these kinds of software was fairly well. In other word, they were able to appropriately use computer in a foundation level. As S6 said that:

> I could use some useful software with regard to foundation level, such as Open office, excel, word, power point, google, Facebook group chat, Literatu. (S6)

4. 1. 2. 4   ICT training

It is believed that providing regular ICT training could improve not only students' ability but also teachers' ability with regard to practical knowledge. All teachers

explained that they tended to have more time for ICT training approximately three to four times per month in terms of self-study and technical support from a technical staff. They added that they were provided ICT training once a month by a technical staff from Kampuchean Action for Primary Education (KAPE) in order to enhance their ICT profession and raise some difficulties to find a good solution all together. As T1 mentioned that:

> I would say I can practice and learn ICT 3 to 4 times per month in terms of self-study and technical assistant form KAPE staff. (T1)

However, all students reported that they were trained two hours per week related to ICT for both theories and practices with computers and tablets in the computer lab and the media center respectively. Regarding tablets in the library, they were allowed to use only one time per month. According to S4, she stated that:

> I had to attend the ICT courses 2-3 hours a week in a computer lab and one time per month for using tablets in the media center. (S5)

4. 1. 3 Perception towards ICT integration in secondary education

Although benefits of ICT in teaching and learning were more likely to have a good impact on improving quality of learning outcomes, drawbacks were also considered as-

another impact to some extent. This section focused on both students' and teachers' point of views with regard to benefits and drawbacks of using ICT in teaching and learning.

4. 1. 3. 1   Benefits of using ICT in teaching and learning

Having ICT facilities in a school was one way to increase the availability of using ICT in teaching and learning and using them in an effective way was another crucial thing to benefit teaching and learning outcomes. All participants stated that their school's environment was quite good for them to use and experience the 21st century classroom because it had many multimedia resources for students and teachers to use as teaching and learning aids. As T1 mentioned that:

> ICT helped me a lot in terms of saving time to develop my teaching aids, helping students to understand the hypothesis more quickly, and assisting a lot of administrative work. (T1)

According to T1, she tended to show both current situation in her school regarding ICT in teaching and learning activities and the ability of teachers to acquire new teaching techniques. On the other hand, she seemed to believe the way in which this school initiated new innovative ideas for teachers to maximize their profession and feel familiar with the technology advancement. Furthermore, she reported that ICT could help her to spend less time in creating teaching materials in an effective way. For instance, her students could understand the lessons more easily and quickly by using visual aids. Moreover, T2 also mentioned that:

> Useful software, such as 3D classroom and Literatu, was available for students and teachers to use to improve their teaching and learning engagement. (T2)

Based on T2, she thought that her school environment was good enough for herself and her students to develop the ability in ICT usage. It was clear that her school was not only equipped with many ICT tools but also supplied useful educational software with technical support for teachers and students to feel comfortable with new classroom instructions. She also mentioned that the ICT was a key element to foster her knowledge

and to innovate her teaching techniques in order to catch students' attention while learning. Using ICT in teaching was considered as a modern teaching method in this century, she added. In addition, T3 also highlighted that:

> ICT provided students and teachers with lots of benefits and students can know or search more information on the internet by doing their assignments, as well as it helped to add more information to textbooks, was easy to understand for students and to teach for teachers as well using videos or pictures. (T3)

Regarding T3, she tended to have a sense of optimistic in her school environment with regard to ICT in education. It revealed that her school can allow students to broaden their knowledge globally, not just followed the textbooks. ICT provided her a lot of benefits in terms of improving students' understanding and enhancing teachers' profession. On the other hand, she seemed to mention only about the surface for the benefits of ICT in teaching and learning.

Similarly, all students had a common sense of viewing their school environment as fair well with regard to ICT in teaching and learning activities. Students were very happy with these kinds of technologies because students could have a chance to practice and felt familiar with it, as well as to prepare themselves for the university life after they finished the high school level. Furthermore, ICT was able to help students learn in the modern way of getting useful information to support their ideas. As S2 stated that:

> It helped teachers to get more information to teach students. Besides, it helped me a lot because it was a modern technology so that it could help me to faster my research and could broaden my general knowledge that textbook may not have had. (S2)

As S6 added that:

> It was highly likely a real practice and textbook lessons were connected, for instance, if history and geography lesson, teacher showed us the videos that related to our lessons. It also let us know about information around the world and it could broaden our knowledge so that when we needed to write an essay it was easy for use. (S6)

According to S2 and S6, they illustrated that ICT integration in teaching and learning activities was not only help improve their learning quality but also enhance their general ideas. It as well as enabled students to visualize the differences between real practices and multimedia resources which teachers presented during learning activities. Moreover, they could find the information that teachers asked them to do more faster and easier using those technologies.

In conclusion, ICT integration in education was not only benefit for teachers with regard to innovative teaching aids but also enabled students to acquire new learning concepts in this 21st century context. Last but not least, it was considered as a catalyze in improving and developing quality of education in modern societies effectively.

4. 1. 3. 2 Challenges of using ICT in teaching and learning

Although ICT in education provided enormous amount of advantages, it also had some disadvantages which needed to be considered in appropriate way. This part highlighted four different main drawbacks which encountered in this study included time availability, English language barrier, the internet accessibility, and lack of IT skills.

4. 1. 3. 2. 1 Time Availability

Many participants stated that they did not have enough time to learn with ICT courses and practice as well because they had to spend more time one the other subjects. Generally, students had 2-3 hours a week for the ICT class and 2 times per month for using tablets in the library. According to S1, S2, S4, S5, and S6, they mentioned that they could not practice or learn as much as they could because of the time, so that the ability to use ICT may have been limited to some extent. Moreover, T2 added that she could insert

ICT and practice it in her lessons because she had 3 hours a week for her subjects, but it was very hard for other subjects which had only one hour per week. As S4 mentioned that:

> I had 2-3 hours per week to learn about ICT and practice it. I had only 2 times per month for using tablets in the library. (S4)

4. 1. 3. 2. 2 English language barrier

Some participants claimed that they had difficulties in using English to search information because most websites did not have Khmer language. More than that, computers' operation system used English as the main language, so it took time to be able to use ICT in an appropriate way. According to T3, she mentioned that it could be a good idea to integrate ICT in classroom instructions, but she tended to worry about her ability to use it effectively because it required the ability to moderately know English. As T3 said that:

> I did not know much about useful websites and most websites used English; my ability of using English was limited so that it was hard for me. (T3)

4. 1. 3. 2. 3 The internet accessibility

Many participants pointed out that the internet service in this school was limited. Three Wi-Fi connections, one in the computer lab, one in the library and another one in teacher's office, were available for student and teachers to use. However, the internet speed was still slow when many students and teachers connected at the same time. As T1 mentioned that:

> There was a problem with Wi-Fi connection. For example, if all students in a class connected to Wi-Fi at the same time it would not work smoothly. (T1)

S3 also said that:
The internet speed was slow and sometimes had problems with computers. (S3)

According to T1 and S3, they tended to highlight a challenge which could not appear in the 21st century learning environment. They seemed not to happy with the internet speed and its accessibility provided by school because it could waste their teaching and learning time if they could not have done their search on time.

4. 1. 3. 2. 4 Lack of ICT skills

The ability to sue ICT in an effective way was still considered as a challenge for not only students but also teachers in this school. They explained that it was quite challenges for them to acquire new concepts and learning techniques using technologies. For instance, they found that following the update of Microsoft Office was hard to use it in an appropriate way. As T1 highlighted that:

> I thought we (teachers) were currently facing a problem of using ICT in an appropriate way because some teachers' ability was still limited. For instance, some of us were unfamiliar with ICT in terms of age, traditional teaching habit, and new technologies. (T1)

> Moreover, S4 stated that:

> We were lack of ability to use ICT so that we cannot know the techniques to use it properly. (S4)

According to T1 and S4, they tended to express their worries about some teachers' and student's capability in using ICT in teaching and learning activities. Some teachers were quite old in terms of age to learn new technologies which they have never learned before; and some were unfamiliar with such kinds of technologies. So that, a lack of ICT competency of some teachers could lead to the limitation of students' learning capacity.

In short, the finding in the study highlighted that there were some challenges could have distracted the effective of ICT integration in teaching and learning. Both teachers and students presented their concern on the unstable internet speed, lack of IT skills, the ability to use English, and time constrains as well.

4. 2   Discussion

This section discussed the three major results in relation to the existing literature review. Subsection 4. 2. 1 addresses the ICT usage in teaching and learning. Subsection 4. 2. 2 deals with the perception of students and teachers towards ICT integration in secondary education. It also includes the two main themes, such as benefits and drawbacks of ICT in education.

4. 2. 1   ICT usage in teaching and learning

4. 2. 1. 1   Frequency of using ICT in teaching and learning

The study found that both teachers and students in this school usually use ICT in teaching and learning process in order to improve their understanding and teaching techniques as well. The most comment technological devices, which were used in this situation, were iMac, laptops, and LCD projectors. The findings also justified that the internet played a crucial role in doing mini researches for students to boost their general knowledge.

4. 2. 1. 2   ICT competency

The finding in this study found that all teachers were able to use not only basic software or applications but also several specific software which was useful for educational purposes. For instance, they could basically use Microsoft Office (word, excel, power point), Open Office, Google search, Gmail, and Facebook. This finding was

similar to the finding of Soeung (2017) mentioned that Facebook, Microsoft Office and email were popular and used by students and teachers. In addition, they were also able to use some science-based software, which was recommended by KAPE, to improve the quality of teaching and learning, such as IXL, 3D Classroom, and Literatu.

The result of this finding also indicated that students were able to essentially use some common software, such as Microsoft Office (word, excel, power point), Open Office, Facebook, Google search, YouTube, and Literatu.

4. 2. 1. 3   ICT training

The study found that all teachers in this school were provided with ICT training once per month by a technical staff from KAPE and had reasonable time for ICT self-study and practices around 3 to 4 times per month along with technical support as well. This finding was different from others because all teachers had an opportunity to improve their ICT profession in a regular monthly basis. This result was different from what Soeung (2017) found that ICT training courses were not adequately provided to teachers and as similarly as the previous research conducted by Ghavifekr, Razak, Fhani, Ran, Meixi, and Tengyue (2014).

The finding in this study also found that all students had only 2 hours per week for in-class training and once a month for E-learning using tablets in the media center. The finding reflected to what Soeung (2017) pointed out that the school was not provide enough time for students to learn ICT subjects, just 2 times per week and E-learning did not use as well.

4. 2. 2   Perception towards ICT integration in secondary education

4. 2. 2. 1   Benefits of using ICT in teaching and learning

The study found that ICT provided teachers with innovative teaching techniques and teaching aids in order to improve teaching and learning activities. Also, teachers could maximize their capability and feel familiar with the technological advancement in terms of the availability of multimedia resources. The finding was highly likely aligned with the result of Brown, McCormac and Zimmermann (2009) revealed that ICT in education brought positive impacts on developing the quality of educational program and enrolment in developing countries. And it was quite similar to the finding of Soeung (2017) showed that teachers derived much benefit from using ICT in teaching and learning activities.

In addition, the study found that ICT played an important role in fostering teachers' knowledge more effectively or broadly and it was a modern teaching tool to both attract students' attention and enhance students' understanding in this century. This finding was in agreement with the result of Light (2009), Harris (2002) and Richardson (2011) whose revealed that ICT allowed teachers to discover new opportunities around the globe and contributed to students' understanding and learning outcomes.

Similarly, the result of this study found that all students felt very positive towards ICT integration in teaching and learning activities because of the fact that it was a modern way in which students could prepare themselves for the upcoming university life and to become independent learners. The finding was quite the same as the earlier study undertaken by Moore and Kearsley (1996) who found that ICT raised up the flexibility of transferring the knowledge, so that students could easily find the appropriate way to access information whenever they wanted.

Furthermore, the study found that ICT integration in education was not only broaden students' general knowledge but also enable them to find out about the information they needed easier and faster than textbooks. The result of this finding was corresponding to the result of Alcuin (2011), Hawkins (2002). and Bhattacharya and Sharma (2007) revealed that ICT in teaching and learning could save time for educators and learners effectively and allow them to gain either new knowledge or ideas easier and quicker than traditional ways.

4. 2. 2. 2   Challenges of using ICT in teaching and learning

The study found that most of the students was not able to practice or learn ICT as much as they could due to the time availability. This could lead to inappropriate use of ICT in education for them. The result of this study was similar to the study of Soeung (2017) who found that timetable for ICT courses was too narrow for both teachers and students. In other word, students did not have enough time to practice and learn ICT. Similarly, Li (2007) and Bingimlas (2009) stated that some challenges of ICT integration in teaching and learning, such as lack of training, resources, and time, were the major problems for increasing students' achievement.

Another challenge was found in this study as well. It was the English language barrier. Both teachers and students had limited understanding or using English when they were doing their research on the internet. The result of this finding was a bit different form the earlier researches mentioned in the literature review because most of them was conducted in good English speaking countries.

Moreover, the study found that unstable internet connections were considered as another key issue for both teachers and students in this school. Although the school provided the internet to use in specific areas, such as library and teachers' office, both

students and teachers still felt unsatisfied with its unstable speed. This finding was likely to the result of Soeung (2017) who revealed that the slow speed of the internet service can interrupt the ICT in teaching and learning program.

Besides, the study found that the lack of ICT skills or knowledge was also a major concern for participants. They faced difficulties to gain unfamiliar technological concepts. This finding was nearly the same as the analysis of UNESCO (2014) which stated that even though ICT played an important role in improving teaching and learning activities, it still needed enthusiastic and capable teachers, who have good knowledge of ICT, to eliminate ICT illiteracy in a sustainable way.

CHAPTER 5
CONCLUSION

This chapter aims to summarize and conclude the major findings of the study which concerns about the perception of teachers and students towards ICT integration in teaching and learning activities after in-depth information has been confirmed and addressed. It is divided into four main sections separately. The sections included: 5.1 summary of the findings; 5.2 recommendation to whom this study may benefit for; 5.3 direction for future research; and 5.4 the limitation of this study.

5. 1 Summary of key findings

Three themes were found and considered as the main findings which already addressed in the chapter 4. Each theme is explained in a short summary which contains subthemes as well.

The first finding of this study was related to participants' knowledge of ICT in education. The study found that most participants had a common understanding about only the surface of ICT in education. They defined ICT in education as a technological tool to help them get a lot of information from outside.

The second was about ICT usage in teaching and learning activities. The study found that all participants were able to use many modern technological devices and used them more frequently in daily instructions. More importantly, three packages of educational software were used additionally in this school to enhance teaching and learning quality, such as IXL, 3D Classroom and Literau. Furthermore, all teachers were provided ICT training once every month and technical support very often to improve their ICT profession in this digital age.

The last one was correlated to the perception of teachers and students towards ICT integration in teaching and learning. The study found that ICT played a crucial role in improving teaching and learning quality in terms of innovative teaching methods. Teachers could make best use of multimedia resources to improve their capability in using ICT in classroom instruction. Also, it helped improve both teachers' and students' knowledge in a modern way. Moreover, the study found that ICT was considered as a special tool that could catch students' attention easier than textbooks and was more likely to prepare students to become independent learns in the near future.

However, the study found some key issues that would affect the sustainability of ICT literacy. All participants faced difficulty in learning and practicing ICT courses due to time limitation, unstable internet speed, English language barrier, and ICT foundation skills. These could lead to inappropriate use and apply ICT in educational purposes.

5. 2   Recommendations

Even if ICT integration in education provided numerous benefits for improving teaching and learning quality, its drawbacks also came along with to some extent. In order to tackle the problems of integrating ICT in school, stakeholders have to responsibly and flexibly consider suitable solutions for the sustainability of ICT literacy. So, some possible recommendations are raised up and made based on the findings of the study.

5. 2. 1   NGS support teams

NGS support teams should focus more on ICT curriculum development which can effectively deliver ICT training to teachers. They should also develop an ICT practical test that can measure teachers' ability before and after providing the training. More than that, they should provide more intensive ICT training to teachers whose ability is still low than those who have high ability. They should have regularly individual ICT conference

in order to give technical support and assistance more effectively as well. In addition, they should carefully attention on teachers' capability before introduce new educational software.

5. 2. 2   School

School should allocate more time for the ICT subject in the study schedule and should encourage students and teachers to learn ICT in a positive way. Also, school should create a good learning environment for ICT in education by providing and increasing numbers of technological devices. Moreover, school should allocate its own budget for improving internet service in the school areas. School should also consider which ICT courses provided by MoEYS can be beneficial for students to learn.

5. 2. 3   Teachers

Teachers should spend more time to search for useful ICT learning materials to support their self-study, as well as improve their English language by taking extra English classes. They should enhance their ICT competency by continuously practicing and seeking for help as possible as they can. More than that, they should create an ICT club for share some useful tips or ideas among them. They should also try to find new educational software that may be useful for their teaching.

5. 2. 4   Students

Students should use technological devices in a positive way and should practice as much as they can before and after the instruction given by teachers. They should do more research on a specific ICT topic in order to get in-depth understanding as well. They should also create an ICT club to share ideas and useful techniques for improving their ICT skills.

5. 3   Direction for future research

Based on the findings of this study, some possible ways are taking into consideration for future research as following:

Method: The next study should use a mix method, qualitative and quantitative, in order to get rich information.

Location and sample selection: The next study should focus not only on one case in a school but it is more practical if the next research can conduct in more than one school in various places. Also, the researchers should consider gender balance for selecting participants.

School management team involvement: The next study should include the school management teams in the study because they may understand the concept of ICT in education better than teachers or students. Also, they may have better ICT skills due to the fact that they use it more frequently.

5. 4   Limitation of the study

The study focused on qualitative method and it was a case study using a semi-structured interview. Moreover, its sample size was small with only one school and participants were only teachers and students. Also, it was conducted in a limit time frame and resources. As a result, its finding cannot imply to other different method of study or various places and background or distinctive participants as well. In addition, it was a special case because the selected site was a new model of schooling, New Generation School (NGS), so its results also apply to neither normal public schools nor other NGSs.

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Appendix A: Data Collection Tools

The main research instrument that will be used in this study is a semi-structured interview which comprises of open-ended questions in order to provoke the perception and experiences of the participants that will lead to the achieve the objectives of the research. All questionnaires have been divided into four parts. The first part was the general information, while the second part required the respondents to indicate their knowledge on ICT in education and ICT usage. The third section contained the items of benefits and challenges of using ICT in secondary education. The last part required the participants express their opinion regarding the ICT professional development, technical support, and facilities.

A. Open-ended questions for semi-structured interview (Students)

Interview Protocol

The purpose of this interview is to support me doing a research on the benefits and challenges of ICT integration in secondary education at New Generation School (NGS). This interview will spend around 30-40minutes for each interviewee. It will be used an audio recorder to record all information from interviewees which will be kept for confidential. Interviewees can either answer or not answer any questions whenever they feel comfortable or uncomfortable with and even they want to stop the conversation at any time.

   I. **General Information**

   1. Full Name:
   2. Sex: ☐M   ☐F
   3. Age: ....
   4. Grade: ....

   II. **Knowledge on ICT in Education and ICT Usage**

1. What does ICT in education mean to you?
2. Can you tell me the ICT facilities that you know?
3. Does your school have a computer lab?
4. How often do you use ICT in learning activities?
5. How well are you in using a computer/laptop?
6. How many topics have you learnt for ICT in your grade? What are they?
7. How many hours per week for you to learn and practice ICT?

III.   Benefits and Challenges of using ICT in Secondary Education

1. How is your school atmosphere for ICT integration in teaching and learning activities?
2. What ICT facilities do your school have to assist students with learning activities?
3. How do you use ICT in your classroom for learning activities?
4. How does ICT help you in learning activities?
5. What challenges do you have for ICT integration in learning activities in your school?

IV.   Students' Opinion of ICT in Secondary Education

1. What do you think about ICT integration in teaching and learning activities in this school?
2. Does ICT really help you to improve your learning activities in terms of the 21st centurey skills? Why or why not?
3. Do you have any suggestions regard to ICT integration in learning and teaching activities? If so, what are they?

B. Open-ended questions for semi-structured interview (Teachers)

Interview Protocol

The purpose of this interview is to support me doing a research on the benefits and challenges of ICT integration in secondary education at New Generation School (NGS). This interview will spend around 30-40minutes for each interviewee. It will be used an audio recorder to record all information from interviewees which will be kept for confidential. Interviewees can either answer or not answer any questions whenever they feel comfortable or uncomfortable with and even they want to stop the conversation at any time.

I. General Information

1. Full Name:
2. Sex: ☐M   ☐F
3. Age: ....
4. Education Background: ☐Primary   ☐Lower Secondary   ☐Upper Secondary   ☐Bachelor   ☐Master   ☐Others...............................
5. Subject Taught: ....
6. Teaching Experiences (Years): ....

II. Knowledge on ICT in Education and ICT Usage

1. What does ICT in education mean to you?
2. Can you tell me the ICT facilities that you know?
3. Does your school have a computer lab?
4. How often do you use ICT in teaching activities?
5. How well are you in using a computer/laptop?
6. How many topics have you taught using ICT in your grade? What are they?
7. How many hours per week for you to learn and practice ICT?

III. Benefits and Challenges of using ICT in Secondary Education

1. How is your school atmosphere for ICT integration in teaching and learning activities?
2. What ICT facilities do your school have to assist teaching and learning activities?
3. How do you use ICT in your classroom for teaching activities?

4. How does ICT help you in teaching activities?

5. What challenges do you have for ICT integration in teaching and learning activities in your school?

IV. Teachers' Opinion of ICT in Secondary Education

1. What do you think about ICT integration in teaching and learning activities in this school?

2. Does ICT really help you to improve your teaching activities in terms of the 21st centurey skills? Why or why not?

3. Do you have any suggestions regard to ICT integration in learning and teaching activities? If so, what are they?

បញ្ជីសំណួរសម្រាប់សម្ភាសសិស្ស

សេចក្ដីណែនាំ

      គោលបំណងនៃការសម្ភាសនេះគឺជាជំនួយក្នុងការស្រាវជ្រាវមួយទៅលើបញ្ហាប្រឈមនានា និងផលប្រយោជន៍នៃការដាក់បញ្ចូល បច្ចេកវិទ្យាព័ត៌មាន និងសារគមនាគមន៍ក្នុងកម្រិតអនុវិទ្យាល័យនៅសាលាអនុវិទ្យាល័យ ជំនាន់ថ្មី (NGS) ខេត្ត កំពង់ចាមៗ។ បទសម្ភាសន៍នេះនឹងចំណាយពេលប្រហែល ៣០-៤៥នាទីសម្រាប់សិស្សម្នាក់ៗ។ ឧបករណ៍ថតសម្លេងនឹង ត្រូវប្រើសម្រាប់រក្សាទុកចម្លើយទាំងអស់របស់សិស្ស ដែលព័ត៌មានទាំងអស់នឹងត្រូវទុកជាការសម្ងាត់ៗ។ សិស្សអាចឆ្លើយ ឬ មិនឆ្លើយសំណួរណាមួយដែលគេយល់ថាមិនប្រពាល់អារម្មណ៍ ឬបប្រពាល់អារម្មណ៍របស់គេ និងគេក៏អាចបញ្ឈប់ការ សម្ភាសនេះនៅពេលណាក៏បានប្រសិនបើគេចង់ៗ។

I. **ព័ត៌មានទូទៅ**

    1. ឈ្មោះ ៖...

    2. ភេទ ៖   □ប្រុស   □ស្រី

    3. អាយុ ៖............ឆ្នាំ

    4. ថ្នាក់ទី ៖.................

II. **ចំណាះដឹងលើបច្ចេកវិទ្យាព័ត៌មានក្នុងការអប់រំ និងការប្រើប្រាស់របស់វា**

    1. តើបច្ចេកវិទ្យាព័ត៌មានក្នុងការអប់រំមាននិយយយ៉ាងដូចម្ដេចសម្រាប់អ្នក?

    ....

    ....

    ....

    ....

    2. តើសម្ភារ: ឬឧបករណ៍បច្ចេកវិទ្យាព័ត៌មានណាខ្លះដែលអ្នកស្គាល់?

    ....

    ....

    ....

    ....

    3. តើសាលារបស់អ្នកមានបន្ទប់កុំព្យូទ័រដែរឬទេ?

....

....

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4. តើអ្នកប្រើប្រាស់បច្ចេកវិទ្យាព័ត៌មានក្នុងសកម្មភាពរៀនរបស់អ្នកញឹកញញាប់កម្រិត
   ណា?

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5. តើអ្នកប្រើប្រាស់កុំព្យូទ័រស្មាតជំនាញកម្រិតណា?

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6. តើអ្នកបានរៀនប្រធានបទអ្វីខ្លះពីបច្ចេកវិទ្យាព័ត៌មានក្នុងកម្រិតថ្នាក់របស់អ្នក?   ចូរ
   រៀបរាប់។

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7. តើអ្នករៀន និងអនុវត្តផ្ទាល់ជាមួយកុំព្យូទ័រប៉ុន្មានម៉ោងក្នុងមួយសប្ដាហ៍?

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III. ផលប្រយោជន៍ និងបញ្ហាប្រឈមនានានៃការប្រើប្រាស់បច្ចេកវិទ្យាព័ត៌មានក្នុងការអប់រំកម្រិតអនុវិទ្យាល័យ

1. តើស្ថានភាពសាលារបស់អ្នកយ៉ាងដូចម្ដេចដែលចំពោះការបញ្ចូលបច្ចេកវិទ្យាព័ត៌មាន ក្នុងការបង្រៀន និងរៀន?

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2. តើសាលារៀនរបស់អ្នកមានសម្ភារៈបច្ចេកវិទ្យាអ្វីខ្លះក្នុងការជួយដល់សកម្មភាព រៀន?

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3. តើអ្នកប្រើប្រាស់បច្ចេកវិទ្យាព័ត៌មានដោយរបៀបណាសម្រាប់សកម្មភាពរៀនក្នុង ថ្នាក់របស់អ្នក?

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4. តើបច្ចេកវិទ្យាព័ត៌មានជួយអ្នកយ៉ាងដូចម្ដេចខ្លះក្នុងសកម្មភាពរៀននានា?

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5. តើអ្នកជួបបញ្ហាប្រឈមអ្វីខ្លះសម្រាប់ការបញ្ចូលបច្ចេកវិទ្យាព័ត៌មានក្នុងការរៀននៅ សាលារៀនរបស់អ្នក?

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IV. យោបល់របស់សិស្សពីបច្ចេកវិទ្យាព័ត៌មានក្នុងការអប់រំកម្រិតអនុវិទ្យាល័យ

1. តើអ្នកយល់ឃើញយ៉ាងដូចម្តេចចំពោះការបញ្ចូលបច្ចេកវិទ្យាព័ត៌មានក្នុងការ
បង្រៀន និងរៀននៅសាលារៀននេះ?

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2. តើបច្ចេកវិទ្យាព័ត៌មានពិតជាជួយឲ្យសកម្មភាពរៀនរបស់អ្នករីកចម្រើនតាមរបៀប
រៀនបែបសតវត្សទី២១មែនឬ? ហេតុអ្វី?

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3. តើអ្នកមានសំណូមពរអ្វីខ្លះ ចំពោះការបញ្ចូលបច្ចេកវិទ្យាព័ត៌មាន ក្នុងការរៀន និង
បង្រៀន? ចូររៀបរាប់។

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សូមអរគុណ!

បញ្ជីសំណួរសម្រាប់សម្ភាសគ្រូ

សេចក្ដីណែនាំ

       គោលបំណងនៃការសម្ភាសនេះគឺជាជំនួយក្នុងការស្រាវជ្រាវរួមទៅលើបញ្ហាប្រឈមនានា និងផលប្រយោជន៍ នៃការដាក់បញ្ចូល បច្ចេកវិទ្យាព័ត៌មាន និងសារគមនាគមន៍ក្នុងកម្រិតអនុវិទ្យាល័យនៅសាលាអ៊ុនជីនាន់ថ្មី (NGS) ខេត្ត កំពង់ចាមៗ បទសម្ភាសន៍នេះនឹងចំណាយពេលប្រហែល ៣០-៤០នាទីសម្រាប់គ្រូម្នាក់ៗៗ ឧបករណ៍ថតសម្លេងនឹងត្រូវ ប្រើសម្រាប់រក្សាទុកចម្លើយទាំងអស់របស់គ្រូ ដែលព័ត៌មានទាំងអស់នោះនឹងត្រូវទុកជាការសម្ងាត់ៗ ត្រូវអាចឆ្លើយ ឬមិន ឆ្លើយសំណួរណាមួយដែលគាត់យល់ថាមិនបង្ហាញអារម្មណ៍ ឬបង្ហាញអារម្មណ៍របស់គាត់ និងគាត់ក៏អាចបញ្ឈប់ការ សម្ភាសនេះនៅពេលណាក៏បានប្រសិនបើគាត់ចង់ៗ

    I.   ព័ត៌មានទូទៅ

       1.   ឈ្មោះ ៖.................................

       2.   ភេទ ៖   □ប្រុស   □ស្រី

       3.   អាយុ ៖............ឆ្នាំ

       4.   កម្រិតវប្បធម៌ ៖   □បឋមភូមិ   □ទុតិយភូមិ   □បរិញ្ញាបត្រ   □អនុបណ្ឌិត
                   □ផ្សេង

       5.   មុខវិជ្ជាបង្រៀន ៖................................

       6.   បទពិសោធន៍បង្រៀន ៖............ឆ្នាំ

    II.   ចំណេះដឹងលើបច្ចេកវិទ្យាព័ត៌មានក្នុងការអប់រំ និងការប្រើប្រាស់របស់វា

       1.   តើបច្ចេកវិទ្យាព័ត៌មានក្នុងការអប់រំមាននិយាយយ៉ាងដូចម្តេចសម្រាប់អ្នក?

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       2.   តើសម្ភារៈ ឬឧបករណ៍បច្ចេកវិទ្យាព័ត៌មានណាខ្លះដែលអ្នកស្គាល់?

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3. តើសាលារបស់អ្នកមានបន្ទប់កុំព្យូទ័រដែរឬទេ?

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4. តើអ្នកប្រើប្រាស់បច្ចេកវិទ្យាព័ត៌មានក្នុងការបង្រៀនរបស់អ្នកញឹកញាប់កម្រិតណា?

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5. តើអ្នកប្រើប្រាស់កុំព្យូទ័រស្ទាត់ជំនាញកម្រិតណា?

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6. តើអ្នកបានបង្រៀនប្រធានបទអ្វីខ្លះ   ដោយប្រើបច្ចេកវិទ្យាព័ត៌មានក្នុងកម្រិតថ្នាក់
    របស់អ្នក? ចូររៀបរាប់។

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7. តើអ្នករៀន និងអនុវត្តផ្ទាល់ជាមួយកុំព្យូទ័រប៉ុន្មានម៉ោងក្នុងមួយសប្ដាហ៍?

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III. **ផលប្រយោជន៍ និងបញ្ហាប្រឈមនានានៃការប្រើប្រាស់បច្ចេកវិទ្យាព័ត៌មានក្នុងការអប់រំកម្រិតអនុវិទ្យាល័យ**

1. តើស្ថានភាពសាលារបស់អ្នកយ៉ាងដូចម្តេចដែលចំពោះការបញ្ចូលបច្ចេកវិទ្យាព័ត៌មាន ក្នុងការបង្រៀន និងរៀន?

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2. តើសាលារៀនរបស់អ្នកមានសម្ភារៈបច្ចេកវិទ្យាអ្វីខ្លះក្នុងការជួយដល់សកម្មភាពរៀន និងបង្រៀន?

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3. តើអ្នកប្រើប្រាស់បច្ចេកវិទ្យាព័ត៌មានដោយរបៀបណាសម្រាប់សកម្មភាពបង្រៀនក្នុង ថ្នាក់របស់អ្នក?

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4. តើបច្ចេកវិទ្យាព័ត៌មានជួយអ្នកយ៉ាងដូចម្តេចខ្លះក្នុងសកម្មភាពបង្រៀននានា?

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5. តើអ្នកជួបបញ្ហាប្រឈមអ្វីខ្លះសម្រាប់ការបញ្ចូលបច្ចេកវិទ្យាព័ត៌មានក្នុងការរៀន និង
បង្រៀននៅសាលារបស់អ្នក?

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IV. យោបល់របស់គ្រូពីបច្ចេកវិទ្យាព័ត៌មានក្នុងការអប់រំកម្រិតអនុវិទ្យាល័យ

1. តើអ្នកយល់ឃើញយ៉ាងដូចម្ដេចចំពោះការបញ្ចូលបច្ចេកវិទ្យាព័ត៌មានក្នុងការ
បង្រៀន និងរៀននៅសាលារៀននេះ?

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2. តើបច្ចេកវិទ្យាព័ត៌មានពិតជាជួយឲ្យសកម្មភាពបង្រៀនរបស់អ្នករីកចម្រើនតាម
របៀបបង្រៀនបែបសតវត្សទី២១មែនឬ? ហេតុអ្វី?

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3. តើអ្នកមានសំណូមពរអ្វីខ្លះ ចំពោះការបញ្ចូលបច្ចេកវិទ្យាព័ត៌មាន ក្នុងការរៀន និង
បង្រៀន? ចូររៀបរាប់។

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សូមអរគុណ!