A LITERATURE REVIEW TO DEVELOP A GUIDELINE TO PROMOTE APPROPRIATE TECHNOLOGY USE IN EARLY CHILDHOOD LEARNING AND DEVELOPMENT FOR PARENTS AND NURSERY WORKERS[1]

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Abstract

Significance: Technologies have become an inextricable part of today's life and living for people of all ages. In younger ages or early childhood, use of technologies can have both positive and negative impacts and therefore warrants a guideline to maximize the benefits of these technologies.

Objective: This article presents a guideline to promote appropriate use of technologies for the purpose of early childhood learning and development for parents and nursery workers in a childcare centre setting.

Methods: The authors reviewed the literature regarding technologies involving early childhood learning and development and identified benefits and risks associated with the use of such technologies. We consulted the parents with regards to how parents and other significant adults played roles in promoting appropriate use of technologies for learning. A guideline was developed by the authors and assessed for its feasibility by 5 experts, and 11 nursery workers.

Results: Technologies involved in early childhood learning and development include smart phones, computers, television, digital toys, applications, online games, videos and entertainments, and social media. The literature suggests that these technologies have both negative and positive impacts on children, their learning, and development. These impacts involve social, physical, emotional, creativity, intelligence, autonomy, and language development. The guideline to maximize the benefits of technologies for learning and development include: 1) Strategic selection of technologies, 2) Minimization of technology-associated risks, and 3) Involvement of parents and adults for effective early childhood learning and development. The experts and nursery workers agreed that this guideline is feasible. Parents suggested that the involvements of adults include: technology selection, playing with the child while playing, supporting the child to play with friends, safety monitoring, teaching discipline, giving praise, teaching the child how to play or use the technologies, maintaining cleanliness, intervening conflicts between children, and teaching the child to share with others.

Keywords: Early childhood development, Technologies, Guideline, Parents, Nursery workers

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Introduction

Technology is widely used in education, nowadays the Thai government attaches great importance and recognizes the benefits of using technology in education. It also supports and stimulates the use of information technology for the country's development. Technology for education is specified in many plans and policies of the ministry of education. For example, the National Education Act 1999, Section 9 on educational technologies, the main content of this act is to support all educational institutions to use information technology and integrate with teaching and learning at all levels. The Minister of Education, Thailand, Mr. Chaturon Chaisang, told at a special lecture on Smart Education policy for quality education that Nowadays, technology has developed to be used in unlimited teaching. How educational management provided in this changing world is going to be organized this is the major concern. Presently, the world is filled up with the information and ample of the knowledge gained. The traditional teaching will not be consistent with these (Thairath Online, 2013). Therefore, the use of technology will help educators and parents in teaching. The use of technology in education gives educators and parents the opportunity to make learning fun and attainable.

Significance

Nowadays, the flow of society in Thailand has increased the use of technology, making technology an important part of modern life and for people living in all ages. Most people believe that having knowledge of technology is essential to everyday life especially in education, business and communication. This is due to the technology's more efficient features. Technology has taken on educational roles at all levels from early childhood throughout higher education. As a result, the educational management in Thailand is organized through computer networks. Internet can be used as teaching aids in delivering knowledge and information. In the world without borders, this makes it easy for learners to access information and learns all by themselves. Almost all kindergartens, technology is used in the management of academic affairs, teaching and learning by using technology in the form of a computer, a tablet and a television. Since technology began to play a role in early childhood, it gives both positive and negative impact. Parents are not sure whether the technology that is used to teach early childhood is appropriate or not. At present, many early childhood scholars still do not agree with the technology applied to early childhood because of it adverse effect on the brain. Children much learn more from the direct experiences, they need to contact with the real object including the size, weight, texture, and several of shapes via their sensory nerves. Therefore, to activate functions of the brain, we need to let the brain perceive the image and three dimensions material of which the brain need to understand the depth dimension of the object through touching and not only by observing. The technology used for early childhood is the two-dimensional which is a one way communication. This cannot substitute the stimuli from the interaction to adults. The impact of technology on brain function is significant to learning. This leads the stakeholders for

early childhood care such as teacher, schools, and government need to look back at the problems and ways to promote the use of technology appropriately, maximize the benefits of these technologies, consistent with the nature and development of children. The principles of learning management and principles of the brain function for early childhood in order to develop all aspects appropriately and the immunity to grow as a quality person among the society of the technology age.

Literature Review

This paper the authors would like to presented the meaning of early childhood, concepts of early childhood education, and educational technology for early childhood development respectively as the follows:

1) Early Childhood Development

1.1 Meaning of Early Childhood

Early childhood refers to children from birth to six years of age, whose quality of life, physical, emotional, social and intellectual, is beginning to be fully realized. (Massoglia, 1997).

Office of the National Education Commission (1979) stated that early childhood" refers to the children in daycare or children in development center as (preschool centers), or children in kindergartens level 1 and level 2 in public and private schools or junior kindergarten is a part of the school, which is generally around 3-6 years old.

Therefore, the authors would like to define that early childhood refers to the children ages from birth to 6 years whose quality of life, physical, emotional, social and intellectual, is beginning to be fully realized, and need to be educated formally and informally.

1.2 Early childhood education

Refers to the education provided for children aged from birth to six years which is special for the children of this age, and is quite different from the other ages. Children at this age are a significant age for the foundation of personality and brain development. Education for children at this age has many different terms. Each program has its own methods and characteristics for organizing activities that are aimed at helping children develop in different ways. Early childhood education should help children develop and fully learn. The concept of education for children of all ages should play an important role in the society (Massoglia, 1997) as follows: Promote the development of children in all aspects from birth to school; Establish the basic health care of children from the beginning as well as children with defects; Home environment should help children grow and development in all aspects; Parents should be the

first teachers who are important to children; Influence from the home affects the process of child development.

In early childhood education there are three important components to be considered as follows: First, the children, teachers and parents should understand about the psychological developmental, the nature of children and their needs, developmental steps, enthusiasm, different background, and friend (Lukutalapang, 2013).

Second, parents are the first teachers of the children and the role models that could help promoting learning. The study found that parents were involved in providing parenting and education and sets good role model for children. Children can learn from the real experience that they directly experience, so the education should be incorporated with parents into the management of education for children (Hibb, 2017).

Third, teachers, caretakers, mentor and other personnel involved in parenting and education for children. They are important for parents to educate their children in order to grow and develop. Therefore, these people should have the knowledge and understanding about the education of children at this age. Studying about the development of children will help us understand the nature and development of children in each age range. This will allow us to provide the experiences, learning and teaching activities, and educate the children appropriately for the children's development (Niamsorn, 2015).

2) Educational technology for early childhood

Educational technology refers to the electrical and electronic appliances that are used to support education, including computers, computer programs, television sets, video-player, recorder, digital camera, mobile phones etc. (Arunothai, 2010) and help in different kinds of learning. At present, there are many technological changes, especially the information technology related to receiving and sending substantial message which are relevant to the reception and delivery of materials that affect education. Therefore, the role of families, teachers and society should promote learning and provide learning opportunities related to information technology in order to access to the knowledge and information promptly.

Nowadays, technology is widely used in schools. There is a study about early childhood education and technology, the study provided feedback on the use of technology, especially computers and demonstrated positive and negative affects especially for computer and laptop (Lokutalapang, 2013). Even through, technology may help support learning and development of children, at the same time the use of computers to organize activities did not demonstrate the value of child development as equal as other activities, such as art activities, playing blocks, sand

plays, books, fictional activities, etc., even though computers are the kind of tools that can be used to develop children, opportunities are used improperly and may have the adverse effect. It is important to have a computer as an activity or a tool for children but the selection will lead to the development of learning and creative thinking. So it is suggested that caretakers must be very selective in the use of technology in learning including the use of appropriate methods in bringing the computer to the learning of children. The time exposure to the technology is also important. The parents and teachers should be aware that overexposure to the computers leads to addiction.

Objective

This article presents a guideline to promote appropriate use of technologies for the purpose of early childhood learning and development for parents and nursery workers in a childcare center setting.

Methods

The authors reviewed the literature regarding technologies involving early childhood learning and development and identified benefits and risks associated with the use of such technologies. We consulted the parents with regards to how parents and other significant adults played roles in promoting appropriate use of technologies for learning. A guideline was developed by the authors and assessed for its feasibility by 5 experts, and 11 nursery workers.

Results

Based on the review of the studies, which were all published between 2008 and 2017, it could be supported that the inclusion of guideline related to promote appropriate technology use in early childhood learning and development for parents and nursery workers. The results showed the roles of parents and the roles of the teachers as follows:

1) Parental role and technology use in early childhood

Parents are important persons in parenting and promoting the development of children from birth. The need for knowledge with understanding child development .Using technology to enhance learning, parents must watch. And, provide guidance to guide the pros and cons of using technology. If the children have any questions or problems, parents can correct it and should cultivate the discipline for children (Chatayaph, 2016). Parents in the 21st century must have a way to manage their children in the digital age. The role of parents with technology is therefore less important than teachers and to select and find out how to use the technology properly (Hibb, 2017). A good culture of technology can have a significant impact on the development of children's potential. There are suggestions for parents' role in technology; Parents should have knowledge of all types of technology to study how to use advantages and disadvantages of technology. While playing a technology device, such as a computer, tablet, smartphone, or even a

television it should be organized as an activity together with children to be consultants for children (Jaista, 2010). In case of parents who do not have the knowledge of technology can study and play together with their children, resulting in good interpersonal interaction; if it is a computer technology, it should be placed in the easy-to-see part, while the children play computer should be in the eyes of the parents all the time; Allow the children to play computer when they are interested. Do not force or encourage children to play; Install software to protect the risks from unwanted website in order to find solutions promptly at the beginning; (Khansingha & Kulapichitr, 2015). Parents use technology with their children, this is a good family activity and parents can put disciplines as well as social etiquette to children as well; Parents and guardians must schedule time to use the technology because all types of technology will have a negative impact. If used incorrectly, it may harm children such as myopia, obesity, ADHD; Organize computer programs appropriate to the age and ability of children should be composed of simple, short and compact, promoting skills for children should not choose a game that is competitive, but it will make children hope but overcome. This will result in child stress and aggressive behaviors (Niamsorn, 2015).

At present, parents have the role to use technology to promote the learning and development of children. However, in the current situation, all children are easily access to the technology, cannot avoid the use of computers, televisions and tablets that have both advantages and disadvantages. So that parents and guardians should select these devices, such as selecting the right program or game for their brain development and skills (Arunothai, 2010). Parents should control the duration of using computers or technology devices to avoid health problems and parents have to be good examples of using technology. Parents need to take care of their children closely to find activities such as doing homework, planting vegetables, planting trees, watering trees to instill a love of nature and practice the children to spend free time. And let children read books to cultivate the habit of reading love. And prevent the problem of using technology incorrectly. Using smart technology helps parents raise their children to live smart and quality in the world of technology.

2) Role of early childhood teachers in using technology for early childhood

Primary school teachers are very important to the development of the nation. Because teachers are the first instructors in education, they need technology knowledge in accordance with the regulations governing professional practice standards (Khurusapha, 2013). The technology is used in teaching to plan and design teaching activities to suit the abilities of children. To integrate the activities in order to be consistent with the nature and development of the child and the learning needs of the child, so that the effective learning and ability of the teachers directly affect the development of children (Zeller, 2009). There are many studies on the behavior and effects of using technology with early childhood. A study conducted by Schmid,

Miodrag, & Difrancesco (2008), found that the technology used to teach children to stimulate and motivate children to learn more consistent with the Morrow's study (Morrow, 2009), children have improved writing and reading. The child develops thinking and social well (O'Hara, 2008). Consistent with the study of Brito (2010) that had studied on the use of technology to help teach children in the age of 2-5 years and is useful in motivating children to develop creativity and encourage children to interact and learn from each other. It also helps in language development but it must be used properly. Therefore, the ability of teachers in technology is essential for early childhood education in modern times (National Association for the Education of Young Children, 2012). From the above concepts, the authors would like to suggest that teachers may adopt technology help providing learning and teaching experiences for early childhood in order to the development of all aspects of the children.

The guideline to maximize the benefits of technologies for learning and development are:

1) Strategic selection of technologies

Parent and teacher Selection of technology that is appropriate to the age and development of children; choose a technology that is durable and of appropriate size for children; should not let children under 2 years use the technology such as television, smartphone, tablet, and computer, etc.; start using technology to promote learning for children at the ages of 2-3 years old; prioritize educational application such as games, quizzes, memory tests, animal games, and drawing games over non-educational applications.

2) Minimization of technology-associated risks in Early Childhood.

Parents and teachers should monitor the safety of the children while using technology. The following details: the instructions for using the technology for your child such as age appropriateness, and safe duration, etc.; early childhood use applications or programs such as "ABC Ya", "Cookie" and "Fuel the Brain" and not allow children to use the application or program that may affect the behavior and emotions, such as shooting games, gun fighting;set up a smartphone screen to blue light filter mode before allowing the children to use it; parent limit the use of technology; children aged 3-4 years old to use technology beyond 30 minutes and children aged 5-6 years old to use technology beyond 1 hour and follow the 20-20-20rule (use the device 20minutes, rest eyes for 20minutes and look away 20feet and then resume use) to reduce the risk of macular degeneration when supervising the children's use of technology.

3) Parent's and adult's involvement for effective early childhood learning and development.

A guideline was developed to promote the use of appropriate technology in early childhood learning and development for parents and nursery workers in Childcare Center, Boromarajonani College of Nursing, Nakhon Lampang. After the guideline was developed, the authors asked five experts in the field to validate the guidelines. Then, the authors also tested for the feasibility of the guideline by conducting a pilot study as a survey using questionnaires among the total of 11 nursery workers. All participants were asked to rate the questionnaires about the Guidelines for using technology for children that divided into two parts: feasibility and practice, and covered three aspects: selection of technology, engaging with children throughout play, and safety precautions and surveillance. The results were presented as follows:

3.1 The feasibly of using technology for children

1) Aspect of the selection of technology, all nursery workers agree with the feasibility towards choosing a technology that is durable and of appropriate size for children and should not let children under 2 years use the technology such as television, smartphone, tablet, and computer, etc as showed on **Table 1**.

2) Aspect of Safety precautions and surveillance, all nursery workers agree with the feasibility towards using early childhood applications or programs such as "ABC Ya", "Cookie" and "Fuel the Brain", do not allow children to use the application or program that may affect the behavior and emotions, such as shooting games, gun fighting and do not allow children aged 5-6 years old to use technology beyond 1 hour as showed on **Table 1**.

3) One hundred percent of nursery workers agree with the feasibility aspect of praise the children when they use technology appropriately and use technology to build relationships and trust with your children as showed on **Table 1**.

3.2 The practice of using technology for children

As the result, the guideline develop based on theory, directed training experience and literature review findings, in order to train parents and nursery workers in Thailand.

The survey results showed that the majority of nursery workers, 72.7%, use technology to build relationships and trust with your children. On the other hand, the minority of nursery workers in practice was 18.2 % which is safety precautions and surveillance aspect in part of using early childhood applications or programs such as "ABC Ya", "Cookie" and "Fuel the Brain" and following the 20-20-20rule (use the device 20minutes, rest eyes for 20minutes and look away 20 feet and then resume use) to reduce the risk of macular degeneration when supervising the children's use of technology as showed on **Table 1**.

Table 1: Feasibility of Guideline Implements and Current Practice among Nursery Workers (n= 11)

No.	Guidelines for using technology for children	Feasibility		Practice	
		YES	%	YES	%
1	**Selection of technology**				
1.1	You choose a technology that is durable and of appropriate size for children.	11	100	5	45.5
1.2	You should not let children under 2 years use the technology such as television, smartphone, tablet, and computer, etc.	11	100	7	63.6
1.3	You start using technology to promote learning for children at the ages of 2-3 years old.	10	90.91	7	63.6
1.4	You prioritize educational application such as games, quizzes, memory tests, animal games, and drawing games over non-educational applications.	10	90.91	6	54.5
2	**Engaging with children throughout play**				
2.1	You teach children how to use.	10	90.91	5	45.5
2.2	You ask questions to encourage children in order to learn about the content that children are using.	10	90.91	6	54.5
2.3	You help guide children on how to solve problems during the use of technology.	10	90.91	5	45.5
3	**Safety precautions and surveillance**				
3.1	You follow the instructions for using the technology for your child such as age appropriateness, and safe duration, etc.	10	90.91	5	45.5
3.2	You use early childhood applications or programs such as "ABC Ya", "Cookie" and "Fuel the Brain"	11	100	2	18.20
3.3	You do not allow children to use the application or program that may affect the behavior and emotions, such as shooting games, gun fighting.	11	100	4	36.4
3.4	You set up a smartphone screen to blue light filter mode before allowing the children to use it.	10	90.91	3	27.3
3.5	You do not allow children aged 3-4 years old to use technology beyond 30 minutes.	10	90.91	4	36.4
3.6	You do not allow children aged 5-6 years old to use technology beyond 1 hour.	11	100	3	27.3
3.7	You follow the 20-20-20rule (use the device 20 minutes, rest eyes for 20minutes and look away 20feet and then resume use) to reduce the risk of macular degeneration when supervising the children's use of technology.	9	81.80	2	18.20

No.	Guidelines for using technology for children	Feasibility		Practice	
		YES	%	YES	%
3.8	You use technology to teach children or let children play with technology at least once a day.	10	90.91	3	27.3
3.9	You observe the behavior and reaction of children that indicate their demand for continuing use of technology such as aggressive behavior and cry.	10	90.91	6	54.5
4	You teach the children about discipline related to technology use and exercise appropriate control over the use.	8	72.73	6	54.5
5	You think children should have their own technology to learn and play.	7	63.40	5	45.5
6	You check whether the technology is safe, intact and clean before allowing the children to use it.	7	63.40	4	36.4
7	You teach the children to share technology with their friends and ask the children to teach their friends how to use the technology.	10	90.91	3	27.3
8	You praise the children when they use technology appropriately.	11	100	6	54.5
9	You use technology to build relationships and trust with your children.	11	100	8	72.7

In addition, parents suggested that adult's participation include: selection of the technology, joining with the child during they are playing, encouraging the child to play with friends, safety monitoring, teaching discipline in using technology, giving praise, teaching the child how to play or use the technologies, maintaining cleanliness, intervening conflicts between children, and teaching the child to share with others.

Discussion and Conclusion

The technology used to promote learning and development with early childhood. Teachers and Parents needed to be ready to seek for such guidelines to prevent children from being affected by inappropriate technology. It is necessary to adjust the thinking system of teaching and learning based on the principles of organizing early childhood experiences for developing the essential skills of the 21st century. It is based on an understanding of the child's development, needs, and learning styles. Using technology in early childhood may affect children both positive and negative sides. if utilized the technology inappropriately, It will induce health problem of the children, in contrast, if the technology provided appropriately, it helps promote new experiences, learn happily, grow and develop into mature adult.

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