The Use of Technology in the Cognitive Development of Early Children

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Abstract: This study was conducted to analyze how the effect of gadget use in early childhood on children's cognitive development. This research is a qualitative descriptive study. The source of the data used is the result of observations of children and parents regarding the use of gadgets in children's cognitive development at Kindergarten Risanti I, West Jakarta. The research result show use of gadgets in children can improve cognitive development of children. Through gadgets, children can learn independently about language or mathematics. Children's learning through gadgets must be under the supervision of parents. Children should not be allowed to use gadgets as they wish. The positive impact of using gadgets on children, consisting of: Improved cognitive skills, More fun for kids, and Educating young ones. The negative impact of using gadgets on children, consisting of: Learning problems, Anxiety, Lazy thinking, Decreased concentration, and hyperactivity.

Keywords: Gadget, Cognitive Development.

1. INTRODUCTION

The era of digital society in Indonesia is shown by the rapid development of Information and Communication Technology (ICT), particularly the telecommunications industry in recent years. There has been a shift from the use of fixed wireline to the use of cellular telephones, and even the rapid use of the internet via cellular telephones.

According to a national socio economic survey 2019, 47.69 percent of Indonesian population has accessed to the internet in 2019. The high use of the internet reflected a climate of information openness and the acceptance of society to the development of technology and changes toward the information society [1].

The use of technology today is more towards digital technology. One of the popular technologies at this time is the gadget. Indeed, this tool has a great influence on human life, as well as for children. From a psychological perspective, childhood is a golden age in which children learn to express their imagination in the form of pictures.

Little is knowing about the actual impact of the technology on the developing minds and bodies of children, particularly those from socio economically disadvantage families. Furthermore, because of the overall increase in gadget ownership, children may have more access today than ever to a gadget in their home or other informal setting (eg, parents' workplace, child care center, baby-sitter’s home, a relative’s home).

The children may use a gadget in a number of ways: playing games, watching pictures, watching video, or observing or imitating parents/adults using a computer. A recent national survey found that young public school children with access to gadget used them every days a week with the purposes of use varying.

With the increasing prevalence of access to gadgets for learning activities in...
schools, it seems that the preschool years are the most promising opportunity to close the socio-economic gap in access to gadgets. However, the potential value of gadgets in early childhood development has been the subject of debate among parents, school teachers, and researchers for decades [2].

Although a number of child development theories have been used in the literature to determine the effect of gadgets on early childhood (either positive or negative) [3], empirical evidence is scarce and conflicting. Studies have found that the use of gadgets improves children's fine motor skills [4], alphabet recognition, concept learning, numerical recognition, numeracy skills and pre-mathematical knowledge, and cognitive development [3]. Applying the use of gadgets to learning in children leads to improved cognitive, motor, and language scores (as measured by the initial screening test).

This study was conducted to analyze how the effect of gadget use in early childhood on children's cognitive development.

2. LITERATURE REVIEW
2.1 DEFINITION OF ICT
ICT stands for "Information and communication technology". It refers to technology that provides access to information via telecommunications. It is similar to Information Technology (IT) but focuses primarily on communication technology. This includes the internet, wireless networks, cell phones, and other communication media. The use of ICT in learning programs in schools can help children participate in fun learning activities. In addition, the use of ICT in teachers can help improve the quality of teachers to teach effectively.

According to UNESCO, "ICTs are scientific, technological and technical disciplines and management techniques used in dealing with information, its application and its relation to social, economic and cultural issues". Teachers are a major part of the education sector in society. Teachers are mostly working to improve the quality of society in every field. Skilled teachers can make creative students in the form of social workers, politicians, poets, philosophers and others for society [5].

2.2 DEFINITION OF GADGET
Gadgets are small electronic devices that have a special function. One of the things that distinguishes gadgets from other electronic devices is the "novelty" element. Gadgets are tools related to today's technological developments. Which includes gadgets such as tablets, smartphones, notebooks, and so on [6]. This means that from day to day gadgets are always on appears by presenting the latest technology that makes human life more practical.

Gadgets are small electronic devices that have a special function. Among them are smartphones like the iPhone and blackberry, and notebook (a combination of portable computers such as notebooks and the internet) [7].

Gadget is an electronic device that has various service features and applications that present the latest technology that helps human life become more practical and has special functions.

2.3 COGNITIVE DEVELOPMENT STAGE
Theories that propose cognitive development include Piaget's theory, Vygotsky's theory, and Burner's theory [8]. According to Piaget, children are born with several sensorimotor schemata, which provide a framework for children's early interactions with their environment. The child's initial experience will be determined by this sensorimotor scheme. According to Piaget, intellectual growth that begins with a child's reflexive response to the environment will continue to develop to the point where the child is able to think about potential events and is able to mentally explore possible consequences.

Jean Piaget's cognitive theory is referred to as the main reference in the
kindergarten curriculum and even in education in general. Piaget, 1960 [9] suggests the stages in children's cognitive or intellectual development which are divided into four periods, namely: 1). The sensory-motor period of age 0-2 years; 2). Pre-operational period 2-7 years; 3). Concrete operational period, ages 6-12 years; 4). The formal operational period is 12 years old and above.

The theory of cognitive development according to Vygotsky is a theory in which children when learning get a big influence from their parents and the people around them. Because children if taught by parents and people who have been trained, the child will better understand and understand what he is doing and learning. In this theory, Vygotsky also emphasized how the mental development processes experienced by children.

Vygotsky's theory is a socio-cultural theory of cognition that focuses on how cognitive development is directed by culture and social interactions. So, culture and social interactions are more important and more focused on cognitive development in children according to Vygotsky [8].

Vygotsky argued that there are four key basic principles in learning, namely: 1). The Concept of the Zone of Proximal Development (ZPD), Vygotsky terms the Proximal Development Zone (ZPD), namely children who get tasks that are difficult for children to do on their own. However, if it is assisted by an adult or by a trained person, the child can do the task that is deemed difficult; 2). Scaffolding Concept, Vygotsky explained about the changes in support experienced by children during the learning process related to cognitive development; 3). Language and Thought. According to Vygotsky, the conversation carried out by children is not only to communicate, but to help them meet their needs. Because by using language even though the language spoken is not perfect, it already represents what the children want or say. According to Bruner, meaningful learning can only occur through discovery learning. Knowledge acquired through discovery learning lasts longer, and has a better transfer effect. Discovery learning improves reasoning and independent thinking skills and trains cognitive skills for problem finding and solving.

In this respect Bruner differentiates into three stages. The three stages are: 1). The information stage, which is the initial stage for gaining new knowledge or experience; 2). The transformation stage, namely the stage of understanding, digesting and analyzing new knowledge and being transformed into new forms that may be useful for other things; 3). The evaluation stage, which is to find out whether the results of the transformation in the second stage are correct or not.

Based on the description above, it can be concluded that Piaget views that children's cognitive development is obtained through individual experience, while Vygotsky states that children's development is determined by the role of adults. Meanwhile, according to Bruner, children's development is determined by discovery, namely learning by finding their own concepts.

3. METHOD
This research is a qualitative descriptive study, the source of the data used is the result of observations of children and parents regarding the use of gadgets in children's cognitive development at Kindergarten Risanti I, West Jakarta.

4. RESULT AND DISCUSSION
4.1 USE OF GADGETS
Respondents in this study consisted of 62 students. Respondents in this study consisted of 62 students. Respondents consisted of 32 boys (52%) and 30 girls (48%). The frequency of using gadgets varies between children who own gadgets. Some children (2%) at least once a day, while some children (82%) used gadgets on average for more than two hour a day. 10 of children (16%) use gadgets 1-2 hours a day. Of the children
who had used gadgets, 48% used learning software, 26% used art-oriented software, 100% played games, 100% watched online videos.

Table 1. Demographic Characteristics and Use of Gadget

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>%</th>
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<tbody>
<tr>
<td>Male</td>
<td>32</td>
<td>52%</td>
</tr>
<tr>
<td>Female</td>
<td>30</td>
<td>48%</td>
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</tbody>
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<table>
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<tr>
<th>Frequency of Using Gadgets</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>at least once a day</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>1-2 hours a day</td>
<td>10</td>
<td>16%</td>
</tr>
<tr>
<td>more than 2 hours a day</td>
<td>51</td>
<td>82%</td>
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<table>
<thead>
<tr>
<th>Used gadgets</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Playing Games</td>
<td>62</td>
<td>100%</td>
</tr>
<tr>
<td>Watched online videos</td>
<td>62</td>
<td>100%</td>
</tr>
<tr>
<td>Used learning software</td>
<td>30</td>
<td>48%</td>
</tr>
<tr>
<td>Used art-oriented software</td>
<td>16</td>
<td>26%</td>
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4.2 COGNITIVE DEVELOPMENT OF CHILDREN

Children who rarely spend time with gadgets will have their cognitive abilities honed through problem solving when playing with peers or playing active props, for example playing lego, coloring with colored sand, feeding horses etc. Meanwhile, children who spend time with gadgets are not really interested in story books, but their cognitive or intellectual abilities are honed due to the experience of gadgets. Kids can watch interactive videos from YouTube or play games, thereby honing their problem-solving skills.

Gadgets will always improve children's cognitive skills. Modern gadgets help to develop their learning skills faster as they are more interested in gadgets then books [10]. Of the 62 children studied, all of them were able to do homework from school on time and did not find it difficult, so from this the researchers concluded that children who do not spend their time on gadgets and children who spend their time on gadgets both have cognitive abilities good.

In the cognitive aspects of children, the behaviors that arise are caused by gadgets, are lazy thinking, decreased concentration, unable to focus, hyperactivity, and learning difficulties.

Table 2. Impact of Gadgets on Cognitive Aspects

<table>
<thead>
<tr>
<th></th>
<th>strongly agree</th>
<th>agree</th>
<th>disagree</th>
<th>N</th>
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<tbody>
<tr>
<td>Lazy thinking</td>
<td>8</td>
<td>22</td>
<td>32</td>
<td>62</td>
</tr>
<tr>
<td>Decreased concentration</td>
<td>5</td>
<td>15</td>
<td>42</td>
<td>62</td>
</tr>
<tr>
<td>Unable to focus</td>
<td>9</td>
<td>18</td>
<td>35</td>
<td>62</td>
</tr>
<tr>
<td>Hyperactivity</td>
<td>8</td>
<td>26</td>
<td>28</td>
<td>62</td>
</tr>
<tr>
<td>Learning difficulties</td>
<td>28</td>
<td>24</td>
<td>10</td>
<td>62</td>
</tr>
</tbody>
</table>

Gadgets can reduce mentality student learning, students are not brave enough to take risks in exams so they find ways to cheat via gadgets. Gadget is a factor that affects student learning. Interest in learning is reduced and results in decreased student learning achievement [11].

4.3 THE POSITIVE IMPACT OF GADGETS USE

The positive impact of using gadgets on children, consisting of:

1. Improved cognitive skills

   Cognitive skills are the ability to process information, reasoning, remembering and relating objects with other objects. These skills are directly related to memory, and language [4]. Now a day’s technology helps faster and better development of cognitive skills in kids. The games which they use to play before whether it’s a puzzle or scribbling on drawing books everything now can be done on electronic devices. Like interactive apps, video games, different kinds of challenges and educative programs available on various kinds of devices. Such products would always improve a kid’s cognitive skills. The modern gadgets help to develop their learning skills faster as they are more interested in gadgets then books.

2. More fun for kids

   Gadgets are fun for kids while they use them. They enjoy playing games on them whether it’s a puzzle or race, or candy crush, or a simple first person shooter
game, children have fun and they understand simple aspects of cause and effect, action and reaction. Electronic devices have much more advanced learning options for children in a fun way than books or older methods.

3. Educating young ones

Technology has been proven to be very helpful in educating student. Children can access the educational websites and can get detailed information about required topic. Technology makes things better as have access to pile of material and can be very useful in research and understanding things better. Visual presentations, educational videos, interactive programs, learning tutorial and variety of books available all the time on internet has revolutionized education in a better way. Kids learn state of the art tools and methods by their own. Educational games help children to perform well in their studies. As they can have many online quizzes available, online tutorials and brainstorming riddles.

4.4 THE NEGATIVE IMPACT OF GADGETS USE

The negative impact of using gadgets on children, consisting of:

1. Learning problems

Children learn lot of things before the age of five even toddlers learning perspective is much faster than children. If they are using gadgets their time to communicate with their parents and learning is bounded. They need proper time talking with their parents so they can learn new words and how to communicate. They need their parents not gadgets. Also exposure of theses gadgets are linked to cognitive delays and impaired learning.

2. Anxiety

Anxiety is a fear about future events and reaction to current events. These kinds of feelings may lead to various physical symptoms, like shakiness and fast heart rate.

5. CONCLUSION

Use of gadgets in children can improve cognitive development of children. through gadgets, children can learn independently about language or mathematics. children’s learning through gadgets must be under the supervision of parents. children should not be allowed to use gadgets as they wish.

Everything is good if you use it in a positive way or bad if we use it in a negative way. Some suggestions have been given above to help parents about limiting their child’s exposure to gadgets. This is difficult to keep them away from gadgets but we can limit their time. Encouraging child to use it in educational field or study purpose can lead to drastic change in their lives. It can help them to enhance their skills. Use of gadgets in a constructive way can lead to healthier and efficient minds.

REFERENCE

Indonesia Pusat Bahasa. Jakarta: Gramedia Pustaka Utama


