A New Tool for Creative Content Evaluation: Young Children's Participation

Yusrita M. Y., Ian R., Monica L., Nassiriah S., and Asmidah A.

Abstract-This paper discusses young children's participation aged four to six-year-old (kindergarten in Malaysia) in developing a new tool for creative content evaluation. A preliminary study was conducted in one university kindergarten in Malaysia to refine the design of existing evaluation tool, Fun Semantic Differential Scales (FSDS) within Malaysian kindergarteners' context. The study aims to validate pictures used in the existing FSDS.

Index Terms-creative content, computer technology, ladder of participation, young children.

1 Introduction

Young children can be involved in developing new technologies such as creative content but what are their roles? How they can contribute and at what stages? According to [1], children can be involved in many roles such as user, tester, informants or design partner in developing new technologies. Markopoulos & Bekker [2] also discussed children's involvement in the design process based on a model introduced by [3] but their concentration was more on usability testing method with children participation as tester. The model is shown in Fig. 1.

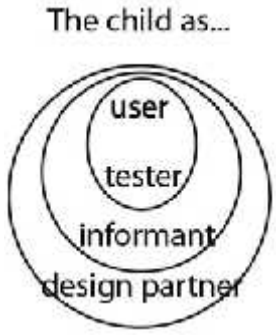

Fig. 1. The four roles that children may have in the design of new technologies. Figure adopted from [3].

Nowadays young children live, learn and play with computer products at home, school, and everywhere. As early as three years old, children are exposed to computer products by their parents, teachers, society, and media. Thus, children can be an important source of information for developers to create enjoyable and usable computer products. Since these products are created by adults, it is very important to get young children's views and participation. Therefore, developers can understand and create enjoyable and usable products for young children.

Many researchers such as [3], [4], [5], and [6] have tried to involve children in different development stages for example in design and evaluation. Our research tries to explore young children's participation in the evaluation stage. According to [7], there is still a big gap in young children's evaluation methodology even though other researchers, for example the Child-Computer Interaction (CCI) community have been focusing and publishing on that subject. Our research aims is to develop a new evaluation tool that can be used by young children in evaluating creative content. There are many stages involved in developing the new evaluation tool, from conducting preliminary study to conducting evaluation studies.

This paper will particularly report on the early development stage, which is in preliminary stage. We plan to refine an existing tool for evaluating creative content, known as Fun Semantic Differential Scales (FSDS). The FSDS is a paper-based evaluation tool developed for very young children (aged three to five-year-old) to assist them elicit how much fun they feel after playing with computer products [8]. Firstly, we review the literature on the ladder of participation. Then, we review on children development and computer products, children and technology, Fun Semantic Differential Scales (FSDS), and finally we report a preliminary study conducted in Malaysia.

2 Literature Review

2.1 The Ladder of Participation

In his book, titled Children's Participation, [9] highlights theory and practices of involving young children in community development and environmental care. He designs a diagram known as the Ladder of Children's

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Participation (Fig. 2) explaining about how children can take part in adult's projects. The children's participation is classified into eight levels; (1) manipulation (2) decoration (3) tokenism, (4) assigned but informed (5) consulted and informed (6) adult-initiated, shared decisions with children (7) child-initiated and directed and (8) finally child-initiated, shared decisions with adults.

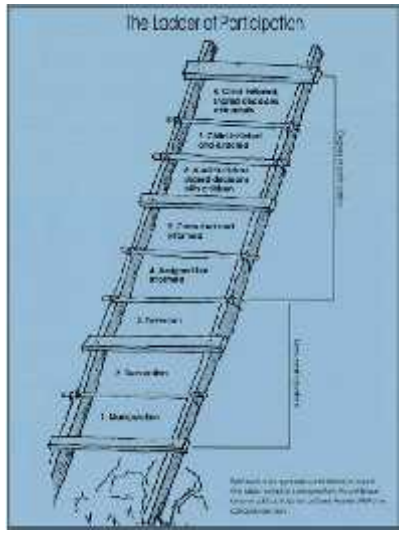

Fig 2. The ladder of participation

However he categorized the first three rungs of the ladder as non-participation that should be avoided. Only level four to eight are considered as degrees of children's participation. This diagram suggests that children should be given choices to participate in adult's projects at any levels from four to eight. A child might choose to work at different levels on different projects or might be at different phases of the same project. A reason why the manipulation level should be avoided is because adult consciously use children's voices to carry their own message. In the decoration level, children's participation is ambiguous; adult may use children as though were understanding the children [9].

2.2 Children Development and Products

[2] discussed children development stages and products characteristics that accommodate each stage. The four stages have been adopted from Acuff and Reiher who have based these stages on a synthesis of cognitive, social, emotional, moral and language development perspectives in the context of marketing to children. The stages were:

- The dependency/exploratory stage (ages birth – 2 years)
- The emerging-autonomy stage (ages 3 – 7 years)
- The rule/role stage (ages 8 – 12 years)
- Early and late adolescence (ages 13 and up).

At different ages, children need different type of products to suit their physical and mental development. For example, children up to two need a simple and safe product, has a round shape that can stimulate learning and supports active exploration. An example of a product for this group is an electronic 'activity centre', which has a form of a tablet, with pictures, buttons and sliders. Normally the product has friendly colours and pictures of fantasy-like characters and animals. So that children can be introduced to simple words and sounds for example to animals, letters, numbers and colours [2].

In the second stage, children enjoy fantasy and magic, are self-centred and do a lot of parallel play. The children need stimulation, love, and safety, even though they are developing autonomy. Products should be simple, not too abstract, adjusted to the not yet fully developed reasoning skills, present ideas only because past and future ideas are still difficult to understand and close to home theme as suggested by Acuff and Reiher in [2]. Example of computer games for this group is often placed in the context of a fantasy world. The children have to search for items that enable them to reach a final goal, such as rescuing somebody and finding a treasure. Along the way the children get to solve riddles and play games that allow them to practice for example basic language, musical and math skills.

In the third stage, children's interest move from fantasy to reality. They play in pairs and groups, like to compete, develop sense of logic, reasoning and simple abstractions, need for acceptance and success, and easily influenced by friends instead of parents. Products can be more complex and challenging, variety, and competitive. A science fiction theme becomes more popular because the past and future concepts can be grasped by this group of children as quoted by Acuff and Reiher in [2]. Examples of current products are laptops or handheld computing devices targeting this age group.

In the last stage, early and late adolescence, children develop their abstract and logical thinking, become more independent of peers and parents, very focused on identity and sexuality. Therefore, products designed for this group are very similar to products designed for adults. Next section briefly discusses on ICT technology played by children.

2.3 Children and Technology

According to [10], since November 2000 almost 20 percent of all digital media users were children and the Internet is a part of child's natural environment. Now, children have access to the Internet at school and/or at home. As Plowman and Stephen in [11] defined information and communication technology (ICT) is not only about desktop computers, laptops and peripherals but also interactive television, digital cameras, video cameras, DVDs, mobile telephones, games consoles, electronic keyboards and toys that simulate 'real technology' such as toy laptops or barcode readers. Therefore children and technology are much related because the technology gives impact on the way the children live and learn with all the ICT gadgets.

For children, playing is the most enjoyable of activities

and nowadays it is very associated with technology. Mostly children play and learn while interacting with technology [2]. They use computer products such as entertainment website at home, school, or everywhere to get information, education and entertainment. [12] described entertainment Web site (EWS) with some features like:

- *Entertainment information* – information about the theme of the Web site, jokes etc.
- *Downloadable items* – screensavers, pictures etc.
- *Small 'stand-alone' games* – 'Memory' or such.
- *Other features dependent on plug-in technology* – Re-mixing of music etc.
- *High quality graphic design*
- *Edutainment content*
- *Communication with others* – chats, virtual meeting rooms etc.

ICT moves from office to home. Thus, fun and enjoyment are becoming a major issue [13]. The next section will briefly explain about a tool that was developed by [8] to measure fun.

2.4 The Fun Semantic Differential Scales (FSDS)

The Fun Semantic Differential Scales (FSDS) was developed using picture representation and adopting Semantic Differential scales. It contains four set of bipolar emotions and one neutral emotion with real pictures/photographs (*happy vs sad, good vs bad, love vs hate,* and *excited vs bored*) in four different sheets. On each sheet, there is one positive picture on the left, one neutral picture in the middle, and one negative picture on the right. The FSDS has two versions; a *Wafiy* version for boy (Fig. 3) and an *Alisya* version for girl (Fig. 4).

The FSDS was developed with the participation of very young children to measure fun and was evaluated within a nursery in the United Kingdom (UK) context to understand how young children respond to it. Fun is an important component in the success of a product and the ability to measure fun has become crucial to the development of age-appropriate computer products [8]. Problem highlighted with the existing FSDS is some pictures misunderstood by some parents who conducted user studies with children at their home in the UK. Thus, we conducted a preliminary study in one kindergarten in Malaysia to refine the design of existing FSDS within Malaysian kindergarteners' context.

Fig. 3. The Wafiy FSDS (existing)

Fig. 4. The Alisya FSDS (existing)

3 PRELIMINARY STUDY

The preliminary study aim was to validate pictures used in the original FSDS. The study involved four to six-year-old children at one kindergarten (named as *Tadika X*) in Malaysia. *Tadika X* was chosen because it is a university kindergarten. As the university staff, we were easily permitted to access and conduct the study there. We involved the kindergarten children in identifying nine pictures that have been used for representing four bipolar emotions and one neutral emotion in the FSDS (refer section D). This is because we want to refine the existing FSDS design in terms of pictures used. The kindergarten details are described in the next section.

3.1 Tadika X Background

Tadika X offers services for baby and children from 2 months to 10 years old. It has different programs for the children i.e. nursery is for below 3 years old, pre-school is for 4-6 years old, and transit/day care is for 7 to 10 years old. A transit/day-care services is for primary school pupils of standard 1 to 4. In year 2012, the total numbers of children were 203.

3.2 Participants

Only 25 preschool children aged four to six-year-old participated in the study (9 boys and 16 girls). The study was conducted from November to December 2012 during school holidays. Thus, we did not get much participation from the children. The participation was based on voluntary basis. We asked the children who want to participate to raise their hands. Then we assigned turn for each child.

3.3 Methods

In the study, researchers' role was assigned; researcher 1 as a facilitator who giving task and asking the children, researcher 2 as a writer who writing and recording answers, and researcher 3 as a photographer and observer who taking photos and do observation on children during the study. In the beginning, class teachers helped us giving instructions to the children to sit down (Fig. 5). Then we handled the session. We told the children about ourselves, the study, and invited them to participate. This is how we invited them, "Who want to take part, please raise your hand". We identified the children and assigned them turns. Only one child was selected at a time to participate in the study. The other children were passed back to the class teacher to be handled.

Fig. 5. Researcher informed the children about the study.

Each child was shown both versions of the FSDS. The child was asked to choose one version that he/she likes most. In the first round, we arranged the FSDS sheets in order (1) happy – sad, (2) good – bad, (3) love – hate, and (4) excited – bored (Fig. 6). We asked each child to show us a picture for each emotions e.g. started with "Show me which one is *happy* picture" and repeated with other emotions. We gave each child two rounds to identify pictures because we want to check children's consistency in selecting the pictures. Thus, in the second round, we randomly arranged the FSDS sheets to the same child and randomly verbalized all the nine emotions.

Fig. 6. A girl participated in the preliminary study.

3.4 Results and Findings

Data was gathered from 25 participants. Analysis was done based on the score of correct picture identified and result is presented in percentage as in Table 1. The results are reported according to the age groups:

Four-year-old (12 children): In round 1 (R1), the highest score (58.3%) were *good* and *excited* pictures. The second highest score (50%) was *bad* picture. We found scores for six pictures; *happy, sad, love, hate, bored, and neutral* were less than 50%. Probably the six pictures might be difficult to be identified by four-year-old children. In round 2 (R2), three pictures (*sad*, *good* and *excited)* were scored more than 50%. The score for *good* picture was remained as in the R1, 58.3%. However the score for *excited* picture was decreased to 50%. But in the R2, score for *sad* picture was increased to 50% compared to only 41.7% in the R1. Only two pictures (*good* and *excited)* scored more than 50% in both rounds. It seemed that *good* and *excited* pictures are the most correctly identified pictures by the four-year-old children in both rounds.

Five-year-old (8 children): In round 1 (R1), the highest score (87.5%) was *good* picture. The second highest score (62.5%) was *bad* picture. The third highest score (58.3%) was *excited* picture. The lowest score was the *hate* picture (0%). A same score, (25%) for four pictures; *happy, love, bored,* and *neutral*. In round 2 (R2), the highest score (62.5%) were the *good* and *neutral* pictures. The second highest score (50%) were *happy*, *bad*, and *excited* pictures. In round 2 (R2), five highest score were *good*, *neutral*, *happy*, *bad*, and *excited* pictures. The score ranges from 50% to 62.5%. It seemed that *good, bad,* and *excited* pictures are the most correctly identified pictures by the five-year-old children in both rounds.

Six-year-old (5 children): In round 1(R), score for *good* picture was 100%. Second highest score was 80% for *bad* picture. The lowest score were *happy* and *neutral* pictures (0%). Other pictures score were between 20 to 40%. In round 2 (R2), the highest score was 80% for *sad* and *good* pictures. The second highest score was 60% for *happy* and *neutral* pictures. The lowest score (0%) were *bad* and *hate* pictures. It seemed that *good* picture is the most correctly identified pictures by the six-year-old children in both rounds.

TABLE 1: SCORE OF CORRECT PICTURES IDENTIFIED ACCORDING TO AGE GROUP.

Children's Age	Four Year Old		Five Year Old		Six Year Old	
Emotions	Round 1 %	Round 2 %	Round 1 %	Round 2 %	Round 1 %	Round 2 %
Happy	41.7	33.3	25.0	**50.0**	0.00	**60.0**
Sad	41.7	**50.0**	37.5	37.5	40.0	**80.0**
Good	**58.3**	**58.3**	**87.5**	**62.5**	**100.0**	**80.0**
Bad	**50.0**	41.7	**62.5**	**50.0**	**80.0**	0.00
Love	16.7	25.0	25.0	25.0	40.0	20.0
Hate	25.0	8.3	0.00	0.00	40.0	10.0
Excited	**58.3**	**50.0**	**58.3**	**50.0**	20.0	40.0
Bored	33.3	33.3	25.0	25.0	20.0	20.0
Neutral	16.7	33.3	25.0	**62.5**	0.00	**60.0**

Yellow box shows score more than 50%

4 DISCUSSION

Score for *good* picture was more than 50% in both rounds by all age groups. For example, 100% of the six-year old children correctly identified the *good* picture in round 1. But the score decreased to 80% in round 2. The *good* picture seems clear and understandable by more than half of the children in all age groups. However, three pictures i.e. *love, hate,* and *bored* were not very clear to all age groups. Scores were below 50% in both rounds.

Young children can be involved in developing tool for computer product evaluation. In this study, we tried to involve kindergarten children as in rung four (assigned but informed) and rung five (consulted and informed) based on the ladder of participation by (RA Hart, 1992). We assigned a task for each child, to identify pictures. We informed them about researcher, the study, and how they can help us to refine an existing evaluation tool. From our observation, six-year old might be a suitable age of young children to be involved in identifying pictures. This aged group of children seemed more confident and ready to participate in the study.

We also observed that there was proximity effect to the children in selecting pictures. Some children tend to choose pictures which were close to them. It can be seen in round 2, when we randomly organized the FSDS sheets. However, we did not report the details of it in this paper.

5 CONCLUSION

A conclusive conclusion from the preliminary study cannot be made yet due to inconsistency data in both rounds. Furthermore only small number of participants involved in the study; 25 participants out of 93 children in the kindergarten. Therefore, no exact pictures can be chosen to be used in the new FSDS. Only *good* picture validated in this study by the kindergarten children. Thus, more studies need to be conducted in the future with more participation from kindergarten children.

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