Research Article

Determining the Pillars in a Framework of Mobile Application for Kindergarten Early Reading

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Abstract. Many children around the world faced reading difficulties problem. In order to overcome this obstacle, many program and initiative has been proposed and implemented. Mobile application seem have a great potential to enhance reading skills acquisition among young children. However, research exposed many of existing mobile application for young children lack of the criteria for well-design learning tool for early childhood. The disadvantage of these application due to there a lack of specific framework for this niche area. Against to this urgency, researchers focused on formulation a framework of mobile for kindergarten early reading. This research aimed to determine the pillars in a framework of mobile application for kindergarten early reading based on the consensus of expert using Fuzzy Delphi Method. Result indicated a highly consensus on three proposed pillars; technology, pedagogy and content.

Keywords. Fuzzy Delphi; Mobile application; Literacy; Kindergarten

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1. Introduction

Reading is an important skills to be acquire by every young children. The successful of children in school are depend on their ability to read. However, the journey of learning to read is quite challenge for young children. Research show students with proficiency reading skills are more active, vibrant and competitive in learning activity [1]. Contrary, students who have reading

difficulties usually have low self-esteem, unable to cope with learning and often involved with disciplinary violation [2].

2. Related Work

2.1 The Disadvantage of Existing Mobile Application for Kindergarten

In recent years, research explored mobile application are capable to foster literacy skills among young children [3], [4]. However, many research found that many existing mobile educational applications did not fit with the need and developmental of children. For instance, Murray and Olcese [5] revealed that several mobile applications were developed without any strong theoretical framework. In another study, Plowman and Stephen [6] found that some educational applications were designed without appropriate interfaces for children's cognitive capability. Recent study by Chau [7], content analysis of existing educational mobile application in Apple's App Store indicated more than 40% application for young children were not developmentally appropriate designed. Moreover, a report by [8] highlighted that a majority of existing mobile applications were devoid of appropriate interfaces, immediate response, clear learning objectives, and they contained too many distractions.

2.2 The Needs of Framework

A study by Neumann [9], although mobile application are affordance for young children, there are lack of comprehensive framework dedicated to current early childhood education policy. Their contention is further reinforced by other researchers, notably by Shoukry, Sturm and Galal-Edeen [10] who caution that studies in this field are relatively few and no specific frameworks have been established to guide policy makers to implement mobile applications in early childhood education. Therefore there are need for researchers to formulate a framework of mobile application for kindergarten early reading. In this study, researchers focused to determine the pillars in a framework of mobile application for kindergarten early reading.

3. Purpose of The Study

The purpose of this study was to obtain expert consensus on the determining of the pillars in a framework of a mobile application for kindergarten early reading. This study is aimed to answering the following research questions:

> What is the expert consensus on determining of the pillars in a framework of a mobile application for kindergarten early reading?

4. Methodology

4.1 Research Method

The research employed Fuzzy Delphi Method to obtain expert consensus on the pillars of the framework. Fuzzy Delphi Method is quantitative method which combining a fuzzy set

numbering, or fuzzy set theory and traditional Delphi Method [11]. Fuzzy Delphi Method are practical due to save cost and time compared to traditional Delphi method [12]. The process of determining the pillars in a framework of mobile application are conducting by experts survey. In this study 14 experts in mobile learning and early childhood education are involved and responses the survey.

4.2 Data Analysis

There are two main component of Fuzzy Delphi Method; Triangular Fuzzy Numbers and Defuzzication. The data has been analyzed based on three condition; threshold value, expert consensus and fuzzy score.

4.2.1 Triangular Fuzzy Numbers
4.2.1.1 Threshold Value $(d) \leq 0.2$

The first condition involves the threshold value (d). In order to determine the consensus of the expert group, the obtained threshold value (d) must be less than or equal to 0.2. In the context of this study, values are rounded to three decimal places. Therefore, every item that has a threshold value (d) of less than or equal to 0.2 will be rendered as accepted by the consensus of the experts.

4.2.1.2 Expert Concensus $\geq 75\%$

The second condition involves the percentage of the expert consensus. This condition is based on the traditional Delphi approach whereby the percentage value is determined according to the number of items that has a threshold value (d) of less than or equal to 0.2. This means that each item that has a threshold value (d) that less than or equal to 0.2 will be accepted and converted to a percentage value according to the traditional Delphi method. The item will be accepted if the percentage of expert consensus equals or more than 75%.

4.2.2 Defuzzification Value
4.2.2.1 Fuzzy Score $(A) \geq \alpha$-cut $= 0.5$

For the third condition, the determination of fuzzy score (A) is based on the value of α-cut, which is 0.5. If the fuzzy score (A) is less than 0.5, then the measured item is rejected according to the consensus of the expert group. If the item's value is equal to 0.5 and above, it is accepted according to the consensus of the expert group.

5. Finding and Discussion

Table 1 show an expert consensus on the proposed pillars in a framework of a mobile application for kindergarten early reading based on three condition; threshold value, expert consensus and fuzzy score.

Table 1. Expert consensus on a pillars of the framework

Pillars	Tringular Fuzzy Numbers		Defuzzification Value	Result
	Average Threshold Value (d)	Average Percentage of Expert Concensus (%)	Average Fuzzy Score (A)	
Technology	0.178	92.0	0.673	Accept
Pedagogy	0.076	98.0	0.714	Accept
Content	0.143	100.0	0.725	Accept

Generally, all proposed pillars are accepted since each construct are fulfill the conditions. Results indicated the highest consensus of the experts are content (100%), followed by pedagogy (98%) and technology (92%). From the finding, a framework of mobile application for kindergarten early reading underpinning by these three pillars:

(i) content

(ii) pedagogy

(iii) technology

6. Conclusion

The study indicated the expert's view on the main pillars in a framework of a mobile application for kindergarten early reading. The formulation of a specific framework are based on analyzing and synthesizing an existing frameworks and guidelines. Towards to formulate a specific framework of a mobile application for kindergarten early reading, it is important to construct the main pillars. For future work, there are for researchers to identify and measure the essential elements for each pillars to support the development of mobile application for kindergarten early reading

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

All the authors contributed significantly in writing this article. The authors read and approved the final manuscript.

References

[1] S. Tarasat and A.M. Daud, Kesan penggunaan perisian asas membaca terhadap pencapaian membaca murid peringkat prasekolah, *Procedia - Soc. Behav. Sci.* **134**, 399 – 407 (2014).

[2] A.R. Jamian, Permasalahan kemahiran membaca dan menulis bahasa melayu murid-murid sekolah rendah di luar bandar, *Malay Lang. Educ. J.* **1**(1), 1 – 12 (2011).

[3] B. Beschorner and A. Hutchison, iPads as a literacy teaching tool in early childhood, *Int. J. Educ. Math. Sci. Technol.* **1**(1), 16 – 24 (2013).

[4] N.S. Yahaya and S.N.A. Salam, Mobile Learning Application for Children: Belajar Bersama Dino, *Procedia - Soc. Behav. Sci.* **155**, 398 – 404 (2014).

[5] O.T. Murray and N.R. Olcese, Teaching and Learning with iPads, Ready or Not?, *Techtrends* **55**(6), (2011).

[6] L. Plowman and C. Stephen, A 'benign addition'? Research on ICT and pre-school children, *J. Comput. Assist. Learn.* **19**, 149 – 164 (2003).

[7] C.L. Chau, *Positive Technological Development for Young Children in the Context of Children's Mobile Apps*, Tufts University (2014).

[8] Michael Cohen Group, *Young Children*, Apps & iPad (2011).

[9] M.M. Neumann, An examination of touch screen tablets and emergent literacy in Australian pre-school children, *Aust. J. Educ.* **58**(2), 109 – 122 (2014).

[10] L.H. Shoukry, C. Sturm and G.H. Galal-Edeen, Pre-MEGa?: A Proposed Framework for the Design and Evaluation of Preschoolers' Mobile Educational Games, in *Innovations and Advances in Computing, Informatics, Systems Sciences, Networking and Engineering*, Springer International Publishing (2015), pp. 385 – 390.

[11] S. Siraj, N. Alias, D. Dewitt and Z. Hussin, *Design and Developmental Research:Emergent trends in educational research*, Kuala Lumpur, Pearson Malaysia Sdn Bhd, Malaysia (2013).

[12] A. Ishikawa, The New Fuzzy Delphi Methods: Economization of GDS (Group Decision Support), in *Proceedings of the Twenty-sixth Hawaii International Conference on System Sciences* (1993).