THE DESIGN AND DEVELOPMENT OF MOBILE LEARNING FOR PRESCHOOL EDUCATION

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Abstract: The impacts of the too-early introduction of young children towards mobile learning have been argued on the suitability of content for these little minds which lead to unease among parents concerning the usage of this technology to their children's education. This raised acknowledgement that more consideration needs to be given to this area. Hence, the proposed approach offers a mobile learning application named as M-Kids Mobile Apps; adopting serious games augmenting the pedagogical aspect of Islamic education that is in-line with the early childhood developmentally appropriate practices (DAP). However, the key idea in this paper is to address the needs and issues on the usage of mobile learning for Islamic preschool education aged five to six years old. Specifically, the aim of this paper is two-fold 1) to identify the needs of parents and teachers on the usage of multimedia learning application in pre-school learning, 2) to design an appropriate mobile learning application prototype for pre-school children aged five to six years old. The design is based on the analysis findings in needs analysis, supported by validated principles and theories by experts as well as an adaptation of Cognitive Multimedia Learning Theory and Islamic Design Principle in its design and content. Finally, for the evaluation, the review from experts upon the completion of a multimedia learning application prototype is also conducted. Although this study focused specifically on cognitive and behavioural change, the findings may affect the continued growth of children's psychomotor and social emotions. As a conclusion, the present study contributes to the growing body of educational studies that suggest the insertion of Islamic moral meaning in children's curriculum applications to increase children's learning experience of behavioural growth.

Keywords: *Design and Development, Mobile Learning, Early Years Education, Serious Games*

INTRODUCTION

Today, the use of technology in education has been generally accepted. As the world is fighting with the recent pandemic issue; COVID-19, mobile learning and online learning seem vital for all level of ages. With the need to be at home and maintaining self-distance becoming priorities, young children are now drawn to learning thru online and mobile app learning as early as 4 years old. Currently, mass-media, digital games have been frequently used to cater to the purpose; this was due to their influence and targeting to young children (Danniels et al., 2019). Unfortunately, computer games have seldom been used constructively. Several more computer games have been developed for entertainment and commercial use rather than knowledge and information transfer (Lace-Costigan, 2017). Also, the consequences of too early exposure of young children to technology have been addressed on the appropriateness of the material for these little minds, which has resulted in parents' anxiety on the usage of this technology for their children's education. This has therefore led to the realisation that more attention needs to be paid to this area.

Meanwhile, these challenges can be fixed if it takes into consideration the age-appropriate, individually appropriate, and culturally pertinent aspect as referred to as developmentally appropriate practise (DAP) framework. This paper intentionality is looking at the developmentally appropriate practices before proceeding to the development of the mobile learning application content, where it is all about knowing children's normal growth and learning at different ages; understanding about particular children helps to improve the judgement on how to educate and care about each child as a person and to get to know the -children's family and learn about the beliefs, aspirations and influences that are important to each child. As teachers plan developmentally suitable learning centres, they can help address children's academic and social needs, as well as promote the provision of a high-quality classroom organisation (Hu et al., 2020). Moreover, games-based learning theory is adopted in M-Kids Mobile Apps content to ensure that the content fulfilled the three development of children's learning; cognitive, psychology and social-emotional development. While gamification is converting the learning process into a simulation, Games-Based Learning (GBL) is using the simulation as part of the learning process. Besides, serious games and gamification are both an attempt to solve an issue, inspire

and encourage learning through game-based thinking and strategies (Anastasiadis et al., 2018). Thus, the M-Kids Mobile Apps learning experience module focuses on enhancing children's cognitive and behavioural growth, serious games are the genre of games that have been selected because this style of game has managed to incorporate real-life situations that allow children to represent learning content on their everyday lives. The use of serious games is explained by the possibility that they offer to mimic reality, which makes them a crucial instrument for fostering learning and knowledge sharing, encouraging student engagement in simulated scenarios, which undoubtedly promotes the generation and management of aspirations, beginning with the desire of learners to learn (Ferraris et al., 2018).

The objectives of this paper are to define the needs of parents and teachers over the use of multimedia learning in pre-school learning; to develop an appropriate mobile learning application prototype for pre-school children aged five to six years, based on the research results of needs analysis backed by established expert theories and hypotheses, as well as adaptation of needs analysis. After all, for the post-study, the completion of a multimedia learning prototype (M-Kids Mobile Apps) is moderated by the experts. Subsequently, this paper presents the results of an investigation on instructional techniques and methods that optimise mobile application functionality and design that enable mobile learning and browsing on mobile devices. The main idea in this paper is to discuss needs and concerns and to divide them into phases in which solutions are formulated based on problems. Specifically, the findings from this paper are written on three phases of mobile learning use in early childhood education study. Phase one, a study of the needs of parents and teachers on the use of mobile apps; phase two, the intervention of the suggested design inside the application and phase three, development and evaluation of the application. Fortunately, the findings achieved great feedback from four kindergartens with complete support from parents and teachers. The aim of this study is indeed to ensure that young children receive appropriate education, even though they are coping with the global pandemic crisis and new standards of everyday life. Also, results were presented as guidance and insights about how digital technology can enhance education, which integrates theories and practices.

METHODOLOGY

The approach used in this paper to attempt to solve the problems would be the reporting of the three phases, as clearly demonstrated.

Phase 1: Need Analysis

The objective of this phase was to identify the needs of parents and teachers on the usage of multimedia learning application in pre-school learning. The need analysis survey was distributed to determine the needs, the current problem and the concern from parents and teachers on the issue of multimedia learning in the children education. The research question asked; *What is the level of acceptance among parents and teachers towards the usage of mobile learning in pre-school education?* The need analysis assessment was designed base on three components; Part A: Teaching and Learning Practices, Part B: Children's Learning in using Mobile Apps and Part C: Features of Islamic and Multimedia Design Apps. None the less; the assessments started with the standard demography research questions; to understand the demographic of respondents. Questions in Part A: Teaching and Learning Practices were directing into how the current children been taught and learned using the frequency scale as 1= Never, 2=Not weekly, 3=some days, 4=most days and 5=every day, while questions in Part B: Children's Learning in using Mobile Apps were focusing on how current children used mobile apps in their daily learning using the frequency scale as 1= strongly disagree, 2=Disagree, 3=Unsure, 4=Agree and 5=strongly agree. Nevertheless, questions in Part C: Features of Islamic and Multimedia Design Apps were looking at the findings on how children's adapt Islamic and Multimedia Design in their daily mobile learning apps usage presently using the frequency scale as 1= strongly disagree, 2=Disagree, 3=Unsure, 4=Agree and 5=strongly agree. Forty-two parents and twenty-one teachers from four different Islamic pre-school in Klang Valley district agree to participate in this study. However, due to the limitation of this study, respondents were chosen based on objective sampling and demographic region.

Phase 2: Design Application

The objective of the study in phase two was to design an appropriate mobile learning application prototype for pre-school children aged five to six years old based on the analysis findings in needs analysis supported by validated principles and theories by experts as well as an adaptation of Cognitive Multimedia Learning Theory and Islamic Design Principle in its design and content. Elements of principles and theories were outlined and list out. Research questions asked; *What is the most important in the design and development of children's multimedia learning application? And what is the guideline in designing the mobile learning application for pre-school children?* Thematic analysis was used in findings of these objectives. It was a process of classifying patterns or themes within qualitative data. Further

explanation on thematic analysis particularly considering it as a method rather than methodology in learning and teaching perspective, which means; it was very flexible method in an assortment of work in teaching and learning as it was not tied to a particular theoretical aspect (Braun, V., & Clarke, V., 2020). Subsequently, the goal of thematic analysis was to identify themes; as in this study, the researcher was looking at similar patterns from the interviews with the experts. Finally, relevant data were analysed and listed out for the next phase. Eleven experts with different field of expertise who are currently involved in the process of designing and developing mobile learning for application as well as the development of early childhood education were chosen. Four teachers, who are the primary users of the mobile learning; three early childhood experts who distinguish early childhood education and theories; two games designers, who are experts in designing games; and two multimedia content developers who are experts in the development of mobile learning content.

Phase 3: Development and Validation

The objective in phase three was to design and determine the review from experts upon the completion of a multimedia learning application prototype in phase two. Post-survey was conducted in this phase. There were check-list of Expert's Evaluation Questionnaire on Usability of the educational apps. The survey checklist was divided into three categories improvised and constructed from Nielsen's Usability Heuristics (NUH), Child Usability Heuristics (CUH) and M-Learning Usability Heuristics (MUH). Usability Heuristic Survey was conducted while the experts tested and reviewed the completed mobile learning prototype. Feedback and reviews focused on the design, user interface and the content of mobile learning. Results from these reviews are noted, and changes upon consideration of improvement are made. The research question asked; *What is the level of suitability of the developed mobile learning prototype (M-Kids Mobile Apps) for the usage of pre-school children?* Selection of experts was gathered from mobile learning content designers, mobile learning content developers, and early childhood education and content experts with more than five years of field experienced. All experts were contacted based on their profile. The numbers of experts were three from early childhood, two from multimedia content, one from Islamic education, one from interface design, and three from game-based learning.

RESULT & ANALYSIS

Each of the findings of the study is discussed concerning the objectives described in the phases below.

Phase 1: Needs Analysis

The findings that need to be addressed in phase 1 were to understand the level of acceptance among parents and teachers towards the usage of mobile learning in pre-school education. The response rate for phase 1 came from forty-two respondents from parents and twenty-one respondents from teachers. Based on the survey results showed the highest family income in the urban demographic area was RM9, 000 and above (27.4 %) and 98.4 % of them owned at least a smartphone. Subsequently, their highest degree of regular mobile device use was for communication; counted as 92.1 %, getting information, 82.5 %, education 71.4 %, entertainment 65.1 %, and other usages 4.8 %. The results of the survey also showed that urban respondents were more educated, earned higher incomes, each owned at least a smartphone, and recognised the value and needs of mobile applications.

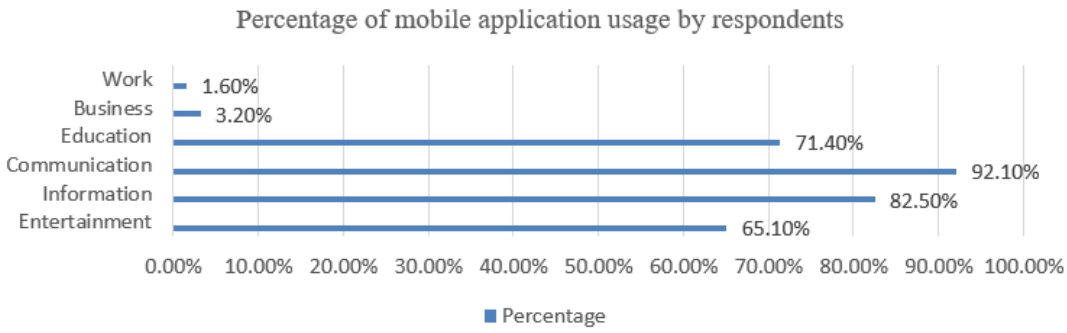

Figure 3.1. Percentage of mobile application usage by respondents

However, the findings of the survey likewise showed that the highest activities of mobile interactive learning among preschool children 36.5 % child-adult interact together using mobile apps, 42.9 % on the child-adult interact together doing web searching. While 41.3 % on the children interact together using mobile apps, and 36.5 % were on children

interact together doing web searching. Meanwhile, the survey also demonstrated that the mobile active learning among preschool children were 40.3 % claims that the frequency of scale (3)-some days, child-initiated discussion with the teacher about how to find information using the Internet and 34.9 % choosing the frequency of scale (3)-some days as a child-led demonstration with classmates about how to use mobile apps. There have also been positive reactions to the use of mobile learning in pre-school children where 44.4 % of the respondents (2)-disagree on the statement that Internet use in the classroom is unnecessary learning resources. Thus, 50.8 % (4)-agree that giving children access to mobile apps was important if it involves the children's learning. Moreover, 41.3 % of parents and teachers (3) agree that it was their role to ensure that mobile application content suitable for the children, engage the children with the mobile content and assist the children when they request for help. Surprisingly, most of the parents and teachers (33.3 %) were (3) unsure about the ideas of using mobile apps in the classroom as part of daily learning. However, further analysis showed that parents and teachers believe and (4) agree that the use of mobile apps in learning enhances children's creativity (38.7 %), improves child memorising capabilities (50.8 %), improves children's motivation in learning (37.1 %), and promotes children's active learning (38.1 %). Consequently, they also (4) agree that the use of mobile apps in children's learning enables children to learn with fun (57.1 %), allows children to learn by experiencing (36.5 %), allows children to learn from electronic media (50.8 %) and improve children's understanding on the certain subject better (46 %).

The results from the analysis of current children's learning using mobile application reported, there were positive responses towards the usage of mobile learning in preschool children. 44.4 % of the respondents (2)-disagree on the statement that Internet use in the classroom is unnecessary learning resources. Thus, 50.8 % (4)-agree that giving children access to mobile apps was important if it involves the children's learning. Furthermore, 41.3 % of parents and teachers (3) agree that it was their role to ensure that mobile application content suitable for the children, engage the children with the mobile content and assist the children when they request for help. Surprisingly, most of the parents and teachers (33.3 %) were (3) unsure about the ideas of using mobile apps in the classroom as part of daily learning. Perhaps the controvert feedback might come from parents and teachers readiness of transforming conventional regular classes into these flipped learning activities.

However, further analysis showed that parents and teachers believe and (4) agree that the use of mobile apps in learning enhances children's creativity (38.7 %), improves child memorising capabilities (50.8 %), improves children's motivation in learning (37.1 %), and promotes children's active learning (38.1 %). Consequently, they also (4) agree that the use of mobile apps in children's learning enables children to learn with fun (57.1 %), allows children to learn by experiencing (36.5 %), allows children to learn from electronic media (50.8 %) and improve children's understanding on the certain subject better (46 %).

Phase 2: Thematic Analysis of Experts' Recommendation

The outcomes that need to be analysed, in phase 2, were to define the most significant elements and guidelines in the design and development of the multimedia learning application for pre-school children. The interview was performed with selected experts based on their expertise. There were eleven selected experts chosen for the interview. The selection of experts was based on the experts' profile that would meet the content criteria for mobile learning. Experts such as teachers who are the key users of mobile learning; early childhood experts who know early childhood education and theories; game designers who are game design experts; and digital content creators who are experts in the creation of mobile learning content. In addition, the interview questions were constructed based on the categories required for the development of mobile learning content. Subsequently, the nature of research chosen to interpret the information obtained from the interviews was a qualitative approach to thematic analysis.

Table 3.1
Summary of the M-Kids mobile learning content upon experts' interview

Themes	Contents	Elements
Multimedia Design Elements	Text/ Words	• Weightage of text or words used in mobile learning content
	Image/ Visual	• Weightage of image or visual used in mobile learning content
	Sound/ Auditory	• Weightage of sound or auditory used in mobile learning content
	Video/ Animation	• Weightage of video or animation used in mobile learning content
	Interactivity/ Sensory	• Weightage of interactivity or sensory used in mobile learning content

Islamic Design Principles	Iqtisad/ Balance	• The concept of visual stability and relates to the physical sense of balance where it opposing forces in a composition that results in visual stability in design
	Tawheed/ Unity	• Unity creates an integrated image in which all the elements are working together to support the design as a whole. A unified design is greater than the sum of its parts; the design is seen as a whole first before the individual elements are noticed.
	Haya/ Simplicity	• Simplicity is another concept of visual minimalism in design. It often starts by designing something more complex. Through an iterative process of thoughtful reduction, the non-essential is removed, leaving only the essential. Simplicity comes about when the final product is an honest expression of its essence.
	Dhikir/ Memorable	• Memorable in Islam relates to the remembrance of Allah. The concept of memorable comes when the whole elements of design and content catch users' attention and easy for them to remember and understand.
Game-based Learning Theory	Cognitive Development	• Simplified interfaces with little or no use of text in interface components • Visual symbols should be used with caution as they require interpretation. • The role of the parent in play is significant and should be accommodated. • Combine auditory instructions with visuals for maximum impact
Game-based Learning Theory	Psychomotor Development	• Excellent motor skills and hand-eye coordination are still developing and should be considered in interface design. • Touch hotspots should be large and well isolated to cater to developing excellent motor skills.
	Social-emotional Development	• The egocentric nature of children at this age limits their ability to understand alternative perspectives. • Assume that the children can't read, any text to be read will need adult assistance.

As a conclusion from the data collected in the interviews, most experts emphasised the value of Multimedia Learning Design, followed by the principles of Islamic Design, considering the suitability of designing Islamic Mobile Learning for pre-school children. Subsequently, according to these experts, the most critical criteria that should be prioritised in Multimedia Design Elements are text and images, followed by animation/ video, interactivity / sensory and sound, given the need for pre-school children and their development. Moreover, since the development of mobile learning was to cater to Islamic content, suggestions for the implementation of the Islamic Design Principles should be considered, whereas iqtisad or balance should be a primacy followed by other principles. Nevertheless, though taking into account the game-based learning theory on mobile learning, most experts proposed that mobile learning material should be based on the development of cognitive children first, followed by psychomotor and social-emotional development.

Phase 3: Development of Prototype and Heuristic Analysis

The assessment process was formed to resolve the research question on the suitability level of the developed mobile learning prototype (M-Kids Mobile Apps) for the usage of preschool children. Hence, M-Kids Mobile Learning Apps are modelled based on Phase 1 and Phase 2 findings built on an Android platform and developed using a cross-platform game engine known as 'UNITY.' Driven by both phase 1 and phase 2 outlines, the completed M-Kids mobile learning application prototype was re-evaluated to ensure that optimal requirements were met. The Experts Evaluation Questionnaire on the Usability of the Education Application was distributed to selected experts. The survey

questionnaires were compiled based on three heuristics assessment systems based on Nielsen's Usability Heuristics (NUH), Child Usability Heuristics (CUH) and M-Learning Usability Heuristics (MUH). The selection of experts was based on an expert profile that would meet the design and content criteria of the M-Kids Mobile Learning Apps. Ten experts consent to take part in the assessment study. Experts such as early childhood experts who are familiar with early childhood education and theories. Experts on multimedia content who have been involved in the development of mobile learning content. An Islamic education specialist with expertise in the development of Islamic education content. Application design experts who have contributed to the criteria of multimedia learning interface design and game-based learning experts who have worked in the development of mobile software or game-based learning applications. Subsequently, the heuristic usability questionnaires were divided into thirteen parts using frequency scale of one (1) to five (5) where; one (1) for strongly agree to five (5) as strongly disagree. Refer to table 3.2 for the details of the questionnaire results.

Table 3.2
Results from the Heuristic Usability Questionnaires

No	Item	Frequency	
	Visibility and System Status		
1	The mobile learning program keeps the child informed about what is happening through appropriate feedback within a reasonable time	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(4) 40% (6) 60% (0) 0% (0) 0% (0) 0%
2	The child gets frequent, clear feedback that encourages him to carry on	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(5) 50% (5) 50% (0) 0% (0) 0% (0) 0%
3	The child should always be able to identify his score/ status and goal in the program	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(3) 30% (6) 60% (0) 0% (1) 10% (0) 0%
4	The child understand all terminology used in the program	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(4) 40% (4) 40% (0) 0% (2) 20% (0) 0%
5	The child knows where he is at all times, how he got there, and how to get back to the main page	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(4) 40% (4) 40% (0) 0% (2) 20% (0) 0%
	Match Between System and the Real World/ Learning Content Design		
1	The mobile learning program interface employs simple words, phrase and concepts familiar to the child	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(4) 40% (3) 30% (2) 10% (1) 10% (0) 0%
2	The mobile learning program makes information appear in a natural and logical order	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(5) 50% (3) 30% (1) 10% (1) 10% (0) 0%

3	All learning objects and images should be recognisable and understandable to the child and speak to their function	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(3) 30% (7) 70% (0) 0% (0) 0% (0) 0%
4	The mobile learning programs hold to good principles of child information processing	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(5) 50% (3) 30% (2) 20% (0) 0% (0) 0%
5	The vocabulary and terminology used are appropriate for the learners	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(4) 40% (5) 50% (1) 10% (0) 0% (0) 0%
6	The organisation of the content pieces and learning objects is suitable to achieve the primary goals of the mobile learning program	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(5) 50% (4) 40% (1) 10% (0) 0% (0) 0%
	User Control and Freedom		
1	Exit signs are visible. The child may leave an unwanted state without having to go through an extended dialogue	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(3) 30% (4) 40% (2) 20% (1) 10% (0) 0%
2	Navigation objects and tools are kept in particular and clearly-defined positions	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(3) 30% (6) 60% (0) 0% (1) 10% (0) 0%
	Consistency and Standards		
1	The child experiences the user interface as consistent (in control, colour, typography and dialogue design)	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(3) 30% (5) 50% (1) 10% (1) 10% (0) 0%
2	Control keys are intuitive, convenient, consistent, and follow standard conventions	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(3) 30% (6) 60% (0) 0% (1) 10% (0) 0%
3	The screen layout is efficient and visually pleasing	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(4) 40% (5) 50% (1) 10% (0) 0% (0) 0%
4	The screen design appears simple, i.e., uncluttered, readable, and memorable.	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(3) 30% (4) 40% (2) 20% (1) 10% (0) 0%

	Error Prevention		
1	The mobile learning program is carefully designed to prevent common problems from occurring in the first place	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (5) 50% (2) 20% (1) 10% (0) 0%
2	The mobile learning programs do allow the child to make irreversible errors	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(3) 30% (2) 20% (3) 30% (2) 20% (0) 0%
	Recognition rather than Recall		
1	The mobile learning program makes objects, actions and options visible so that child does not have to remember information from one part of the program to another	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (7) 70% (1) 10% (0) 0% (0) 0%
2	Instructions for the use of the program are visible or easily retrievable so that the child does not have to memorise unnecessary things	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (6) 60% (2) 20% (0) 0% (0) 0%
3	Icons and other screen elements are intuitive and self-explanatory	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(3) 30% (6) 60% (1) 10% (0) 0% (0) 0%
4	Navigation is consistent and logical	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(3) 30% (7) 70% (0) 0% (0) 0% (0) 0%
	Flexibility and Efficiency of Use/ Use Appropriate Hardware Devices		
1	The mobile learning program is designed to speed up interactions for the expert child, but also to cater to the needs of the inexperienced child	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(4) 40% (4) 40% (1) 10% (1) 10% (0) 0%
2	The mobile learning programs do allow the child to make irreversible errors	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (3) 30% (2) 20% (3) 30% (0) 0%
3	Input/ output devices are used for their purposes and are suitable for the specific age group of the child	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(4) 40% (6) 60% (0) 0% (0) 0% (0) 0%
	Aesthetic and Minimalist Design		
1	The screen interface does not contain information that is irrelevant or rarely needed in the mobile learning program	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (8) 80% (0) 0% (0) 0% (0) 0%

	Help unrecognised, diagnose and recover from errors		
1	The mobile learning program expresses error messages in simple language that does not include programmer code, precisely indicates the problem, and in a friendly way suggests a solution that a child can handle	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (5) 50% (1) 10% (2) 20% (0) 0%
	Help and Documentation		
1	The child does not need to use a manual to use the application	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (6) 60% (1) 10% (1) 10% (0) 0%
2	The child has the option to receive additional guidance instruction or other forms of assistance as needed	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (6) 60% (1) 10% (1) 10% (0) 0%
	Challenge the Child/ Assessment		
1	The child should have enough information to start to use the program when he turns it on	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (7) 70% (1) 10% (0) 0% (0) 0%
2	The mobile learning program is easy to learn but hard to master. The application is paced to apply pressure but not frustrate the child.	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(1) 10% (5) 50% (3) 30% (1) 10% (0) 0%
3	The child's fatigue minimised by verifying activities and difficulties during learning sessions. Challenges are positive learning experiences, rather than negative experiences; resulting in the child wanting to learn more, rather than quitting.	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(1) 10% (6) 60% (2) 20% (1) 10% (0) 0%
4	The program is enjoyable to replay	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(1) 10% (6) 60% (2) 20% (1) 10% (0) 0%
5	The child gets involved quickly and easily with the lessons	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (5) 50% (2) 20% (1) 10% (0) 0%
6	The mobile learning program provides sufficient feedback (audio) to the child to provide correct	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (6) 60% (0) 0% (2) 20% (0) 0%
7	The mobile learning program provides the instructor with child evaluation and tracking reports	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(3) 30% (7) 70% (0) 0% (0) 0% (0) 0%

	Evoke Child Mental Imagery/ Motivation to Learn		
1	The mobile learning program allows the child to use his imagination, which enhances his comprehension	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(0) 0% (7) 70% (2) 20% (1) 10% (0) 0%
2	The mobile learning program appeals to the imagination and encourages recognition to create a child's unique interpretations of the characters or context, i.e., behavioural influence	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(1) 10% (7) 70% (2) 20% (0) 0% (0) 0%
3	The child is interested in the mobile learning program characters because (1) they are like the child; (2)they are interesting to him, (3)they are drawn from the child's own culture	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (5) 50% (3) 30% (0) 0% (0) 0%
4	The mobile learning program incorporates novel characteristics	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (6) 60% (2) 20% (0) 0% (0) 0%
	Support Child Curiosity/ Interactivity		
1	The program supports the child's cognitive curiosity through surprises, paradoxes, humour, and dealing with topics that already interest the child.	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(2) 20% (5) 50% (3) 30% (0) 0% (0) 0%
2	The mobile learning program uses stories, activities to gain attention and maintain the motivation of learners	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(3) 30% (7) 70% (0) 0% (0) 0% (0) 0%
3	The child should be able to respond to the program at his leisure. The program, on the other hand, needs to respond immediately to the child	1-Strongly Agree 2-Agree 3-Neutral 4-Disagree 5-Strongly Disagree	(3) 30% (7) 70% (0) 0% (0) 0% (0) 0%

Therefore, based on the results of the phase 3 data analysis; the production of the prototype and the expert assessment, a review of the refining was drawn up and adjustments were made to ensure optimal and acceptable implementation as required by all forms.

DISCUSSION

Before summing up all the phases illustrated in this review, this report was split into three phases. Phase one of the findings established needs and issues; where the results of the needs analysis showed a strong acceptance by parents and teachers on the usage of the mobile learning application for pre-school children. Parents and teachers have since found out that they understand that the children should have access to mobile technology for their learning. While parents and teachers emphasised that it was their job to determine if mobile learning content suited to the child, to engage the child with mobile content, and to assist the child when they asked for support. The relationship between parent and child/student and teacher/student in Internet and mobile addiction is a risk factor; it is less likely when parents and teachers realise and help (Jin Jeong et al., 2019).

However, some parents and teachers were still uncertain about the possibility of using a mobile learning app in the classroom as part of children's everyday learning. Perhaps the divisive input might come from parents and teachers who were reluctant to turn traditional everyday classes into these flipped learning events. Having said, the experimental model for coaching the potential teachers for collaborative learning is built taking into account the following stages: the awareness of students of established technologies, the students participation in current innovative activities, and

ensuring the implementation of the teachers own innovation (Taytelieva, L., et al. 2020). However, after further research and implementation of M-Kids Mobile Apps on their children, has shown that parents and teachers believe and accept the usage of M-Kids Mobile Apps in preschool can stimulate children's imagination, boost children's memorization skills and inspire them to learn. Furthermore, parents and teachers have also expressed the view that mobile learning applications can facilitate active learning for children not just in school but anywhere they are. Moreover, parents and teachers have accepted that the use of a mobile learning application for children's education would make it easier for their children to learn while they learn from their own experience. This solved an issue highlighted by scholars where the needs of some instructional innovations are not only accessible in structured educational environments but it is also necessary to explore using them in other environments and in free time for students (Melo, C., et al. 2020).

On top, by adopting Islamic Design Principles into the content of M-Kids Mobile Apps, improved child's cognitive and behaviour as the findings showed parents and teachers;

1) The principles of 'unity' in Islamic design principles will enable the children to learn social skills, play and work with other children.
2) The principle of 'balance' will ensure the children to have a safe, structured environment for them to explore and face new challenges.
3) The principle of 'simplicity' will motivate the children initiative, curiosity, the desire to explore, and enjoyment without feeling guilty or inhibited.
4) The principle of 'memorable' will guide the children to be a better person as they learn through' 'watch' and 'tell/listening'.

The result above, somehow, managed to align with the desires to understand how higher levels of concentration and motivation in learning have an impact on emotional, social and children's mental health where research investigating the influence of immersive learning scenarios on student behaviour is needed (Melo, C., et al. 2020).

CONCLUSION

The goal of this research is to identify the needs and issues from parents and teachers on the usage of mobile learning in their children's preschool learning. This research was therefore conducted to develop an application called M-Kids Mobile Learning Apps based on needs and related hypotheses justified by experts. Development and review of the application were made obligatory before it was enforced for pre-school children; input was collected to justify the hypotheses. As a result, this study identified the adaptation of the Cognitive Theory of Multimedia Design Elements and the Islamic Design Principles to the design of M-Kids Mobile Learning Apps managed to fulfil parents and teachers concerned on the cognitive, psychology and social-emotional issues on their children upon the usage of mobile learning in their preschool education.

The findings of this research provide insight into the design of the M-Kids mobile learning application that can be used for pre-school children to understand, appreciate, and adapt the moral / Islamic value of their daily learning activities. This research addressed critical concerns about the nature of creating and planning relevant material for young children on their present and future progress. As proposed by the previous scholar, it seems that mobile applications can potentially promote technology-related practices in pre-school education and that digital competence is a well-integrated part of learning technology. Even now, more focus needs to be paid to how precisely these efforts are emphasised or what instructional material can be taught in the pre-school programme (Anastasiadis et al., 2018). Successively, the present study adds to the growing body of educational research that indicates the insertion of Islamic moral value in children's learning applications to enhance children's learning experience in behavioural development. This new understanding should help to improve predictions about the negative impact of the current mobile application on young children (Herodotou, 2017). These findings will therefore help other researchers, designers and content developers to develop appropriate learning materials for children's education.

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