Research Paper

**Web Based E-learning System for Pre-school Kids**

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**Abstract**

The main aim of this research is to conduct a review on three possible solutions that can improve learning and teaching in pre-schools. The report will then propose and develop the most appropriate solution that will answer the research questions. This research shall also discuss the importance and impact of information and communication technology on teaching and learning in pre-schools. It will however, discuss the advantages and disadvantages of web-based e-learning system over traditional kids learning.

**Key Terms:** Childhood, Education, Web-based, E-learning, Pre-school

1. Introduction

Preschool age is critical for kid’s development (Priyankara, et al., 2013). A good reading ability and understanding of any child depends on the training and background upon which the child is laid on. This now matters for parents to invest more time and money on materials and tools that can help their little kids to gain knowledge and become successful in the future education and profession.

In the early days, teaching and learning were more formal and being conducted in classrooms; but due to the rapid growth in technology today, kid's way of learning has changed (Agudo, et al., 2010). Learning and teaching materials has shifted from the black board to more sophisticated gadgets that supports teaching and learning at any level of learning, starting from the preschool to the higher learning. Therefore, there has been a lot of home schooling for kids due to the dynamic approach of teaching and learning in recent years.

Agudo et al. (2010) in their preliminary study with preschool kids dictated that kids face some difficulties in their interaction with the mouse while playing computer games. Double click and any interaction leading to dragging the cursor is difficult for kids as it requires more complex psychomotor abilities.
Based on a strong theoretical foundation, this research will propose a web-based system that will allow kids to develop cognitive and psychomotor skills such as recognition of numbers and alphabets, logical thinking. The system was designed with friendly navigation, backgrounds, sounds and colors to attain the attention of kids while learning.

**Research Aim**

To design and develop a web based application that will achieve a more precise activity base-learning and focuses on using real-world objects to facilitate pre-school learning of the English alphabets and counting of numbers.

**Research Objectives**

- To conduct literature review on user centered design and the current trend in teaching and learning, taken into consideration their strength and weaknesses that best suit kids understanding.
- To design and develop a functional advance web based application but yet simple that is able to focus on kids understanding, rather than destructions.
- To design a system that help kids to be focus and happy to learn by using real world objects like sounds, and graphics that will attract kids attention.
- To improve the efficiency of teaching and learning at the pre-school level and maximizing the speed of learning in growing kids.
- To develop a system that is limited to pre-school learning activities, but not the higher learning achievement and to establish a system that explains the much needed areas when it comes to child development and learning ability.
- To develop a web base application that is operating system (OS) independent.

**Problem statement**

From the study and investigations being conducted the earlier, and the previous researches on the current kids learning system, the following problems shall be addressed by this research:

- Assessment Problems: Most of the existing system does not support kid's assessment and this will make it difficult for parents and teachers to check the kid's development progress as well as their performance.
- Inappropriate security access: Since mostly the websites are exposed to external links for advertisements purposes to earn extra income for some of the creators of these online kids learning websites. Kids may navigate away to some of these unsafe contents and may have negative impact on the kids. For example adult contents or violence videos.
- Operating system dependent: Since the contents mostly in SWF file formats, iPads and iPods might not be able to display lessons. It is known that currently mackintosh operating system does not support flash content and this might be a problem for many kids to have access to some of these lessons if their parents are using Apple computers products.
- Inadequate information provision: The dangers and the problems associated with this is that the lessons might not suite the syllabus of what the kids will be learning in their schools.
2. Literature Review

Education they say is very important to the step of the social, political and economic progress of any nation, so effective teaching is very important. Effective teaching is important because teaching is based on helping kids progress from one level of learning to another in a more sociable interactive environment and to get the approach right to get students to be independent learning.

According to Edward, Walter and Stephanie (2012), the state and local governments take a huge responsibility of formal schooling in the United States. They provide public education for kids as early as from their tender age. In most communities, kids at the age of five years are eligible to enroll in the public education system. For example in New York City and Boston, public schools admit kids of four-year-olds and 22 months old respectively.

This shows that early childhood education is widely becoming the most effective way to promote children's educational success and preschool programs are a high point of many school and social reforms. Sending a kid to preschool will increase his or her readiness for formal schooling. However, the type and quality of services provided, with the length and intensity of the program will determine the increase in their chances of succeeding in school and later in life.

In this competitive world of computer it is very significant to train the kids in such a way that they will not be left behind. Studies have shown that with preschool training, kids show much developed skills of learning when they enter kindergarten. If a kid is being read to at home, visits museums, have access to online learning or training, learns how to play a game and reads along someone then it is more likely that the child learning abilities are polished and ready for kindergarten (Stube & Patrick, 2010).

According to Johnston et al., (2010) state that through play, children can develop intellectually, physically, creatively, socially and emotionally. By providing well planned experiences in both indoor and outdoor which are based on children's natural play are an important way in which practitioners support young children to learn with enjoyment and challenge. "Children enjoy the idea of playing. A world that is filled with different play activities will result in better learning. That is why it is good to use games that are fun and exciting to help kids learn easily. A great deal of language will be engaged and children will have no idea they are being taught specific letters, words and concepts.

According to (BBC news 2008 online), they have been some research proved to say that the use of Computer system or web-based preschool system can be used to provide some interactive educational games to the kids which will allow them to identifying or differentiating shapes and giving them a score at the same time or the end. Besides, with the help of web-based or computer system, teachers or instructors can make the kids listen to stories by providing them with images and videos.

Expressive, Creative and Aesthetic Development (ECAD).

According to Morrison (2009), during the preschool years children are in the pre-operational stage. Throughout this stage children will be thinking in terms of existing materials, they will believe that everyone thinks as they think, and are perceptually guaranteed by making judgments based primarily on how things look. At this pre-operational stage, children are very deeply influenced by their perceptions and do not fully understand the concept of conversation. Children who have trouble with conservation have trouble understanding that the quantity of something can stay the same notwithstanding of physical transformations. One example of this is if a child is shown two identical cups filled with the same amount of rice, and then you pour the rice...
into two different size cups, a child will think that one cup has more rice, not understanding that the same number of rice is in each cup.

Basically, it is very important to consider some factors such as; the aspects surrounding the child's senses. For instance, to enhance learning through the sense of sight, placement of study materials such as charts and pictures should be at visible locations. In the same way, other senses necessary for normal learning such as touch, smell and hearing have to be relevantly considered. If the senses are suitably addressed, then learning for such kids is made easier (Barbarin & Wasik, 2009).

According to Bracken and Nagle (2007) stated that Studies hold contrary grounds from the studies in class, researchers have evidently proved the importance of play in various aspects of child development using web-based system. In terms of the cognitive aspect of it, kids play has been known to enhance desirable skills such as problem solving, critical thinking and creativity, spoken and written language, minor management skills such as organizing, planning. Generally, it leads to success in the child's endeavors not to mention success in their academics.

According to Deidre Crook (Online, 2007), had researched on ICT in UK and they have been a proved that with the help of web-based computer system, young children are able to use paint programs and that they were showing to their peers how to use it and also to the development of language and literacy by using web-based programs which develop reading and writing cultures.

**Impact of ICT or web-based system on Preschool education**

Children from birth to age of eight learn through play and exploration. Recent studies have shown that technology in the classroom improves learning in number of ways. Some of the impact includes:

- The use of web-based or computers in the classroom while learning motivates young children and contribute to cognitive and social development.
- The use of web-based or computer system enhances children self-concept and their attitudes towards learning.
- Kids tend to show increased levels of spoken communication and cooperation during the use of web-based or computer system. Besides web-based or computer system play encourages more complex speech and the development of fluency.
- With the help of web-based system children interact more frequently with their peers by engaging in turn taking that is a child will use computer in his/her turn to play.
- With the help of web-based computer system, Kids lean to narrate what they are doing as they draw and color pictures or move objects and characters around the screen.

Children are active learners, for web-based computer system or technology to have a positive impact on them; they should use it for a maximum of 10-20 minutes as kids get bored easily and like to do new things.

**Advantages of preschool e-learning over traditional kids learning**

- It is used to make decisions about kids learning progress and It is used to increase learning and motivation on kids
- Speed: the speed of spread is unthinkable because it is a worldwide thing.
- Computer platform independent: It can be done using computer or even your smart phones etc.
- Learning space: It is a wider range of learning which has no limit.
- Being able to conduct learning 24/7 hours: Because preschoolers can even learn/read things even in the night.
- It is used in monitoring kid's performance.
- It is a good opportunity to reduce costs: this can be cost effective and reduces costs through elimination of hiring a private instructor.
- Safety: It is even safer because preschoolers don't need to leave his or her house to attain the class.

**Disadvantages of preschool over traditional kids teaching**

- Internet: It might requires constant supply of internet connection
- Electricity: It requires constant supply of electricity to function
- Time: It is time consuming due to addition of it.

**Summary**

It is a known facts that every country has its own way to teach young learners but most of them agree that web-based computer system or the use of technology can be used to enhance the traditional way of learning. Web-based computer system is a tool that can provide alternative way for kids to learn and make sense of their world but it should never replace the use of practical materials and manipulative.

Preschool web-based system does not only increase their academic skills but also enhances their social and emotional attributes. It is important for kids to get preschool education so that they can compete in the ever increasing computer age competitive world. The flow of Preschool is a way in which information and communication technologies (ICT) can contribute to development of kids learning education.

A preschool system, Is a welcome development in educational industry by using IT or web-based system to increase and enhance learning skills in kids. It will also revolutionize their thinking at the tender age and it will acquaint with the right educational learning abilities and cultures. The pretext for this system is to address the problems that affect traditional ways of learning in kid's education and existing systems.

3. **Research Design and Methodology**

In this chapter, this research will identify and discuss the research questions and design. Furthermore, it will discuss how data will be collected, from whom the data will be collected and how the data will be analyzed.

Qualitative and Quantitative research methodology will be used to collect data in this research and Prototype system development model will also be used for the system development.

**Research Questions**

This study aimed to address gaps in literature review by conducting survey, observation and one-on-one interview with focus group or target audience. The reason for this research is specifically to answer three research questions pulled from the literature review.
1. First, with regard to early childhood education, what are the teaching and learning difficulties faced with the current preschool programs, and how it can be improved?
2. Secondly, is Information and Communication technology (ICT) the future of early childhood education, and what impacts can it create in the improvement of preschool programs and curriculum?
3. Lastly, how vital is Information and Communication technology (ICT) with regard to assessment and learning process in the preschool?

**Research Design**

This is the planning and description of structure, processes and strategies that will be used in obtaining answers to the research questions and problems. The figure 3.1 below shows a clear understanding of the key processes involved in this research.

![Figure 3.1: Research design](image)

**Why Qualitative and Quantitative Methodology?**

The purpose of using this research methodology is to get an in-depth understanding of the current teaching and learning difficulties faced in the preschool. Since this research involved focus group discussion, qualitative research will be most appropriate method to collect data as it will enable this study gain insight into complex issues from multiples perspectives. One-on-one Interview will be conducted in-order to identify or find the answers to the research questions.

In the other hand, quantitative method will further been use to get more knowledge on the problems and difficulties faced by both the preschool teacher and preschoolers in their teaching and learning processes respectively. Survey or Questionnaires technique will be used for data collection and this methodology will be used to quantify and analyze the data using charts and graphs presentation.

**Data Collection**
The data collection techniques for this research involve interviewing, observation and survey and there are three main target audiences that will participate in the activity.

**Target Audience**

Since this research is specifically based on preschool and early childhood development, the following audience will be targeted in order to get a rich and trusted data that will be further analyzed. The richness of the collected data will help give an answer to the research questions.

The following are the target audience for his research:
- Preschool teachers/Trainees and any higher related body
- Parents/Guardians of preschoolers
- Preschool kids/Students

**Prototyping Model**

There are three main reasons for using prototype model to develop this system. They are as follows:

1. It will allow this research to get a detailed requirement from user right from the initial stage of the system development till the acceptance stage.
2. Even though it takes time to develop a finalized system using this model due to the constant changes in users requirements, it provides a better system for the users and to their satisfaction since the system specification is based on their requirement.
3. After requirement has been gathered from the users at the initial stage of the project, this method will allow users get a better understanding on the system development since a prototype will be provided to them.
4. Results and Discussion

Outcome of the interview

From the conducted interview, it shows that:

1. The current kid’s learning system in the institute is outdated and this has resulted to the sluggishness of the teaching process in the institute activities and more paper errors, the technique engage in the institute is very poor and time consuming.

2. The institute learning process is managing with an outdated database system which resolved to data errors and data insecurity.

Questionnaires and Survey

This questionnaire was geared towards two different categories of audience:

1. The Parents/Guardians category and,
2. Teachers/Trainers category

The Parents/Guardians category

This category targeted parent and guardian of any kid between the ages 3-6. 50 copies of the questionnaires were distributed to the audience both in hard and soft copies. There were 30 respondents of which 23 of them participated in the survey. 7 are not eligible to participate and 20 did not respond.

Outcome of the survey

i. The (figures 4.1) below shows that 77% of the respondents participated in the survey while 23% did not participate due to their ineligibility.
ii. From each of the statements in the table, participants were able to reflect their opinion towards their kids learning ability using either a touch-screen or a pointing device.

52% of the participants strongly agree that ICT is the future of early childhood education while 4% disagree. 13% of the participants strongly agreed that their kid can learn faster using a mobile devices. 4% of them strongly agreed that their kids can start and close activities with touch-screen device while 9% strongly agreed that their kids can start and close activities with a pointing device. 30% strongly agreed that their kids prefer activities that involves sounds and rhymes while 4% strongly disagree. 32% and 5% of the participants strongly agree and strong disagree that their kids prefer touch-screen devices to pointing devices respectively. See the figure below for full details.
**Teachers/Trainers Category**

This category targeted teachers in the preschool and 20 copies of the survey paper were distributed to 20 persons both in hard and soft copies, 10 persons responded to the survey while 10 did not respond.

**Outcome of the survey**

i. 70% out of 100% respondents who are preschool teachers participated in the survey, while 30% respondents were not eligible to participate. See figure 2.5.2.2a for details:

![Figure 4.2: Details of participants opinions base on the given statements.](image)

ii. In the below chart, it is shown that 54% of the participants uses self-Assessment strategy to check their student’s performance and development. 38% of them use Performance strategy while 8% uses Standardized Tests strategy.

![Figure 4.3: Details of the survey respondents](image)
iii. From the range of (0-2), (3-5), (6-8) and (9-10), 29% of the participants think that the provision of any software that can help in teaching and assessment of student’s development in the preschool is very essential, while 71% think that it is essential.

Observation

This data collection method was specifically designed to collect data from preschool kids between the ages of 3-6 and it was being conducted at UCSI- Child development Centre”. The purpose of conducting this study is:

- To learn the interaction between the kids and the teacher as well as their learning environment.
- To learn the skills they already and yet acquired, and
- To learn their weaknesses from all aspect.

Observation Finding
After watching the kids and observing them while they are in the classroom with the teacher, this research founds out the following facts about the kids:

1. Most of the kids do not like to participate in the class activities. This could be because of the nature of the activity and how it is being conducted.
2. Most of the kids are actively responding to activities that involves singing and jumping. They always want to learn through play.
3. Most of the prefer activities where they can feel and interact with an object rather than verbal activities.
4. Most of them have already acquired basic social skills. Only few of them has acquired basic cognitive, emotional and environmental skills.

Summary of Feasibility study

<table>
<thead>
<tr>
<th>SOLUTIONS</th>
<th>Organizational Feasibility</th>
<th>Technical Feasibility</th>
<th>Economical-Feasibility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Solution 1</strong>: Hybrid Web Application for kids learning</td>
<td>Feasible</td>
<td>Feasible</td>
<td>Partially Feasible</td>
</tr>
<tr>
<td><strong>Solution 2</strong>: Responsive E-learning Website for Kids</td>
<td>Feasible</td>
<td>Feasible</td>
<td>Partially Feasible</td>
</tr>
<tr>
<td><strong>Solution 3</strong>: Content E-learning Management System for Kids</td>
<td>Feasible</td>
<td>Feasible</td>
<td>Feasible</td>
</tr>
</tbody>
</table>

Proposed Solution and Justification

From the feasibility study above, it is seen that solution three (content e-learning management system for kids) is the most appropriate solution to the problems faced by the existing systems. It is no doubt the most economic and technical feasible when compare to the other solution. Just as its name and according to (Roebuck, 2011), Content management system is a software that allow users with little knowledge of web programing to create and manage their website contents easily and effectively. Hence, the choice for the best solution to fit-in the kids e-learning solution is not wrong as it is easy to use and as well as producing a good and interactive learning activities among the users. Another advantage of this solution is that it can be used online or offline through the local-host server (Apache) as long as it is turned on. Nevertheless, in my opinion the best choice that will suit e-learning process has been chosen and that is content e-learning management system for kids.

5. Conclusion
This report proposes a user-centered approach to the development process of web based learning resources in school education. The approach was evaluated from three different perspectives: school teachers, students' parents, and school kids. The approach needs to be further developed through continuous cycles of design, implementations, and evaluations in various school contexts.

The approach provides re-entry points into the analysis, design, implementation, and evaluation stages to allow for continuous improvements. For example, developers may return to the design phase to revise selected objects that are important for the learning process. They may also return to the analysis stage to re-examine the context of use, influencing factors, or learning goals. Results also stress the importance of a thorough user-needs analysis, as well as early and frequent assessment of prototypes with the users. The pedagogical use of Web-based learning resources in school environments and reuse of Developing Web-Based Learning Resources.

**Future research**

Since this research focuses only on providing an appropriate solution to the teaching and learning difficulties at pre-school level and using a content web-based e-learning solution to address the gap in the pre-school learning system, it is important to study further on how to improve the system with regards to the future technology and innovations.

**Reference**


