# MOBILE BASED LEARNING SYSTEM FOR PRE-SCHOOL CHILDREN – IMPLEMENTING A COMPREHENSIVE CONCEPTUAL STRUCTURE OF APPLICATIONS FOR MOBILE LEARNING

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***ABSTRACT: This Paper gives insight on the possibilities of using mobile learning in the Indian preschool education of young children. The current preschool educational system in India are presented and discussed. The problem concerning the children's safety when using mobile devices in terms of access to information on the Internet is presented and discussed. Two progressive models for mobile learning proposed for preschool children are designed along with the advantages and disadvantages, outlined and discussed.***

## I. INTRODUCTION

The Mobile based technologies have been making significant progress in its development in our days. They have become an integral part of people's daily life [1]. Therefore, the importance of the use of mobile technology in education is easy to understand. Just a couple of years ago, the internet or computer based learning was only distance learning or e learning. But today it is Mobile learning, also called as m-learning. Technologists and Researchers from all over the world are working on its development and distribution.

The term mobile learning denotes the use of mobile applications installed on a mobile device (smartphone or tablet) that are used in the education process at school and at university [2].

Implementation of this M-Learning technology is not a simple process, especially when it comes to young children's learning. It is closely related not only with the authors of textbooks, teachers, children (students), but also with the parents who have a crucial influence on the way their children perceive the outer world: they play an important role in the formation of their character, interests and social behavior. The phenomenon of this influence is represented in detail in [3].

The opinion of parents also play an essential part with the implementation of Mobile learning system in the young children's learning. In order to obtain an objective assessment of their attitude regarding this subject an inquiry research among parents of children of different ages was made and the results from it were published [4]. The data obtained from this study revealed that more than 90% of the parents support the idea of using mobile learning.

State and Central educational departments and ministries give different guidelines to the educational institutions of different class starting from pre-school. However there are a number of preschool chains in India, which follow different International systems. Therefore, for the purposes of this investigation, the state guided syllabus of the state of Karnataka is being presented and analyzed. It is also very important to mention about the special attention that should be paid to the safety of children when using any e gadget that provides access to the internet or World Wide Web. This Article does not focus on the technical specification of the software for mobile learning like many other articles, but it will be a well-balanced presentation of the skills of the users (primarily children) and the provision of transparent and safe of mobile learning.

With this brief background, the intended goal of this research may be defined as follows:

To present a comprehensive structure of applications appropriate for Mobile learning by pre-school children, which meets the requirements of the State syllabus and the safety of children in terms of access to information on the internet space.

- To achieve this objective several tasks have been set in this study:
- Presenting the preschool syllabus of the Karnataka state;
- Discussing the safety of children when using mobile devices;
- Examination of the interface limitations associated with mobile devices;
- Summarizing the necessities for mobile learning applications for young children;
- Scheming a comprehensive conceptual structure of applications for mobile learning.

## II. ANALYSIS OF KARNATAKA STATE PRE-SCHOOL REGULATIONS AND SYLLABUS

As mentioned in the introduction, when it comes to developing new learning tools it is important to study the State Educational Regulations and Syllabus. Karnataka Government published its last Regulations and Syllabus concerning the pre-school education in the month of March 2015. Therefore based on this guideline, the following modules can be distinguished (Table 1).

| Table Head | Table Column Head |
|---|---|
| Language and Literature | • Introduction to language (Kannada, Tamil, Hindi or English) <br> • Continuous speech, understanding the words and the use of the words. <br> • Simple and complex sentences. <br> • Correct pronunciation. |

| | |
|---|---|
| | • Distinguishing between sentences, words and sounds.<br>• Identification of a sequence of actions based on an image and recognition of literary heroes.<br>• Interpretation of literary works.<br>• Completion of a story based on an image. |
| Mathematics | • Knowledge related to quantitative, spatial and temporal relationships of objects, development of thinking and memory.<br>• Counting, addition and subtraction to 10.<br>• Units and concepts of latitude, longitude and altitude<br>• Spatial relations related to determining the position of objects relative to each other, solving problems with maze and searching for a route.<br>• Terms related to parts of the day, days of the week and the seasons.<br>• Recognition of geometric shapes, such as square, circle, triangle, rectangle, top, side and others. |
| Social Science | • Getting acquainted and orientation in the surrounding world.<br>• Communicating with others and self-affirmation.<br>• A subject area.<br>• Healthy social environment.<br>• Cultural and national values. |
| Art and Craft | • Basic skills related to creative activities and children's creativity<br>• Focusing on artistic work, application and modeling.<br>• Ways to construct a variety of products and fine Motor training.<br>• Paper work: folding, cutting and gluing; sewing, tying, interlacement, drawing straight and curved lines, connecting the dots. |
| Music and Games | • Formation of basic skills and personal approach to music.<br>• Basic knowledge of the art of music.<br>• Games environment.<br>• Development of artistic abilities. |

TABLE I. STATE SYLLABUS (KARNATAKA STATE) REGARDING THE TEACHING MATERIAL REQUIREMENTS FOR PRESCHOOL CHILDREN.

The objective of the introduction of these educational necessities of the state is to outline the needed compliance which an application must have so that it can be used in the education of children at the pre-school level.

### III. SAFETY OF CHILDREN WHEN USING MOBILE DEVICES

Another important aspect of the implementation of mobile learning is the child's safety. The notion of 'safety' presupposes limiting their access to the Internet or to other applications that can lead to some negative effects on their health and/or physical and/or mental development. With a connection to the global network external attacks aiming at gaining access to personal data are possible. The use of mobile devices including in education and their impact on the social life of young children and teenagers is presented in [5]. What is noted is the fact that their priority is to provide updated information at any time and place. On the other hand, they have a negative impact as well, since their use leads to alienation of the children. Research related to the safe use of various mobile devices in terms of the dangers threatening young children and their parents is presented in [6]. These are massive media advertisements with the purpose of purchasing a commodity; showing any event in the life of the children in the social networks; chatting with strangers and others. Topics such as cyber-bullying, pornography and risk of addiction to mobile devices are taken into consideration. Quotations from interviews with both adults and children are provided, thus, the actual opinion of consumers has been revealed. What is more, the children's preferences of using mobile devices in accordance with the personal and portable computers are investigated and the results have been provided here. As a result of this research the following conclusion can be drawn: when developing applications for mobile learning for children, the most important is to ensure reliability and limiting external attacks. One solution to this problem is the use of Web services that restrict the access to external Internet resources, except for those that are necessary for the application itself.

### IV. REQUIREMENTS TO THE MOBILE APPLICATIONS FOR TEACHING YOUNG CHILDREN

The topic related to the use of mobile devices as a learning tool is currently important and up to date. Before the model of a single framework for mobile application is presented, first, the criteria which it must comply with must be specified. Similar studies have been already conducted and their results have been supplied. However, no clearly defined requirements for the software designed especially for preschool children have been stated there. These studies are mainly aimed at students at the secondary education and university students.

In another article [7] principles for the implementation of mobile learning as a tool for distance learning in the form of web-based applications, using a browser on one's mobile device are presented. However, with this model a direct Internet connection is required.

Based on the statements made in the sections above, several requirements that an application must meet in order to claim that it is appropriate for a mobile learning for young children can be determined:

1)  To provide safe environment for children: If Internet connection is needed, it can be secured so as to limit children's access to inappropriate content and to ensure the termination of external attacks to their personal data;

2)  To cover the teaching material prescribed by the

Education Board of the State;

3) To be in the native/common study language of the children: in our case, we will stick to English;

4) To be with a friendly and intuitive interface that will allow children to use the application easily.

## V. CHILDREN INTERFACE LIMITATIONS OF MOBILE APPLICATIONS FOR CHILDREN

What is typical of mobile devices is that they have limited resources of the hardware components.

The most significant disadvantage is the size of the screen. Today there are still smartphones with a screen size of 2.4" and a resolution of 240x320 pixels. Now even Reliance Jio, Vodafone, BSNL etc., are coming out with such phones for free. Hence, it results in a serious restriction on the size of the objects that can be displayed as well as in the size of the fonts. Even the font with size 12pt is usually too small and hardly readable even at a larger screen. With such screens the rule is not to use serif fonts, which is contrary to the rules laid down in the prepress related to the texts intended for children. Furthermore, when specific custom fonts are used, it must be certain that they will be readable and render nicely on the most devices. The used buttons must be big enough and must stand out from the rest of the interface part, so that the user can easily navigate in its utilization. The best practice in this case is that the buttons should only contain graphic image. So the text on them will not be perplexing and confusing for children. The child (user) must be always able to return to the home page, so that the interface of application might be defined as an intuitive one.

## VI. CONCEPTUAL DESIGN OF APPLICATIONS FOR MOBILE LEARNING

Keeping in mind the above rendered facts, it can be inferred that mobile learning is already seen as necessary and great help to overcome the barriers of time and space associated with providers of knowledge. This is how the access to updated information increases. Sometimes the manner of teaching depends on the curriculum and on the different ways of building a teaching system. Therefore, when building such systems, the required simplicity of the teaching material must be achieved and the influence of the used technology on the quality of the developed application must be reduced. Furthermore, any system for mobile learning must provide a safe and secure environment for consumers. The education of preschool children can be conducted only by parents, or with collaboration between parents and teachers. This article discusses these two situations as different cases of use of mobile learning. This is necessary in order to cover the various opportunities that arise when developing a mobile application designed for teaching to young children. This will allow the smooth development of real systems. This will allow the unproblematic development of real systems. The proposed models are based on the best practices that are explored in contemporary literature, on the analyzed parents' opinion in Karnataka and on the authors' own view on the problem. In these conceptual models the kind of mobile operating system is ignored because modern integrated development environment provides a wide range of cross-platform development tools and the sane be used on a variety of platforms like IOS, Android, Windows, etc.,. Moreover, applications are often designed only to solve a specific task and they have a varying type of interface and architecture. That is why our model seeks to provide flexibility in the development of real prototypes. It should be noted that in both cases a remote database in which there are teaching materials that can consist of textual and multimedia information is used. As the home schooling is just an emerging system in India, where the students studies from home under the guidance of the parents/guardian. We will skip this system and will concentrate only on the collective learning/ or conventional school system which involves students, teachers and parents. The concept here is that everyone has a different application, appropriate for its role, installed on a personal mobile device. All applications have access to a remote database server with a common database. It provides synchronization of the data between the different users' applications using Web services. Data synchronization is done only when it is necessary and the connection to the server is available. Only the parent and the teacher can set up synchronization, while the pupil (child) can only use it. The renovation of the educational content can be done both by the teacher and the parent. In addition, they can upload media objects, define daily or monthly tasks, as well as the expected objectives. If the teacher does not agree with the content uploaded by the parent, he/she can remove it. Only the teacher can assess the results achieved by the children, while parents can only see the assessment, but cannot change it. The children can access and utilize various resources: textual and multimedia information, tasks, and view their grades. The parent may monitor the complete diary of the child who uses the application; the duration of working with it; if a new version of the application is available, the parent can install it, being authorized by their account in the application of the child. In this way the child's access the Internet is limited.
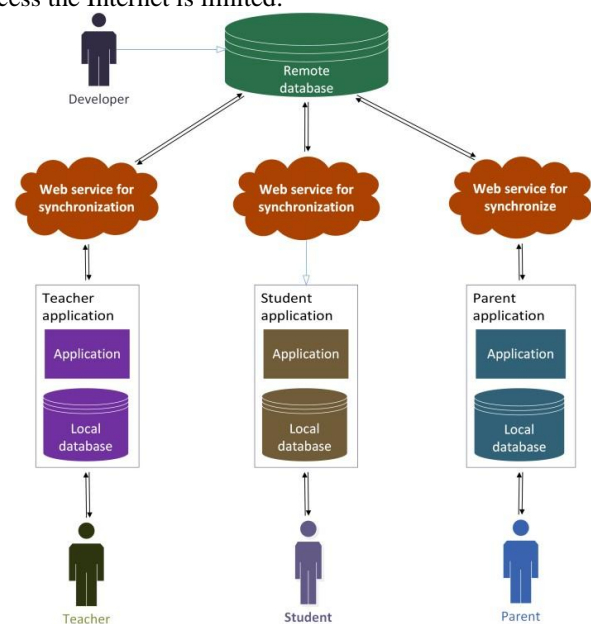


Figure 2.  A conceptual model of a mobile application for collective learning.

Some of the advantages of using the proposed conceptual model for collective mobile learning are given below. The major one is that the parents can actively participate in the education of their children. Another advantage is the provided safe environment to work when using a mobile device in terms of limiting access to the Internet. The disadvantage of this model is the complexity of software development.

## VII.   CONCLUSION

Undoubtedly the design and quality application development for mobile learning is an important part of the software technology future. The educational content requirements stated by the Education Depart of the State of Karnataka have been presented in this article. The issue of safety of children using mobile devices relating to the protection of their personal data on the Internet has been discussed. The criteria for assessing applications for mobile learning of young children have been identified. The frameworks for the mobile learning presented here are based on continuous study of best practices in this area. The proposed conceptual models have been illustrated by diagrams. Their positive and negative characteristics have been pointed out. The practical developments of the mobile learning frameworks are to be made. They are going to be the subject of further research in view of their practicality and applicability.

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