Computer Aided Primary Education Systems:
A Review

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ABSTRACT

In this paper we present a review of the existing Computer Aided Primary Education Systems (CAPES). These systems are: ESL Kids Lab, Kiz School, Khan Academy, Kids Math Games, Starfall, YouTube, Learning Chocolate, Learn English Kids and E-learning for Kids. We have conducted a comparative study of these available systems. For the comparison, we have considered different parameters. These parameters include medium of instruction, syllabus, and subject, user friendliness of the system and availability of user interaction, animation, visual ads, audio support and games etc. We have also considered the software cost as well as online availability. On the basis of these mentioned parameters, we have investigated the strengths and weaknesses of these systems.
KEYWORDS: Computer Aided Learning, Computer Assisted Learning, Primary Education, eLearning

1.   INTRODUCTION

Education means knowledge of something. This knowledge is usually achieved in educational institutes like schools, colleges, universities, etc. Primary education is the first stage of compulsory education. The main purpose of primary education is achieving basic knowledge of science, mathematics, geography, history and social science[Primary Education, 2013].Visual ads or pictures are normally given in the text books of the primary school. The main purpose of these visual ads is to provide easy way of learning to the students. Due to these pictorial ads, students and specially the children learn faster. Furthermore, these ads make the information representation for the children very easy and are full of interest for them. The interest and motivation of the children in the visual ads lead to better learning. Pedagogy also suggests that images/visual ads help in learning, because images are directly related to long term memory. By seeing an image about a concept, the learner understands it easily and gets the satisfaction about that concept[Using images in education, 2013].Visual aids like animation, videos and pictures enhance student interest in learning material. It enables the student to understand the main ideas in the text [Yunus, Salehi, & John, 2013].The use of animation in education has two main goals, first that it is used to attract the students' interest, engage them in learning and maintain their motivation. The second goal is to achieve the cognitive function, which is used for the interest and motivation of the learners [Lowe, 2004].In Nigeria a study was conducted to know about the importance of the use of animation, cartoons and other visual ads in teaching. The result showed that 100% of teachers and 86.7% of students (from three secondary schools) believed that cartoons and visual ads in the text books help in learning [Ajibade & Elemi, 2012].Another study was conducted at Aljouf University, Saudi Arabia for the importance of audio and visual aids for English as a Foreign Language (EFL) teaching[Mathew & Alidmat, 2013].Results showed that audio-visual aids improve thinking and learning in classroom [Ainsworth, 2008]. Animation can also be used for many purposes. We can show to the learners many things through animation that they cannot see in the real life e.g. the movement of atoms/molecules in gases etc. Games also have a good effect on learning. It increases student's attention and interest in the lesson.

Now a day, computer technology is used in educational institutions for teaching purposes. Different computer aided systems are in practice. In this article we are going to review the different computer aided systems that help learning at the primary level. Computer aided primary education system (CAPES) is a new term introduced in this paper that means the application of computer technology for teaching and learning at primary level. CAPES are broadly synonymous with Computer-Based Instruction (CBI), Computer-Based Training (CBT), Computer-Aided Instruction (CAI), online education, computer-based learning, and virtual education, Virtual Learning Environments (VLE) and digital education collaboration [E-learning, 2013]. CAPES include computer technologies (software and hardware) for teaching and learning. In this article we will introduce and compare the different available software systems that help learning at primary level. For the comparison, we have considered different parameters. These parameters include medium of instruction, syllabus, and subject, user friendliness of the system and availability of

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user interaction, animation, visual ads, audio support and games etc. We have also considered the software cost as well as online availability. On the basis of these mentioned parameters, we have investigated the strengths and weaknesses of these systems.

2. Review of the Computer aided Primary Education Systems. During our study, we explored the different available computer aided systems. These systems are: ESL Kids Lab, KizSchool, Khan Academy, Kids Math Games, Starfall, YouTube, Learning Chocolate, Learn English Kids and E-Learning for Kids. Here we present a brief introduction of these systems.

2.1. ESL Kids Lab: ESL (English as a second language) Kids Lab [ESL Kids Lab, 2013] provides English learning and teaching materials for primary school children and also some material for high school students. The learning materials consist of animated videos, printable worksheets, self-grading exercises, flash cards for online work, phonic materials, teaching methods for teachers and some math exercises [ESL Kids Lab, 2013].ESL Kids Lab learning materials have good audio support for each step. Its medium of instruction is English, which is good for the English speaker kids. It has a clear syllabus for teaching in English. Cartoon environment is used for teaching which is interesting for children. The cartoons are designed to capture the interest and attention of the children. Visual ads and animations are used in their videos. ESL has a variety of interactive games and exercises. It also includes teaching tips for the teachers. There is no need of installation and all of their materials are online. Progress tracking test is also done at ESL Kids Lab. After completing a step, the child progress is judged through progress tracking test. It has a good user friendly interface but there is no user interaction in ESL system. One can only watch their videos but can't interact with them. So the child may become bore and loss his/her attention. ESL Kids Lab is not free and one must pay for downloading the lessons. Its medium of instruction is English which is not good for the non-English speakers. Its accessibility for the kids especially for the non-English speakers is difficult. Free demo is not available for the new visitors, so they can't easily understand its contents. Its contents include only the English materials and a little mathematics materials but other subject(s) are missed here.

2.2. Kiz School: Kiz School [Kiz School, 2013] is an online English program for primary school kids that include animated videos, power point slides, interactive games and quizzes, printable PDF worksheets and flash cards. These are designed to teach grammar, vocabulary, sentence pattern and reading. Thesystem teaches the lessons by level and by unit. There are over 600 PDF worksheets to print for use when a kid is online. The kiz school materials are presented by a pre-defined printable lesson plan [Kiz School, 2013]. Kiz school learning materials are easy and interesting to teach them so that one does not need to be a professional teacher to use these materials. One can download their power point lessons and videos. Every lesson comes with its respective interactive games and exercises so that one does not feel boring and also revise his/her previous learned lessons[Kiz School, 2013]. Animation and visual ads make the Kiz School materials very interesting. There is good audio support for the learners. Free demo is available for each lesson. One can sign up for the first month free. There is no need of installation and one need to download the contents. Kiz School has a user friendly interface design. The system offers a one month trial. The system contains only English materials and other subject are missed here. Its medium of instruction is English which is not good for the non-English speaker. Its accessibility for the kids especially for the non-English speaker is difficult.

2.3. Khan Academy: The Khan Academy is an educational website [Khan Academy, 2013]created in September 2006 by the educator Salman Khan, a graduate of MIT and Harvard Business School situated in USA. The main goal of khan academy is to provide a good quality free education to everyone [Thompson, 2011].The website contains videos of short duration of more than 4,300 micro lectures and over 260 million lessons. Generally the duration of each video is seven to fourteen minutes. The video lectures are about mathematics, history, healthcare, medicine, finance, physics, chemistry, biology, astronomy, economics, cosmology, organic chemistry, American civics, art, history, microeconomics, macroeconomics and computer science, but mathematics is the major subject which khan academy teaches [Thompson, 2011]. These videos are totally free for anyone around the world and are also stored on YouTube. It can be downloaded. Khan Academy videos and lessons have been translated into many languages including Urdu. Khan Academy provides the basic operations of mathematics in an easy way. Khan academy has a large number of students and two million students use its services each month. Some critics have stated that khan academy learning videos make the kids bore, because one just bearing at screen and there is no interaction for the learner interest [Thompson, 2011]. There is no animation and support of visual ads for the interest of kids. There are no interactive games for the attention and revision. Khan Academy has not a good user interface. There is no progress tracking test for the learners.

2.4. Kids Math Games: Kids Math Games [Kids Math Games, 2013] is an online academy to teach English, math and science to kids. They use worksheets, animated videos, quizzes, pictures, games and fun stufffor teaching.

In math section they teach about the basic addition, subtraction, multiplication, division, counting, money, fractions, memory, facts, geometry and probability. In science section they teach about the basic technology, chemistry, biology, physics, weather, animals, earth, scientist, space, planet and funny facts of science. In English section they teach about the words and vocabulary resources, grammar, reading resources and kindergarten English activities [Kids Math Games, 2013]. Kids Math Games is an online teaching academy. Their materials are free for anyone anywhere. There are hundreds of interactive games for each section for the purpose of revision. Their interactive learning activities are interesting, so one can take interest in the learning material [Kids Math Games, 2013]. Visual ads and animation are frequently used. They have lessons plan, ideas and science fair projects. Its medium of instruction is English. There are virtual experiments for science subject. There are clear lessons plan for teaching. It has a good user friendly interface. There is no free demo for the overview of Kids Math Games. Its medium of instruction is only English which is not good for the non-English speakers. There is no audio support for the learners. One can only play online games. There is no progress tracking report facility.

2.5. Starfall: Starfall [Starfall, 2014] opened in September 2002. Its learning material includes only phonics which is designed for the preschool, kindergarten and other higher classes of primary school. Starfall is an educational site designed to entertain the students with phonics [Starfall, 2014]. It is divided in four sections to learn English. Starfall is free for everyone. Animation is used in their phonics for teaching and guidance. User interaction is involved in phonics. Many interactive games are available and there is a good audio support. When the child completes an activity, the progress is shown by words or by an audio message. It has a good user friendly interface and its medium of instruction is English which is not good for the non-English speaker kids. Its accessibility for the kids especially for the non-English speaker is difficult. They have no clear syllabus and subject for teaching. There is no free demo of Starfall.

2.6. YouTube: YouTube [YouTube, 2010] is a video-sharing website and was launched in February 2005. One can upload his/her video(s) and can also watch and share the video(s). It contains every type of video in a large number i.e. educational videos, movies, music, TV clips, religious videos, short original videos, etc. [YouTube Wikipedia, 2014]. It is the most useable site for education and other purposes. It contains both the cartoon and real environment lectures. Videos are available in different languages but English is the major one. YouTube does not usually offer a download link for its videos. One can only upload and watch the videos. So for downloading these videos, one must use some third-party websites, application and browser plug-in [YouTube Wikipedia, 2014]. One can only watch these videos but cannot interact with it. Its accessibility for the kids especially for the non English speaker is difficult.

2.7. Learning Chocolate: Learning Chocolate [Learning Chocolate, 2014] is an online website for learning English. Itsaim is to help students and children memorize English vocabulary by using games, images and pronunciation. They also teach about animals, body, clothing, community, weather, colors, classroom and other basics. Learning Chocolate contains the free learning material for the student and kids. It contains interactive games and phonics with audios. Visual ads and animation are frequently used in the phonics and games. Its medium of instruction is English which is good for the English speakers. It has a good syllabus for learning English. There is no need of any installation. It has a good user friendly interface. Learning Chocolate contains only the English material, other subject are missed here. Its medium of instruction is English which is not good for the non-English speakers. Free demos are not available for the overview. There exist some learning materials which are not suitable for the kids learning level.

2.8. Learn English Kids: Learn English Kids [Learn English Kids, 2014] is an online English learning site for kids. It contains games, songs, stories, animated videos, reading and activities for English learning. It is sponsored by British Council. Parents and teachers can also register themselves to download the learning recourses. Parents and teachers can share their ideas and can ask questions about helping their child to learn English [Learn English Kids, 2014]. Learn English Kids is totally free. One can register free by providing his/her e-mail address. There are a numbers of different types of interactive games for learning and revision. One can watch and listen the stories. With the available worksheets, one can read and write. One can also speak and spell the English words. The grammar is taught through games, quizzes and videos. Learn English Kids has a good user interface. Its medium of instruction is English which is good for the English speaker. Each step is guided through audio or text message. Learn English kids have used the cartoon environment which is interesting for the kids. It teaches only English, other subjects are missed here. There is no progress tracking test to check the performance of the kid. As its medium of instruction is English, so the non-English speaker will face difficulties in learning. User interaction with the system is limited.

2.9. E-learning for Kids: E-learning for kids [E-learning for Kids, 2014] is an online education resource for kids from age 5-12 years. It is established in late 2004 by Neck Van Dam. At this site the educators and experts can share their knowledge and expertise [Elearning for Kids, 2014]. They teach math, science, language arts courses, environmental skills, computer, health, life skills and English language. E-learning education resources are totally

free. They teach through level-by-level. They teach in five different languages including English. There are games for each activity and section for the kids' interest and learning. They have a good syllabus for teaching. Good quality of animation and visual ads are frequently used. Free demo is also available to overview the E-learning. All the learning materials are for kids. It has a good user friendly interface. E-learning learning material is free but can be access only online. There must be an internet connection for learning from e learning. There is no audio support for guidance. Progress tracking test report facility doesn't exist. Their learning resources are available in seven different areas (math general, science courses, computer, environmental skills, health, life skills and English language), other areas are missed here. They teach in five different languages (English, Dutch, Spanish, French and Portuguese), so the other languages speaker will face difficulties in learning.

We discussed the different computer aided systems for primary level education. In table 1 we have compared the different facilities that these systems provide.

Computer Aided Primary Education Systems (CAPES)								
Parameters	**ESL Kids Lab**	**KIZ School**	**Khan Academy**	**Kids Math Games**	**Starfall**	**YouTube**	**Learning Chocolate**	**Learn English Kids**	**E Learning for Kids**
User Interaction	Limited	Limited	No	Limited	Limited	No	Limited	Limited	Limited
Subject(s)	English, Maths	English	Maths	English, Maths, Science	English	All	English	English	English, Maths, etc.
Animation	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Games	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Visual Ads	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Free or Not	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Free Demo	No	Yes	No	No	No	No	No	No	Yes
System Level	Child Level	Child Level	Child & Elder Level	Child Level	Child Level	Child & Elder Level	Child & Elder Level	Child Level	Child Level
Progress tracking test	Yes	Yes	No	No	No	No	No	No	No

Table 1. Comparison of different computer aided primary education systems based on the evaluation parameters

3. Conclusion. We discussed that primary school children take great interest in images, animations and games. Many surveys have been conducted to know the importance of these visualads. There are many systems for fast learning for primary school children. These systems normally contain visual ads, animation and games. In this paper we discussed and compared different systems. For comparison, we have considered different parameters. These parameters are user interaction, medium of instruction, subject, animation, visual ads, games using approach, audio support, progress tracking test etc. From this study we have concluded that most of these systems are non-interactive and these systems can be improved if user interaction is also included in these systems.

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