ISSN NO. 2320-5407

Journal homepage: http://www.journalijar.com
Journal DOI: 10.21474/IJAR01

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH

RESEARCH ARTICLE

Analysis and Evaluation of Computer Apps for Special Education.

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Manuscript Info

Manuscript History:

Received: 12 February 2016
Final Accepted: 25 March 2016
Published Online: April 2016

Key words:
Learning, Learning Disabled Students, Special children , ICT, Apps.

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Abstract

Each child has individual academic strengths and personality; however learning disabilities will impact differently on individual children. This learning disability results in underachievement in examination and in particular, in mathematical subjects. Students with special needs spend most or all of their time with non-disabled students. Difficulties with early numeracy can interfere with the acquisition of mathematics skills in later childhood. The success of any learning improvement depends upon many factors. The adoption of interactive materials and technology and preparing teachers with essential knowledge and skills for the education is one of the best methods of teaching learning disabled students. In this paper a review work was carried out to study the work carried out in the learning disabled students and the apps related to mathematics.

Introduction:-

The learning disability is a classification in which a child has difficulty, learning in a typical manner and this may be caused by known or unknown factors. In general, the term learning disabilities can be described as a set of disorders due to inadequate development of specific academic, language and speech skills. The examples of learning disabilities are mathematics disability, reading disability and writing disability (Jamili, H. R., Williams, P., & Nicholas, D., 2006).The parents of the learning disabled students face stresses and they prefer assistive tools for their children.

Special needs education is the method oftrainingand educating students with special needs based on their individualneeds and differences. Ideally, this process involves the planning and monitoringthe teaching procedures, also inspecting the materials and equipments. They are designed to help learners with special needs achieve personal self-sufficiency and success in education and in the social success in school and community, than may be available if the student were only given access to a typical classroom education. One of the important special needs is learning disabilities and students with these kinds of special needs are likely to benefit from additional educational services such as ICT (Lidström, H., Granlund, M., &Hemmingsson, H. (2012).

Toll, S. W., & Van Luit, J. E. (2012)carriedout a study to test the effectiveness of a remedial numeracy program for children who were low performing and to evaluate the role of visual and verbal working memory in the development of numeracy. The study included kindergarten students and the children with a pretest numeracy score falling below the 50th percentile were matched and randomly assigned to an intervention group and a control group. Intervention group obtained meaningful and statistically significantly higher adjusted outcome numeracy scores at the posttest stage than did the control group .

Zhang, D., Xin, Y. P., Harris, K., & Ding, Y. (2014)carriedout a study to examine the effectiveness of a strategic training program for improving students' performance in solving multiplication problems. The results showed that the three participants began the intervention at different strategic developmental levels and consequently were given

differentiated tasks to promote their strategic development during the intervention. In response to the intervention, the three participants improved their problem-solving accuracy, use of advanced strategies, and flexibility in choosing backup strategies (Zhang, D., Xin, Y. P., Harris, K., & Ding, Y. ,(2014). Few researchers examined the relationships between mathematical learning difficulties (MLD) and the planning, attention, simultaneous, successive (PASS) theory of cognitive processing. The results showed that students with MLD performed lower than their peers in the MLD group. In order to investigate the relationships between cognitive abilities and improvement in the mastery of basic math facts and problem solving, students with MLD were given a special multiplication intervention. It appeared that the effectiveness of this particular intervention did not differ across the groups of students with specific cognitive weaknesses (Kroesbergen, E. H., Van Luit, J. E., &Naglieri, J. A. ,2003). A group of researchers investigated the relation between early mathematical skills and cognitive processing abilities for two samples of children in Italy and the Netherlands who completed both a cognitive test that measures Planning, Attention, Simultaneous, and Successive (PASS) processing and an early mathematical skills test. They observed some differences between the Italian and Dutch group on their scores on both tests, the relations between PASS processes and early math skills were comparable for both groups. The results may have implications for early identification of math learning difficulties (Kroesbergen, E. H., Van Luit, J. E., Naglieri, J. A., Taddei, S., &Franchi, E. , 2010). Johannes E. Van Luit, J. E., &Naglieri, J. A. (1999) examined the utility of a Mathematics Strategy Training for Educational Remediation (MASTER) program and investigated the effectiveness of the program. The results showed that the use of the self-instruction program resulted in significant improvement over the general instruction program.

Van Luit, J. E., &Schopman, E. A. (2000).developed an early numeracy program specifically for young children with special educational needs and early numeracy difficulties. The results showed that the 62 children in the experimental group performed better at post-test than the 62 children in the comparison group .Mukhopadhyay, S. (2014)investigated the perception of primary teachers towards inclusive education in the South Central regions of Botswana. The research employed a descriptive survey design that used both qualitative and quantitative research methodology. A questionnaire that contained both open-ended and closed items was designed to explore Botswana primary teachers' attitude, knowledge and skills and their views of the perceived benefits of inclusion of learners with disabilities in regular classrooms. The findings of this study indicate that although most of the teachers were positive towards the concept of inclusive education they did not have a favorable attitude towards the inclusion of learners with special educational needs in their classrooms due to the lack of essential knowledge and skills in inclusive education.

Information and communications technology:-

Computers and educational technology can be powerful tools for assisting children with special needs and disabilities. Information and communications technology (ICT), consists of IT as well as telecommunication, all types of audio and video processing and transmission and network based control and monitoring functions. The ICT based learning system play a vital role in enhancing on line education because it can be delivered anywhere, anytime and can provide flexible models, such as just-in-time learning. Peter et al literature shows a great number of ICT initiatives for children with all kinds of disabilities, there has been a surprising lack of research into the usability of the various applications developed and even less concerning those with learning difficulties. The review of existing literature indicates a lack of attention to the application of ICT for children with special needs, compared to the other groups of learning disabled children such as visually impaired. Findings highlight the need for more research on usability aspects of current and potential applications of ICT for children with special education needs (.Williams, P., Jamali, H. R., & Nicholas, D., 2006, July).. Hence, ICT with recent IT devices or tools will be a boon to children with learning disabilities and special education needs. Mobile devices like the iPad, enable children with developmental delays and other special needs to acquire life skills, engage in self-directed play, and perhaps most importantly facilitate communication with their caregivers.

Interactive media can be beneficial in helping some students with different learning styles find new ways to explore and understand material and to demonstrate their learning. Software can be created that has special features for visual, verbal, auditory and tactile learners. Basic computational is one of the most fundamental math skills for children and the students who have difficulty in learning math skills may benefit from representational approaches, such as TouchMath. Few researchers have investigated the use of TouchMath and studied the effectiveness of this strategy on the students' ability to solve basic addition problems with sums to 20. All students were successful in reaching the criterion, with high percentages of correct responses using the TouchMath strategy to answer simple addition problems(Avant, M. J. T., & Heller, K. W. ,2011).

iPad:-
The iPad is a multisensory product and offer portability and flexibly over the conventional devices and it has customizable options. The children have problem in using mouse, however in iPad they can use their fingers to touch and drag things and interact in an application. The iPad can be tailored to the child's specific needs, Most children who use the iPad find that tapping and sliding motions are much easier than typing on a device or using a traditional pen or pencil to write on paper. Since the screen of the iPad is fingerprint and scratch resistant, it will be an useful device to the students. Also, it helps the teachers to teach in better way and work with multiple students simultaneously.

In recent years, several apps have been developed and available in the open market includes. Apps are available in improve the fluency of the learning disabled and special need children for addition, subtraction, multiplication and division. Few special needs experts recommend that the parents identify the child's needs and capabilities first and then try to match them with an app.

Apps for the iPad:-
The various assistive communication apps for the iPad are being developed and discussed in the following sections are retrieved from http://www.techinspecialed.com and hhttp://teacherswithapps.com (2015, July, 26)

1.Touch Math Adventures:-
This app is a touch and count based and with number based association and early learners are engaged in everything from counting to problem solving wit2014h this multi-sensory game. In this App, the children are required to work their way through an adventure that progresses with each math based fact solved. This Apps can be customized the pace of the adventure or begin the adventure based on child's skill level so they don't feel rushed or grow bored.

2. Math Board:-
Math Board is an addition app which is a great introduction to their product and uses a simple chalkboard background to present math ideas, drills and problems to children. Math board teaches everything from basic addition all the way up to algebraic problems with intelligent learning so the program progresses with your child's learning. Math Board Apps has several math based learning apps that parents of special needs children stand behind.

3. Math Drills Lite:-
Math Drills Lite is a very simple app and helps in learning math problem involving addition, subtraction, multiplication, or division. Along with the basic equation, the app also provides some kind of visual representation. In this Apps, the child needs to pick the correct answer to move on to the next question.

4. Math Tappers:-
This Apps focuses on helping kids learn basic addition and subtraction not through numbers, but through counting objects. For example, if a child wanted to make the number seven, a picture of five apples came up on the screen and the child need to select "2″ in order to get the correct answer. This is Apps provides a simple game that can really help build a strong foundation in basic math.

5. Counting Bear:-
The Counting Bear Apps is designed to help children learn to count numbers from 1 to 20. It is highly customizable in terms of range of numbers, sound and images. This apps uses the images and sounds and can users photos and voices. This App is intended for young children, however its versatility would make it suitable for older children with special needs.

6. Happi 123 – A Maths Game:-
This Apps is developed for helping with concepts of counting, basic addition and subtraction, number sequencing and number patterns. Two different activities help children to learn and practice each concept. Uses numbers 1 – 10. Reward tokens encourage children to keep practicing.

7. Arithmetic Invaders – Express: Grade 1, 2 and K-2 Math Facts:-
Arithmetic Invaders Grade 1 includes the mathematical concepts such as addition and subtraction using tens and ones, double-digit addition with trading, basic multiplication and basic division. It is suitable for children in year 1 to 2. Arithmetic Invaders Grade 2 is similar to the grade 1covers addition and subtraction of numbers to 50,

including trading (regrouping), doubles facts, halves of numbers under 20. It is suitable for lower primary students. Arithmetic Invaders Grade K-2 is suitable from Prep to Year 3 children. Age-appropriate for older children who need support with these concepts.

8. King of Math:-
This Apps has lots of fun for learning and has great game for all ages, but will particularly appeal to older students in high school. The idea is to practice Math skills while working through a medieval-themed story.

9. MathBlasterHyperblast:-
This Apps has exciting drill and practice game with a space theme that covers each of the operations. You can customise the game in terms of both game skill and mathematics skill. The App is suitable for children working at a junior primary level, but is age appropriate for older children working at this level.

10. School A to Z:-
This App has a multiplication game that allows children to practice their Multiplication tables. It is age-appropriate for all primary levels. It has excellent reference materials and a great spelling game,

11. Fractions:-
This Apps has four entertaining activities to help children work with fractions. It covers basic fractions, addition, equivalence, comparison, with three levels of difficulty. It is suitable for all levels of primary school.

12. Mystery Math Town:-
It is a wonderful app for working on addition, subtraction and multiplication math facts. It allows for practicing math facts in an engaging and thoughtful manner. It requires critical thinking and will keep kids engaged as they have to choose which of the possible equations to build to solve each puzzle, as sometimes there are multiple answers. It doesn't build speed, but it definitely builds good number sense and knowledge of fact families.

13. Math Slicer:-
It is another great app for practicing facts in addition, subtraction, multiplication, and division. In this app students work through math questions in sets of 15, and each set is a specific skill. Choose an operation and a specific number set, and students must swipe or slice through the correct answer as it falls across the screen. This is a quick moving app that would be great for using when there are just a few extra minutes that need to be filled.

14. Math Mathews:-
It is an app that works exclusively on multiplication facts 1-9. It takes the students on a treasure hunt, and there are tons of mini-games that reinforce multiplication facts in a variety of ways–finding the answer, building the equation, and using a multiplication chart to find an answer. This app builds fluency, as speed and accuracy are necessary to advance in the game and collect the treasure. It has an engaging story to go along with the treasure hunt that will keep kids interested and keep them engaged, as they will want to find out what will happen next.

15. .Motion Math : Hungry Fish:-
Mental math is such a key component for success in building a strong foundation in math, and building on this early on helps all other math concepts fall into place with relative ease. Our students were enthralled by this simple, yet brilliant game – and they were polishing up on their number skills with smiles on their faces! Brilliant job Motion Math!

16. Math Evolve:-
This app introduces a revolutionary "video-like" gaming app for practicing math facts. One of our students called it, "The Call of Duty," of math games. Adam Coccari, teacher and creator of Math Evolve, sums it up best when he says, "Achieving success in all levels of math starts with having a solid foundation in addition, subtraction, multiplication, and division." Mastering these facts takes time and lots of practice, Math Evolve has taken care of all of that in an enormously engaging format.

17. Oh No! Fractions:-

Oh No! Fractions is as simple as it gets. This gorgeous app lets the user decide whether the given fraction is less or greater than another fraction. After the child has decided and chosen less or greater, it asks "I'm Sure" and then "Prove It" where a visual representation of the two fractions is shown and manipulated by the child.

18. Tally Tots:-

It is a simple yet invaluable learning app to teach youngsters number concepts. The intent of the app is to teach your child number recognition, one-to-one correspondence, and how to count to 20 – all while having a delightful time. When the app starts, you are taken to a screen that has all 20 numbers. Your child chooses the number they want and the counting begins. Each number is outlined as it is counted up the number line.

19. Mathmateer:-

Mathmateer, appeals to kids' creative side. To build a rocket ship to launch into space, kids must earn money by completing basic math challenges while recognizing patterns and shapes, telling time, and working on fractions and square roots.

20. Counting Caterpillar:-

In this apps, gorgeous colors and stunning visuals on the display is enough to keep kids engaged. Feed the caterpillars by counting and catching aphids in the correct number sequence and earn butterflies (displayed in a gallery) to progress through more than 45 levels.

21. Number Monster:-

One for the very early learners, Number Monster is a simple app that teaches kids to recognise numbers – from 1-20. It's friendly and easy for kids to pick up. Parents can turn on and off visual clues as their child progresses. It doesn't go much further than that so is a little expensive for what it offers.

There's plenty of variety – and that's important when encouraging kids to like maths – and the games are simple to get the hang of despite a lack of instruction from the developers. There are many varied games to play, including all the kids favourites such as insects and other animals, and space arcade games.

Challenges:-

One of the challenges in the use of technology for the learning disabled students is the cost of the iPad and the Apps. If the cost is reduced then the poor can make use of these technologies for the learning disabled or special needs children. However, iPad is a versatile tool which is cheaper than other assistive technology devices. There are several apps available that work on fact fluency for addition, subtraction, multiplication, and division. If the instructor are unsure of how to start using a classroom iPad, then it will be an obstacle for the introduction in the teaching learning process. Hence, training the teachers and parents about the new technology is another challenge. The rapid-fire speed in which apps are being developed has made it easy to meet the requirements of the children. However, special needs experts including Dr. Shane recommend that parents identify the child's needs and capabilities first and then try to match them with an app.

Conclusions:-

With the development of multimedia technology and animation with different game modes, young children can do basic mathematical operations such as number identification, addition, subtraction, multiplication and fraction. Apps may helpful to the children to build their math skills by solving problems and with the IT development Apps promise that the children learn mathematics while playing. Since iPads have customizable options, the iPad can be tailored to the child's specific needs, which make them more attractive than traditional learning devices. Many children can master the use of an iPad faster than adults. If the cost of iPad and free Apps are available, then the learning of learning disabled students will make use of its for learning and also it will reduce the burden on the teachers and the parents.

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