ARTICLES

DO MULTIMEDIA APPLICATIONS BENEFIT LEARNING-DISABLED CHILDREN?

By

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ABSTRACT

This paper focusses on the need and benefit of using multimedia applications to cater to the needs of children with learning disabilities. The children with special educational needs found in various schools may face difficulties in acquiring academic skills such as reading, spelling, writing, speaking, understanding, listening, thinking or arithmetic.

Multimedia approach to teaching is a strategy that comprises more than one instructional technique for teaching a particular unit. Different multimedia applications can be used to present disabled learners with visual, auditory or kinesthetic experiences thus helping them to adopt their own style of learning. The various educational media include audio media such as audio tape, recorders etc., visual media such as videotapes, television, computers, motion pictures etc., and realia such as models, kits, globes specimens etc certainly meets the needs of disabled learners with varied learning styles. The instructional media namely projected media such as slides, transparencies, projectors etc and non-projected media such as chalkboards, bulletin / magnetic boards, photographs, pictures, charts etc can benefit such learners as they provide a variety in learning. The educational media namely print media which include books, programmed texts, flash cards and electronic media or the non-print media which include CCTV, computers and other machines may help to overcome their learning problems to a large extent.

Innovative use of technology can help to engage students with learning disorders to learn in an enjoyable and meaningful way. The information and communication technologies provide a number of learning opportunities in formal as well as non-formal educational settings. Computer-based education has a very important role to play as an advanced technological instruction as it employs different instructional techniques that encourages active learning and meets the diverse needs of the learners through the use of technology in education. Educational technologies like web-based learning provide a number of opportunities to the disabled learners like self-paced instruction, flexibility, self-correction etc. Various information and communication technologies can be used to teach the students the knowledge and skills they need in the 21st century. Different communication technologies such as Electronic learning, Mobile learning, Ubiquitous learning etc can be used to enrich, enliven or add variety to the learning of such educationally handicapped learners. Thus the variety and flexibility of different multimedia applications offer the opportunity to adapt any media-combination to cater to the needs of learning-disabled children.

Keywords: Learning disability, Multimedia applications, Information and Communication Technologies.

INTRODUCTION

Educational technology makes desired improvement in the teaching-learning process by making it effective and efficient. It can bring about desirable modifications in the behaviour of teachers and pupils by improving the teaching and learning skills. The extensive use of technology enables teachers and learners to identify and use various strategies that integrate with their teaching and learning processes. Technology deployed in education can help to remove inequities between the schools of developing nations and developed nations and between rural and urban areas. It can maximize and individualise learning and make it more productive and relevant.

Educational media are used as tools, both for teaching and creating awareness in learning. The use of different educational media used for teaching and learning

activities help to provide individual differences among pupils. They include the things which are manipulated, seen, heard, read or talked about and the instruments which facilitate such activities. The use of various media increases the number of creative opportunities and challenges for education. It involves the use of various technological devices in the educational activities. It helps the learners to attain the objectives of educational technology such as individualizing instruction, providing quality education, offering equal educational opportunity etc and to enrich or add variety to traditional form of learning. The multimedia instructional strategies have the potential to facilitate better communication and retention in the teaching-learning process. The use of different media in the teaching and learning processes helps to meet the diverse needs of the learners.

Learning-Disabled Children

The study of learning disability or specific learning dysfunction is one of the most controversial, dynamic and significant areas in special education. The field of learning disabilities is distinctly multidisciplinary, a fact which has influenced the controversy surrounding every aspect of the field, from defining the learning-disabled to planning intervention strategies (Smith *etal*, 1983). Learning disability is a problem in which individuals find it difficult to perform well in academics in spite of having average or above average intelligence. The learning disabilities which impact an individual's ability to learn are *dyslexia* (difficulty in reading and spelling), *dysgraphia* (difficulty in writing), *dyscalculia* (difficulty with mathematical calculations), *dyspraxia* (difficulty with acquisition of patterns of movement), *dysphasia* (difficulty in speaking and understanding) and so on.

The learning-disabled are those who function at high intellectual level, but who have a specific academic deficit coupled with an executive processing deficit. Such deficits often involve memory and perception, resulting in weaknesses in reading, writing or mathematics (Biswas, 2002). Often school teachers may come across such children who face difficulty in learning the school subjects. Such children with special educational needs can be found in various schools. They may face difficulties in

acquiring academic skills such as reading, spelling, writing, speaking, understanding, listening, thinking or arithmetic.

The symptoms of learning-disabled students manifest in one or more of the areas such as reading comprehension, spelling, written language, auditory processing, mathematical computation and problem solving skills. They may also experience difficulty in organizational, time management and social skills. Learning-disabled students may be slow readers and writers, have poor handwriting, have difficulty in copying materials, have frequent misspellings and grammatical errors, have difficulty in paying attention in class, have difficulty in recalling sequence of operations etc (http://www.tntech. Edu/disability). A learning disability is found across all ages and in all socio-economic classes. Learning disabilities may affect individuals differently at different stages of life - early childhood, elementary school years, adolescence and adulthood.

Multimedia Applications

Multimedia is media and content that uses a combination of different content forms. The term is used in contrast to media which only use traditional forms of printed or hand-produced material. Multimedia includes a combination of text, audio, still images, animation, video, and interactivity content forms. The word "multimedia" is used exclusively to describe multiple forms of media and content. Multimedia represents the convergence of text, pictures, video and sound into a single form (http://en.wikipedia.org/ wiki/Multimedia).

Multimedia approach to teaching is a strategy that comprises more than one instructional technique for teaching a particular unit. Various educational media are used for teaching and learning activities. They include the things which are manipulated, seen, heard, read or talked about and the instruments which facilitate such activities. Multimedia instruction involves the use of multiple forms of media integrated together. Media can be text, graphics, audio, animation, video, data, etc (http://www.topbits.com /multimedia.html).

Multimedia applications can be used to present learners with visual, auditory or kinesthetic experiences in learning. The various educational media include visual media such

as videotapes, television, computers, motion pictures etc., audio media such as audio tape, recorders etc., and realia such as models, kits, globes, specimens. Technological devices like audio tapes and video tapes allow the learners the freedom of the choice and the length of information they would like to get exposed to. Audiotapes are best devices for adult learners who desire to study at a place and time of their convenience. Educational television like other audio-visual instruction, is most effective in perceptual phases of learning, in providing sensory experiences, pointing out significant cues, in informing the students and inspiring them to carry on further. The chief advantage of educational television is that can carry instruction to different classrooms, makes possible close-up views of what is being demonstrated and views of on-going events for class observation (Sharma, 2005). Motion pictures make up many of television's most exciting presentations. The movement and change in a motion picture attract the viewers and hold their attention. The motion picture heightens reality and bring the distant past and present into the classroom. They promote an understanding of abstract relationships and offer a satisfying esthetic experience (Dale, 1969).

The media used for instruction can be either print media or electronic media. Print media is the software approach to educational process which includes books, programmed texts, flash cards and games. The electronic media or the non-print media is the hardware approach to educational process which includes videotapes, CCTV, computers and other machines. There is greater flexibility in the use of electronic media like CCTV. The trends towards innovations and improvement in teaching methods and instruction and towards individualization of instruction indicate the significance of electronic media. These media facilitate diverse learning objectives and contribute to specific learning activities. The non-print media have the flexibility of accommodating individual needs and interests, especially through computers. The computer applications have certain remarkable advantages over the traditional print media. The novelty of working with a computer raises the motivation of the learner. Colour, music and animated graphics can add realism and appeal to drilling exercises, laboratory activities etc (Sharma, 2005).

The instructional media can also be classified as projected media and non-projected media. The projected media includes devices such as slides, transparencies, projectors etc and the non-projected media includes such as chalkboards, bulletin / magnetic boards, photographs, pictures, charts etc. The opaque projector can instantly project any material that have a flat surface. Teachers may use the opaque projector to enlarge picture, drawings, maps etc. The bulletin board is often the most active and exciting display element in the classroom. It invites and sustains creative work by students and enable them to share their learning experiences. A drawing or photograph can be used to convey a particular message (Dale, 1969). Through the skillful use of radio, audio recording, television, video recording, photograph, models, exhibits etc, one can bring the world to the classroom.

The information and communication technologies provide a number of learning opportunities in formal as well as non-formal educational settings. Web-based instruction is a growing trend in the field of education. The rapid growth of information and communication technologies has led to the development of web-based education. It is a type of education in which the medium of instruction is computer technology. It makes learning much easier as one need not be physically present in the classrooms all the time. Web-based training is delivered over the internet using a web browser. It includes interactive methods such as bulletin boards, chat rooms, instant messaging, video conferencing and discussion threads (Bharathi *et al*, 2009).

Different communication technologies such as E-learning, M-learning, U-learning etc can be used to enrich, enliven or add variety to learning. E-learning or electronic learning is the use of network technologies to create, foster, deliver, and facilitate learning anywhere and anytime. It makes learning much easier as one need not be present in the classrooms all the time.

M-learning or mobile learning refers to the deployment of training programmes on wireless handheld devices like cell phones and personal digital assistants. Mobile technologies have the potential to provide learners with increased access to information and learning material and to support learning and working from anywhere rather than

from a specific location at a certain time. U-learning or ubiquitous learning utilizes smart devices to provide individuals the right information in the right way. This type of learning may offer great innovation in the delivery of education, allowing for personalization and customization to student needs (Bharathi et al, 2009).

Various information and communication technologies can be used to teach the students the knowledge and skills they need in the 21st century. Multimedia in education has been extremely effective in teaching individuals a wide range of subjects. As technology progresses, so will multimedia. Today, there are plenty of new media technologies being used to create the complete multimedia experience. For instance, virtual reality integrates the sense of touch with video and audio media to immerse an individual into a virtual world. In addition as computers increase their power new ways of integrating media will make the multimedia experience extremely intricate and exciting (http://www.topbits.com / multimedia. Html).

Multimedia Applications for Learning-Disabled Children

Different multimedia applications can be used to present disabled learners to adopt their own style of learning. The human brain learns using many senses such as sight, hearing or touch. While a lecture can be extremely informative, a lecture that integrates pictures or video images can help an individual learn and retain information much more effectively. Multimedia presentations may be viewed in person on stage, projected, transmitted, or played locally with a media player (http://en.wikipedia.org/wiki/Multimedia).

The use of various educational media may help to overcome the academic difficulties of children with learning disabilities. The study which attempted to diagnose the problems in reasoning faced by the students in learning geometry and their prevention revealed that the experimental group taught by audio-visual materials and techniques achieved significantly more than the control group taught by the conventional method and that learning through audio-visual materials caused more prolonged retention than through the conventional method (Dutta, 1990). Innovations in the design and use of such materials must be encouraged so that their use

makes learning enjoyable and meaningful. By choosing materials and activities suited to their level of learning and by stimulating their urge to bring out their best, teachers can help the pupils with learning disabilities to turn their difficulties into special opportunities to be model achievers (Kumar & Raja, 2009).

Computer-based education has a very important role to play as an advanced technological instruction. It employs different instructional techniques and meets the diverse needs of the learners through the use of technology in education. Computer-assisted instruction encourages active learning and can cater to the individual needs of many students at a time. This type of instruction produces learning experience effectively and efficiently. A good amount of information stored in the computer is made available to the learner than any other media (Mohanty, 2003). Nwaizu and Ifeanyi (1990) on assessing the level of retention of students with specific learning disabilities while using computer-assisted instruction and teacher-assisted instruction to teach multiplication skills, it is revealed that students had higher retention level of multiplication facts mastered during computer-assisted instruction than during teacher-assisted instruction. On conducting a study (Calhoon, 2000) to know the effects of computer-based test accommodations on mathematics performance assessment scores for secondary students with learning disabilities, the results suggested that providing a reader, either human or computer significantly increases mathematics performance assessment scores for students with learning disabilities.

The use of technology like multimedia instructional technology or computer-assisted instruction may facilitate the process of mathematical exploration in dyscalculic learners. By these specialized approaches to teaching, most disabled learners can be helped to learn normally (Kumar & Raja, 2008). Mohankumar and Rajaguru (2001) on evaluating the effect of using multimedia instructional strategy for learning-disabled children studied that multimedia instruction facilitated the learning-disabled students in learning algebra concepts rather than their counterparts in conventional teaching group.

Heo (2007) investigated an experimental study on the

impact of multimedia anchored instruction on the motivation to learn of students with and without learning disabilities in a general classroom setting which included 80 randomly selected seventh-grade students with 28 students having a learning disability and findings of the research indicate that students with learning disabilities who received the anchored instruction improved in their motivation to learn and also in their academic achievement to a level similar to students without learning disabilities. In a study (Vasanthi, 1991) done on the development of a multi-media instructional system for remedial measures in fractional numbers, it was found that the multimedia instructional system helped the students in improving their performance on the computational skills in fractional numbers.

Innovative use of technology may help disabled learners to overcome their disability to a large extent and clever use of such technology can help engage such students with learning disorders. Chen (2004) on evaluating the efficacy of mathematics interventions for children with learning disabilities studied that technology-based intervention categories were highly effective for group design studies but moderately effective for single subject design studies and they could be effectively implemented to students with learning disabilities in mathematics. A study conducted by Lugo (2004) explores how multimedia computer technology could be a potential supplemental teaching aid that teachers use in addition to traditional classroom instruction.

Educational technologies like web-based learning can help disabled children in overcoming severe learning problems and permit a greater number of opportunities for learners' epistemological styles, pace of learning, flexibility, self-correction and modification of learning. There is a need to create a more inclusive web-based environment as technology advances and more and more students with learning disabilities web-based classes. On investigating the strategies and limitations students with learning disabilities namely dyslexia, dysgraphia and dyscalculia face in a web-based instruction environment and the contributions of web-based instruction course designers and their impact on web course design, it was

revealed that learning through the web helps to increase students' motivation, self-esteem and a sense of autonomy (Tandoh, 2003). Opitz (2003) on determining the effects of web-based learning modules for adolescents with learning disabilities found that web sites created using universal design guidelines that adhere to federal recommendations for web accessibility may assist all types of students in improving the accuracy of response when using information from a website.

Thus the variety and flexibility of different multimedia applications offer the opportunity to adapt any media-combination to cater to the needs of learning-disabled children.

Implications

Teachers have a great role to play in meeting the needs of pupils from a larger number of diverse backgrounds and with increasingly diverse special needs. Multimedia applications can be used for the benefit of learners with special educational needs. The various technological devices provide learners with visual, auditory or kinesthetic experiences. The instructional media such as projected media and non-projected media can benefit such learners as they provide a variety in learning. Also the educational media namely print media and electronic media or the non-print media may also help to overcome their learning problems to a large extent. All such devices have to be used for the benefit of learning-disabled children.

ICT technologies like Web-based learning allow students to engage in learning sessions that are less impacted by time restrictions, learning schedules etc. So it leads to variety and flexibility in learning. Web-based learning can thus be effectively implemented for enhancing the academic performance of learning-disabled children. Different communication technologies such as Electronic learning, Mobile learning, Ubiquitous learning etc can be used to enrich, enliven or add variety to the learning of such educationally handicapped learners.

Awareness about learning disabilities like dyslexia, dysgraphia or dyscalculia is very much essential to investigate about new technologies that can be most appropriately used to facilitate the learning of disabled

children. Technologies have the potential to create a conducive atmosphere to active learning by the students. It can help students with learning disabilities in developing motivation and self-esteem by allowing students to take more responsibility for their learning. Hence researchers need to come forward to carry out more intensive studies on this area to meet the special needs of academically-disabled students who need special attention.

Conclusion

Multimedia applications can thus be effectively designed to cater to the needs of children with learning disabilities as it provides opportunities for variety in learning, collaborative learning, flexible thinking, incidental learning etc. The use of different multimedia applications could facilitate the process of acquiring the various academic skills that are needed for learning and create a wide range of learning opportunities for these educationally backward learners. It certainly meets the needs of disabled learners with varied learning styles such as visual, auditory or kinesthetic learning styles. Also it helps to enhance the learning of such pupils by using different instructional techniques and thus integrating educational technology in the classroom. Adoption of different media for learning can help engage such disabled individuals which help them to learn in an enjoyable and meaningful way. So it is imperative to adopt different educational media to help these academically weak learners to improve in academics.

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