ISSN 2278-8808
An International Peer Reviewed & Referred
SCHOLARLY RESEARCH JOURNAL
FOR INTERDISCIPLINARY STUDIES
UGC APPROVED SR. NO. 45269
SJIF 2016 = 6.177

USE OF ASSISTIVE TECHNOLOGY IN CLASSROOM ASSESSMENT TO ACHIEVE INCLUSIVE EDUCATION AND THE CHALLENGES FACED THEREIN

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The concept of inclusive education has evolved over the years with the projection of equality in approach for the education of the 'disabled' providing them opportunities to display their differential abilities, guiding them to be capable enough to learn and perform together, at par with their non-disabled peers. This has given rise to evolving the teaching strategies or the means of instructional delivery in the inclusive classrooms, to address the diverse learning needs of all learners in an equitable manner. Acknowledging the capabilities or 'differential abilities' of all learners, the education of children with special needs in inclusive schools becomes more of a shared responsibility between the different stakeholders involved (Ahmad, 2015a; Praisner, 2003); demanding a shift in attitude, availability and accessibility of infrastructure, pedagogy, need-based methods and materials for instructional delivery, assessment and evaluation; and the much evident issue of acceptance and accommodation at all levels in the education system (Ahmad, 2014; 2015b; Stainback and Stainback, 1984).

Researches on inclusive education, have predominantly focused on the success stories of inclusion in developed countries in North America and the Western Europe, that have made significant progress in inclusive education (Arnsen and Lundahl, 2006; Ferguson, 2008; Gronlund et al., 2010; Kearney and Kane, 2006; Meijer et al., 2007; Norwich, 2008); however, the status of inclusive education in the developing countries in Africa, Asia and the Eastern Europe, typically highlights difficulties in the implementation of inclusive education (Charema, 2007; Chitiyo and Chitiyo, 2007; Singal, 2006). Among the prevalent barriers to

the successful implementation of inclusive education like limited governmental support, ineffective policies and legislation, inadequate funding, insufficient trained teachers and support staff , political instability, and economic crisis; the ineffective and inefficient use of assistive technologies is seen to be a major obstacle hindering inclusion (Chitiyo, 2007; Ellsworth and Zhang, 2007; Gronlund et al., 2010; Singal, 2008).

'Assistive Technology' broadly spells out a continuum of tools, strategies, and services that match a person's needs, abilities and tasks, and includes evaluation of the needs of an individual with a disability, a functional evaluation of the individual in the individual's customary environment, and the selection, designing,customization, adaption, application, maintenance, repair, and replacement of assistive technology services, and their coordination with the existing education and rehabilitation plans and programs for inclusive development.

Assistive technology is a generic term that includes assistive, adaptive, and rehabilitative devices for individuals with disabilities and includes 'virtually anything that might be used to compensate for lack of certain abilities' (Reed and Bowser, 2005), ranging from low-tech devices like crutches or a special grip for a pen, to more advanced items likehearing aids and glasses, to high-tech devices such as computers with specialized software for helping dyslexics to read (WHO, 2009). Also known as 'technical aids', or 'assistive equipment', including information and communication technologies (ICT), universally designed technologies, educational technologies, emerging and innovative technologies, and accessible technologies; they can be any item, piece of equipment or product system that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities, and help them to work around or compensate for a disability' (Goddard, 2004: p.2), in order to participate in the activities of daily life.

Approaches in the use of assistive technology in inclusive education focus on using technology to train or rehearse, and to assist and enable learning. A large population of 'at risk' students are seen to need assistance, but since they often don't easily fall into a diagnostic profile, they often lack assistance. Assistive technology serves in bridging this gap by 'assisting' in the practice of educating children in the same classroom, including children with physical and developmental disabilities (Smith et al., 2005); helping them to learn the material in a way that they can understand, by eliminating barriers that had been preventing them from being at the same level as their peers. Attitudinal barriers are perceived to be the basis of all other environmental barriers, and are perhaps the most difficult to change (Piviket al., 2002; Williams and Algozine, 1977). They are reflected in misconceptions, stereotypes, labeling, fear from the unknown, resistance, misunderstanding the rights and opportunities of

individuals; and lead to the further isolation of children.

In the field of education, broad introduction of new digital technology presents great possibilities and initiates new pedagogical approaches apt to meet the overgrowing demands of modern society. Information and communication technologies (ICTs) have become the most suitable tool, which can help people with different learning demands exercise their right to education, employment, social life and leisure, and access to information and democratic channels. The use of new technologies in the sphere of education helps to enhance independence, integration, and equal opportunities for all people.

E-learning separates a teacher and trainees. Interpersonal face-to-face communication of conventional education is replaced by communication and guidance mediated by the Internet. The instructional method of the training course is based on a common approach for both forms of learning, i.e. conventional classroom learning and e-learning. The basic instructional approach is a learner-centered approach – selfregulated and collaborative learning guided and supported by a trainer. Inorder to build the appropriate background both for knowledge accumulation in the sphere of ICT application in SNE, as well as for stimulation of skills' application in the daily educational practice, there is a need to provide reflexive, pragmatic, and experiential approaches. In this case, the trainees will be placed at the center of the teaching-learning process and will have to find their own individual access to information to construct their knowledge.

ICTs offer a great potential to support lifelong learning for all groups of students, including those who have special educational needs. The application of ICTs must enhance independence, integration, and equal opportunities for such people and in this way will facilitate their inclusion in society as valued, respected, and contributing members.

Revised Educational System in Information Age

The current period of social development is characterized by the mounting role of information and knowledge which are becoming the main factors of the progress and prosperity of society. The development of Information Society is having a growing impact on every aspect of people's lives. Information technology becomes more and more accessible in daily life. It changes our society bringing a new cultural environment where information is present in every field.

Recent years have brought some remarkable innovations in the delivery of education. The world is getting linked to an increasing extent via computer networks. Digital telecommunication systems are replacing analogue ones. Computer systems, telephones, and

television are getting more integrated. Different applications of information and communication technologies have opened up and will continue to open more and more possibilities for home-working, Internet banking, e-commerce, e-medicine, and (not in the least) new opportunities in education and training. Technology rapidly turns out obsolete, requiring new skills and knowledge to be mastered frequently. Adaptation is possible only when based on a sound understanding of ICT concepts. The issue of ICT literacy is actively developed in the modern society. Many countries now regard understanding of ICTs, mastering of the basic skills as well as concepts of ICTs as a part of the core education, alongside with reading, writing, and calculating. Specialists are relied on to define the sets of skills required in the modern world of communication.

Inclusive Education enhanced by ICT Implementation

Inclusive education presents an opportunity for students with special needs to attend mainstream classrooms with their age-group peers. To realize this we need to provide for the relevant conditions of overcoming the barriers to the learning process. Promoting ICT infrastructure for SNE is necessary inorder to provide for the appropriate conditions of teaching and learning in the SNE context. Assistive tools must be used to allow students with SEN to participate in the educational process based on special techniques and equipment.

It is also important to recognize that with ICTs alone we cannot solve all problems. There has to be the willingness of educators to develop innovative teaching methods or to change and adopt the existing approaches to accommodate new concepts of special needs education and modern technologies. If a learner is unable to manage a particular activity (due to physical or sensory barriers), alternative activities must be designed or adapted, so that he/she gets a chance to receive the needed information and demonstrate the results. To implement this intention ICTs must be fully integrated in SNE curricula. Curriculum modification is not about its simplification for some students or lowering of academic requirements or standards. The modified curriculum must preserve the skills or knowledge required for a particular course and distribute knowledge and training resources in a more creative way and on a more equal basis.

Material and Method

Research Design

The present study focused on the usage of assistive technology in Secondary schools for SEN

students. The data was collected from an Inclusive school catering to special students across Classes V-X.

The study adopted mainly a quantitative approach including qualitative interviews. The survey methodology (Dillman, 2006; Fowler, 2008) was employed to examine teachers' use of and knowledge about Assistive Technology. Survey is a suitable method to gather information on specific topics and allows the investigator to obtain numerical information from particular populations (Fowler, 2008). The participants surveyed in this study are professionals (i.e. general and special education teachers) who usually have computers and Internet access. Combining qualitative and quantitative methods is a legitimate and common practice in educational research (Creswell, 2008).

Research Objectives

1. To review the tools and technology based applications available for SEN students.
2. To find out the use of assistive technology in classroom assessment for achieving inclusion.
3. Suggest usage of tech based applications that would help students to overcome their handicap and enjoy the learning process in a conducive environment.

Data Collection

Data was primarily collected through questionnaire survey. The questionnaire was distributed via mail to all the teachers participating in the survey through their schools. The first part of the questionnaire collected personal and professional information from them. The second part was designed to assess teachers' use and knowledge level of assistive technology. Interviews were used to gather in depth inputs for data analysis.

Description of Survey Participants

A total of 36 participants responded to the online survey. Participants were from different geographical region. More females responded than males. In terms of participants' education, the majority were holding bachelor degree, while few were holding a master's degree. The number of respondents werea healthy mix of general & special education teachers. About quarter of respondents had less than one year of teaching experiences. Almost half of the participants had one to two years of teaching experiences. Almost thirty percent of the participants reported three to five years of teaching experiences. Very few of the participants had six to ten years of teaching experiences.

Table 1 summarises the teachers' knowledge , availability and usage of assistive devices within their classrooms.

Table I

Variable	Frequency(n)	Percentage (%)
Are teachers aware of AT?		
Yes	6	16.7
No	30	83.3
Is AT being used by teachers ?		
Yes	2	5.56
No	34	94.44
AT availability in schools		
Yes	2	5.56
No	34	94.44
Types of AT available in school		
Charts& Computers	5	-

The above table elucidates that though the teachers are aware about assistive technology there is not widespread popularity about its availability and usage as should have been in today's day and age. Few teachers who seem to be well versed with the technological innovations and its functionality are handicapped by the lack of funds which further leads to lack of available technology resources that can be used in the classrooms to aid learning for SEN students. If at all any assistive devices are easily procured, they are computers and charts but with limited programming that can only provide basic assistance to learning.

Teachers' preparedness for classroom delivery with the help of assistive technology:

Table 2 lists out how well prepared are/aren't the teachers in utilizing assistive devices to facilitate their students' learning within the classroom.

Table 2

Variable	Frequency (n)	Percentage (%)
Preparation to provide students with AT		
Zero	30	83.3
Ill prepared	4	11.2
Little development	2	5.5
Appropriately prepared	0	0
Sufficiently developed	0	0
Knowledge of AT		
Zero	12	33.3
Inadequate	18	50
Little	4	11.2
Good	2	5.5
Excellent	0	0
Training on AT		
Nil	34	94.5
1-2	2	5.5
2-4	-	-

Most of the trained teachers are unaware or not trained to handle advanced devices which in turn could be of help to the students for learning. Their levels of technology based education are bare minimum or negligible unless the teacher is personally clued up on the latest advancements in this field. Professional development courses are often being held nowadays but they are yet not widespread and many teachers seem to be unaware or disinterested in getting trained on the same.

Assistive Devices & technology popularly utilized in schools:

Table 3

Technology	**Features**	**Use in Assessment**	**Present situation**
Graphic Organiser	Gives graphical explanations	Yes	Being used
Braille Technology	Gives details for blind	Yes	Being used
Models	2D and 3D models	Yes	Being used
Computers	Basic features only	Yes	Very basic features

The above table elucidates the basic technology based devices being popularly available in schools. For varied variety of learners only a few such devices are accessible and that to in limited numbers making learning typically conservative and stereotypical within the classroom. It's a sad reflection on the reality in the classrooms that in spite of several advancements in technology the same have failed to enter the classrooms where it is most needed to assist SEN learners.

Having observed the dismal state of usage of assistive devices in the classrooms, it is recommended to prod over the advancements that can help to make classroom learning easy and fun for SEN students. The listed devices are mostly simplistic but come at a cost which could be considered as an investment for enhancing the challenged students' growth trajectory if implemented.

Additional & advanced assistive devices that can be used to assist learners:

Table 4

Talking Calculators	**Relay maths via audio**	**Visually**

		Impaired
		Learning disabled
Electronic Worksheets	Digital worksheets	All
Text to voice	Combining reading spelling	Dyslexic students
Digital pens	Convert handwriting to audio recording	All
Variable speed recorders	Word recording for future use	Slow learners
Portable word processor	Word processing	Learning disabled
Alternate mice	Joy Sticks	Learning disabled
	Roller balls	Learning disabled
Phonetic spelling software		Dyslexic students
Scholastic keys	Simplify software	All

With rapid advancements in technology, several advanced devices have become popular and are being regularly utilized in classrooms especially in advanced countries. Focusing on the specific challenges of SEN students, these devices are categorized and utilized for several types of learners making learning accessible and easy for day to day assimilation of academic concepts.

Conclusion

The effective use of assistive technologies is the difference between experiencing success or failure in the educational setting for students with disabilities. Findings of this study signify that the vast majority of the teachers have an inadequate level of knowledge and skills of using assistive technology. Previous researchers (Ashton et al, 2005; Bausch and Hasselbring, 2004; Parette et al., 2006; Smith and Kelley, 2007; Wilcox et al, 2006) concluded that teachers were not confident in using assistive technology due to lack of knowledge and training in this area. Knowledge and skills of using assistive technology essential for general education and special education teachers in equal measure.

Assistive technology should not be viewed by educators within a 'rehabilitative' or 'remeditative' context, but as a tool for accessing curriculum, and exploring means to help students achieve positive outcomes (Warger, 1998). For the proper and optimum use of assistive devices, it is essential to ensure need-based assessment considering the applicability of the technology and its effectiveness; a sound development plan ensuring student centered goals and proper identification in the plan of the devices needed through action oriented

approach with effective monitoring and periodic review.

Teachers' perceptions of the usefulness of receiving training on using assistive technology affect how often it is used. It was encouraging to find that the majority of respondents indicated their interest in professional development in assistive technology. Formalized courses were the least preferred methods for learning about technology for professional development delivery. Face to face methods that involved hands-on opportunities and personal contact were preferred over others. The results of this study has a clear implication that teachers must be provided with adequate opportunities for professional development in implementation and use of assistive technology.

There is a distinct need for researchers, practitioners, and other stakeholders in the system to identify ways to encourage the development of tools and strategies for technology integration, and strive to work together on issues surrounding the use of technology, for effective inclusion of students with disabilities within the general education environment, ensuring that they are entitled to the same high standards and effective instruction that is available to the non-disabled students.It is essential to focus and build on the strengths and capabilities of the students, with the necessary support and assistance, to give more room to their abilities in order to address their 'disabilities'.

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