# ICT for Intellectually Disabled Children: An Initiative for Inclusion

<table>
<thead>
<tr>
<th>Key Words</th>
<th>Education Technology, Intellectually Disabled, Assistive Technology, ICT Supported Teaching Methods, Educating Children With Disability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; Dr. Sreedevi P. S.</td>
<td>Assistant Professor, Department of Education, The Gandhigram Rural Institute-Deemed University, Gandhigram, Dindigul-Tamilnadu</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Swapna K.S</td>
<td>Research Scholar, Department of Applied Research, The Gandhigram Rural Institute-Deemed University, Gandhigram, Dindigul-Tamilnadu</td>
</tr>
</tbody>
</table>

## Abstract

Technology of education is being developed with the aim not only of making education more widely available but also of improving the quality of education. Technology can assist learners to perceive purpose in learning. If purpose is lacking, there will be little incentive for pupils to learn. Goal centered pupils achieve more than those who fail to perceive objectives in learning. Technology can assist pupils to attach meaning to ongoing lessons and units of study. The positive impact of Information and Communication Technologies (ICT) motivates and improves the success of a student with special needs in the inclusive classroom. Students with handicaps, intellectual disabilities or who have difficulties adjusting to school benefit from ICT possibilities to learn, sometimes better, and sometimes in a different way and excel in their achievement. In order to do cater the needs of the students with special needs the teachers can use the dedicated technological aids or assistive technology that is more appropriate to address specific needs such as physical or sensory needs, needs in terms of school or social maladjustments or needs linked to the acquisition of competencies. The knowledge about the ICT supported teaching methods for the disabled children would be of great boon to the teachers to handle the entire class without any discrimination. Hence this paper, discusses about the research perspectives of the role of ICT supported teaching methods in educating children with disability.
I. INTRODUCTION

The term intellectual disability (ID) is increasingly being used instead of mental retardation. ID or mental retardation is defined as a condition of arrested or incomplete development of the mind, which is especially characterized by impairment of skills manifested during the developmental period, which contribute to the overall level of intelligence, i.e., cognitive, language, motor, and social abilities (World Health Organization, WHO, 1992). The American Association on Intellectual and Developmental Disabilities (AAIDD) describes ID as characterized by significant limitations both in intellectual functioning and in adaptive behavior as expressed in conceptual, social, and practical adaptive skills. This disability originates before age 18. In general, ID applies to the same individuals who were previously diagnosed with mental retardation in kind, level, type, duration and the need for services and supports. People with ID represent a significant subgroup within the population, most of whom require support of some kind. People with ID are extremely heterogeneous, with complex aetiologies, presentations and often comorbidity. For example, physical (20–30%) and sensory impairments (10–33%) often exist alongside their primary cognitive, functioning and developmental impairments.

For students with intellectual disabilities there are programmes which have been developed and are constantly being developed to allow them greater participation within the classroom. Many intellectually disabled students have limited to verbal or written communication skills, so assistive technology is vital to their involvement in the work around them (Parette, Stoner, and Watts, 2009). “For most people technology makes things easier and for persons with disabilities, technology makes things possible” (Radabaugh, 1988, as cited in Ribeiro & Moreira, 2010). This statement creates a realisation about the responsibilities teachers have in making participation, inclusion and acceptance possible for these students. It is not simply a matter of making them more engaged or on-task, it is about allowing them to communicate what they are thinking and feeling in ways they never could before or without the use of ICT. Some examples include the use of programs such as boardmaker, PowerPoint and Clicker5. In various ways these programs allow for students to create written commands, requests and expression. They also allow for visual and kinaesthetic learning rather than auditory (Parette, Hourcade, Boeckmann, and Blum, 2008).

II. INFORMATION & COMMUNICATION TECHNOLOGIES OVERVIEW

ICTs are making dynamic changes in society. They are influencing all aspects of life. The influences are felt more and more at schools. Because ICTs provide both students and teachers with more opportunities in adapting learning and teaching to individual needs, society is, forcing schools aptly respond to this technical innovation. The modern technological advancement may be properly employed for the evaluation and training of the intellectually disabled. There are many technologically advanced devices that can help the intellectually disabled to learn essential adaptive behavior functioning skills.
One of the commonly used augmentative communication device is known as Digivox System that can be used to teach skills such as operating a washing machine, as electric or gas stove, etc. Computer assisted instruction can help intellectually disabled students in gaining knowledge and skills in so many ways. Computers can provide individualized institutional programme to the learner based on their requirements and competencies. Intellectually disabled students can experience a lot satisfaction of being independent and controlling their environment related to teaching and learning. Programme available on the computers can help them individually by providing the most common services related to a) drill and practice, b) tutorial services, c) teaching cause and effect relationship, d) word processing, e) thinking and problem solving, f) simulation. The employment of such services may help them to acquire basic skills like reading, arithmetic’s, motor and communication skills as well as proper adaptation to their environment.

Assistive technology can be defined as any item, piece of equipment or system that helps people bypass, work around or compensate for intellectual disabilities. Assistive technology is an umbrella term, which can be divided into two main groups: hardware and software. Hardware refers to actual equipment. For example, tape recorders and calculators are two common types of hardware. On a computer, the hardware includes the central processing unit (the computer’s “box”), the monitor (the screen) and the internal circuit boards. Software, on the other hand, refers to the programs that run on computers, telling the computers what to do. The purpose of assistive technology is to work around specific deficits, rather than fixing them. It helps people with learning differences reach their full potential and live satisfying, rewarding lives. Assistive technology, however, should be a part of an overall program to help individuals with learning differences. Assistive and adaptive technology does not “cure” a specific learning disability. These tools compensate rather than remedy, allowing a person with an ID to demonstrate their intelligence and knowledge. Adaptive technology for the person with an ID is a made-to-fit implementation. Trial and error may be required to find a set of appropriate tools and techniques for a specific individual. Ideally, a person with an ID plays a key role in selecting their technology to determine what works and what does not. Once basic tools and strategies are selected, they can be “test driven,” discarded, adapted, and/or refined.

Assistive technology can support both compensatory and remedial approaches for a student. A compensatory approach might be when a student listens to a digital version of the book for English class to answer questions about it, with the goal of bypassing a reading problem, not of learning how to read. If the student listens to the book or has a computer reading a scanned or digital version of the book while following along with the text and trying to learn unfamiliar words, this would be a remedial approach, designed to improve areas of deficiency. Both approaches have value. Using only the remedial approach (sometimes with little benefit) can lead to burnout. Discouraged students benefit more from more immediate solutions to particular
problems. Assistive technology (AT) can help students with learning disabilities to read, write and spell. Research shows that assistive technology can not only help these students in their academic pursuits, it can be a lifeline for them to obtain and maintain gainful employment (Hasselbring & Bausch, 2005).

III. TYPES OF ASSISTIVE TECHNOLOGY

- **Handwriting** – Writing by hand can be a daunting task for students with intellectual disability. As a result, students with handwriting challenges typically produce written work that is far below their oral expressive skills. Fortunately, assistive technology can alleviate the handwriting burden, so that students are freed to focus on the content of their written work. Alternative writing surfaces (white boards) or slant boards and alternative writing implements (magnetic letters, alphabet stamps) can make a difference. Raised line paper or pencil grips can also help with handwriting. Writing devices - come in variety of shapes and sizes. They are designed to alleviate writing stress and gripping problems.

- **Reading** - There is a wide range of Assistive Technology (AT) tools available to help individuals who struggle with reading. Books on tape; screen reading software; picture/print stories; line marker; highlighter; tracking and contrast aids. Tracking Devices - assists students in tracking lines of text displayed on the page. Generally highlights one row of text at a time. Device is moved down page as student moves from one line of text to the next.
Mathematics - Assistive technology tools for math are designed to help people who struggle with computing, organizing, aligning, and copying math problems down on paper. With the help of visual and/or audio support, users can better set up and calculate basic math problems. Calculator with large numbers, printout or talking capabilities; number line; touch point numbers; adapted abacus, protectors and tactile rulers. Adapted compass – made of black plastic, which allows the user to draw circles measuring quickly and easily. Raised lines show the half centimeter marks and raised dots to show the centimeter marks, by each measurement mark is a hole for pens and pencils to fit in, enabling circles to be drawn.

Home Living - This domain addresses such activities as preparing and eating food, taking care of clothes, housekeeping and cleaning, dressing, bathing and personal hygiene, and operating home appliances. There also are apps for i-Devices that can support individuals in performing home living tasks. For example, i-Dress for Weather has customizable closet and personalized temperature settings to reinforce connections between weather and clothing, My Healthy Smile provides information about oral health and dental visits, and Healthy Cook offers recipes catered to meet individual health needs.

Community Living - This domain focuses on activities such as using transportation, participating in recreation/leisure activities, shopping and purchasing goods and services, interacting with community members, accessing public building’s, etc. Examples of apps that support community living activities include Model Me Going Places (helps to navigate challenging locations), Community Sidekick (tracks the locations of individuals), and Work Skills Sampler (reinforces common words important for independent living).

Lifelong Learning - This domain focuses on interacting with others while making educational decisions, learning functional academics and using learning strategies, acquiring self-determination skills, and using self-management strategies. Examples of AT supports in this domain include: Examples of apps that support this domain include: Money Equivalence (teaches about money equivalents and combinations of coins and bills) and Autism/DTT Shapes (teaches basic shapes using a discrete trial training technique).

Employment - This domain addresses activities such as accessing job accommodations; learning and using specific job skills; interacting with coworkers, supervisors and coaches; and completing work-related tasks with acceptable speed and quality. An example of an app that supports employment is Quick Cues, which provides social prompts to help individuals handle new situations and learn new skills.

Health and Safety: This domain emphasizes taking medications, avoiding health and safety hazards, obtaining health care services, ambulating, learning how to access emergency services, maintaining a nutritious diet, staying healthy and fit, and maintaining emotional health. Examples of AT tools that support this domain
include: Examples of apps that support this domain include Living Safely (a series of self-directed learning modules for 17 important safety skills) and Pill O’Clock (a medication reminder).

➢ **Social Activities** - This domain focuses on social activities within and outside of the households, making and keeping friends, using appropriate social skills, engaging in volunteer work, and forming loving relationships. Examples of AT tools used in social activities include: Examples of apps that support social interactions include Photo Tell (a fun way to display photos with audio captions), AA Visual Schedule (for creating visual schedules using real photos), and Memory Fun (a game to train the memory that can involve multiple players).

➢ **Protection and Advocacy** - The activities in the protection and advocacy domain include advocating for one’s self, managing money and personal finances, avoiding exploitation, exercising legal responsibilities, making choices and decisions, and advocating for others.

### IV. INTEGRATING ASSISTIVE TECHNOLOGY IN TEACHER PREPARATION

The ICT enabled education support the learning of learners with intellectual disabilities and special educational needs in inclusive settings. The teachers need to learn the strategies to promote diversity and inclusion strategies in a learning environment for all students, including students with special needs. The needs and challenges of inclusive education were addressed through training of teachers, in addition they should be able to work with information, technology and knowledge. ICT represents a powerful tool for supporting and promoting inclusive practice. It provides extensive support to promote communication and learning. ICT helps to breakdown some of the barriers that lead to under-achievement and educational exclusion. Teachers should be able to cope effectively the innovations that have affected the scope of teaching methods and learning concepts with special preference to the assistive technologies for the learning disabled. A successful teacher training for inclusion can be promoted through the integrated training for the Pre - service teachers in both general and special education, also by learning the latest ICT tools which really contribute much to the enhancement of learning of the disabled children. Pre - service teachers must learn innovative child-centred strategies to teach children with diverse range of abilities, as well as strategies that promote active student learning and adaptations to meet individual student needs. The education of the teaching staff and all academic staff in contact with special needs is very important for the promotion of the inclusive teaching strategies using ICT. Pre - service teachers must have the knowledge and skills to select, adopt, implement and assess assistive technology successfully. Selection begins with documentation of the students baseline performance prior to assistive technology consideration. This step is crucial for establishing the efficacy and long-term viability of any assistive technology intervention. Students are eligible for assistive technology only if it has the capability to improve their functional performance in the classroom.
V. FRAMEWORK OF ICT IN TEACHER EDUCATION

The present framework is coherent with the context provided by today’s society and reflects the recent trends in the nature of learning during school years and lifelong learning patterns. The holistic framework will help teacher educators and administrators consider the cultural and educational system context, technology resources, and other factors that are important in planning the integration of technology into the pre-service curriculum. The technology resources and pedagogical innovations can become contexts for curriculum reforms in teacher education.

Figure 2: Framework of ICT in Teacher Education

- **Context and Culture** identifies the culture and other contextual factors that must be considered in infusing technology into teacher education curriculum. It includes the use of technology in culturally appropriate ways and the development of respect for multiple cultures and contexts, which need to be taught and modelled by teachers.

- **Leadership and Vision** are essential for the successful planning and integration of technology into teacher education and require both leadership and support from the administration of the teacher education institution.

- **Lifelong Learning** acknowledges that learning does not stop after school. In common with the other themes, it is important that teachers and teacher preparation faculty model lifelong learning as a key part of implementation, and as an ongoing commitment to ICTs in teacher education.

- **Planning and Management of Change** is the final theme, born of today’s context and accelerated by technology itself. It signifies the importance of careful planning and effective management of the change process.

The ICT competencies are organized into four groups. **Pedagogy** is focused on teachers’
instructional practices and knowledge of the curriculum and requires that they develop applications within their disciplines that make effective use of ICTs to support and extend teaching and learning. Collaboration and Networking acknowledges the communicative potential of ICTs to extend learning beyond the classroom walls and the implications for teachers’ development of new knowledge and skills. Technology brings with it new rights and responsibilities, including equitable access to technology resources, care for individual health, and respect for intellectual property included within the Social Issues aspect of ICT competence. Finally, technological advancements and the emerging patterns can be an added aspect of the Lifelong Learning to update skills and knowledge for the teachers.

ICT is used in teacher education for a number of reasons. At one level, the teacher education institutions wish to ensure that newly qualified teachers have the appropriate ICT skills. It may be that in the long term there will be less need for this ICT skills development, as students will develop better ICT skills before they reach teacher education. The second dimension to ICT in teacher education is the development of students’ capacity to make appropriate use of ICT in their teaching. This is more challenging, as student-teachers sometimes tend to use the most obvious applications of ICT, resulting in over-use of these ideas. In most of the teacher education institutions, developing ICT capacity among student-teachers is the responsibility assigned to the ICT specialist. This is an effective way to develop skills but its utility for educational purposes needs to be emphasized. To achieve a wider spread of ICT usage within teacher education, the staff development programmes can make use of the services of system analysts as well the pedagogical scientists. A third dimension to ICT in teacher education is the use of virtual learning environment to provide support to student teachers. This is both a useful support to the student-teachers and an opportunity for them to develop the experience of a virtual learning environment. Student-teachers should gain experience of the same virtual learning environment as it is intended for school use, but this may present difficulties as the teacher education institutions are funded through different agencies and may have adopted different technologies.

VI. CONCLUSION

Assistive technology can help people with intellectual disabilities overcome barriers towards independence and inclusion. Technology can compensate for a person’s functional limitations. People with intellectual disabilities should be introduced to assistive technology as early as possible. Not all technologies are appropriate for all individuals. People have their own unique set of strengths, weaknesses, interests, experiences and special abilities. Therefore, a technology that may be a blessing for one person may be useless for another. Similarly, a technology that is appropriate for one purpose in a particular setting may be of little value in another situation. So, when choosing an assistive technology, consider the specific individual, the setting and the task(s) to be performed. The AT device should be available for use throughout the day.
and in natural settings, including home, school, work and recreation. There should be consistency in the kind of technology available, how it is used, and methods for instructing the user on operating the device. Transitions from one device to another should be made as smooth as possible by building on and integrating previously learned skills. Technology solutions should be flexible and customized to accommodate the unique abilities of each person with intellectual disabilities. There is a growing use of assistive technology with infants and young children, particularly with communication devices introduced to facilitate early language development. Use of teaching machines and computers may help in structuring well sequenced, programmed instruction along with its proper delivery, continuous proper feedback and remedial measures for the education and training of intellectually disabled children.

VII. REFERENCES

TO CITE THIS PAPER
Available online through- http://www.ijifr.com/searchjournal.aspx