Advanced Information and Communication Technologies in Education of Children with Special Needs.

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Abstract: This paper is designed to know the roles of information and communication technology in general education as well as in special education. In modern era the information technology become as necessity of all children with students. Even though information technology is not a new concept which has been used by the professional, paraprofessionals and teachers in different curricular and co curricular activities since few decades. Very less importance is given in developing countries specially in remote areas to teach children with special needs due to lack of awareness and resources about the information technology, on the other hands most of the developed countries are properly using Information and communication technology on the gross root level. In this connection, 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 must enhance independence, integration, and equal opportunities for all people. It also suggests about few practices in education and rehabilitation in various setup that can successfully meet the need of children with special needs. Information and Communication Technology can be fully utilized only with the positive cooperation of parents, caregivers, teachers and administrators in education and research.

Key words: Digital inclusion, Information Age, Information Society, Communication Technology and Children with Special Needs.

I. Basic Concept

Building of a civil society requires an increased access to knowledge and education. The right to education is an essential human need and a basic human right, which is crucial to human development. Furthermore, the major social problems of individual countries and the world as a whole cannot be solved without high-grade level of education. In accordance with Universal Declaration of Human Rights, education is seen as a pre-requisite of facilitating democracy, and a means of promoting peace and respect for human rights and fundamental freedoms. The inclusion of students who have experienced barriers to learning in mainstream education has become a part of a global movement for human rights. Implementation of the inclusion principle encourages policy and decision-makers to look at the barriers in education systems. 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.

The UN Convention on the Rights of the Child (1989), the UN Standard Rules on the Equalization of Opportunities for Persons with Disabilities (1993), and the Salamanca Statement (UNESCO, 1994), together, these documents recognize the human right of all learners to education being inclusive. One hundred and ninety three countries signed the Convention on the Rights of the Child, with Somalia being the latest in May 2002. The Salamanca Statement on special educational needs (1994) called on governments to adopt the principle of inclusive education for all summarizing the aims and aspirations of the international community. Booth (2002) state that policies on inclusion should not be restricted to the education of people thought to have special needs.
II. Objectives

- To understand main alterations of the educational system in Information age.
- To identify various barriers that children with special needs face.
- To acquire knowledge regarding main SNE approaches at the present stage of society development.
- To understand the particular role of ICTs in Education of children with special needs.
- To know the benefits of using ICTs to satisfy the needs of children with different disabilities.

Changes in the 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. It changes our society bringing a new cultural environment where information is present in every field. Recent 20 years have brought some remarkable innovations in the delivery of education. The table below illustrates some changes brought about by the new vision of learning and the educative role of ICTs Progress of educational system impacted by ICT application.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Traditional model</th>
<th>Emerging model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher role</td>
<td>Expert</td>
<td>Collaborator</td>
</tr>
<tr>
<td></td>
<td>Recalls facts</td>
<td>Resource person</td>
</tr>
<tr>
<td></td>
<td>Sage on the stage</td>
<td>Guide on the side</td>
</tr>
<tr>
<td>Learning</td>
<td>Focused on the teacher</td>
<td>Focused on the student</td>
</tr>
<tr>
<td>Criterion for success</td>
<td>Demonstrate full competence</td>
<td>Demonstrate growth and personal abilities</td>
</tr>
<tr>
<td>Type of knowledge</td>
<td>Acquisition, accumulation, or reproduction of data</td>
<td>Construction or mental representation of meanings</td>
</tr>
<tr>
<td>Assessment</td>
<td>Based on test</td>
<td>Based on the student’s performance of real tasks</td>
</tr>
<tr>
<td>Instructional paradigm</td>
<td>Content-oriented</td>
<td>Processes-oriented</td>
</tr>
<tr>
<td></td>
<td>Teacher-oriented</td>
<td>Student-oriented</td>
</tr>
<tr>
<td>Grouping</td>
<td>Homogeneous</td>
<td>Heterogeneous</td>
</tr>
<tr>
<td>Student activity</td>
<td>Personal work</td>
<td>Group work</td>
</tr>
</tbody>
</table>

Changes in the learning process caused by Information Age:

From teacher-centered instruction to student-centered learning: The educational paradigm has gone from the ‘instructional’ paradigm that emphasized the roles of education and a teacher, to the ‘personal’ paradigm focused on the learning itself and the student who learns. Now the important thing is that the student learns, and all elements of the educative system are subordinated to this process of learning, including the teacher and education itself. The roles of a teacher and a student are interchangeable. Teachers become the facilitators of learning and are no more the sole authoritative source.

From content-based classes to process-oriented lessons:

There has been a conceptual change that does not interpret the learning as acquisition, accumulation, or reproduction of informative data, but as construction of mental representations of meanings. This conception of education uses suitable strategies to relate, combine, and transform the knowledge.

Toward a more collaborative learning:

Children often learn better from other children. Small groups provide for dynamic interchange of dialogue, generation of ideas, formulation and experimentation with opinions as well as interpretation of data. In this way we promote cooperative learning. Students learn through collaboration with peers and experts. Students are now grouped heterogeneously so that each can contribute to the completion of a task collaboratively, exactly as in the real world. Each student contributes with his/her abilities, an excellent model to include students with SEN into the group.

Equal Opportunities for All through digital inclusion:

Information has become a social necessity and a fundamental aspect of human rights, and we cannot allow any group to be excluded from it. Therefore, we have to find ways to integrate these people into the current information and technological space. We have just started to explore and put into practice the potential of ICTs to support independent living and learning by persons with special needs.

Identification of Barriers to Learning for Students with Special Need:

Barriers to learning refer to a situation in which certain functional limitations caused by different impairments become a significant obstacle to educational progress. The differences in the levels of technology resources available to families and communities have been referred to as a “digital divide” -limited access to the networks and
facilities society offers for the majority of people, while those, who are excluded, have no access to them at all (Spicker, 1998). To prevent social exclusion we must clearly understand the role of ICTs in education for people with special needs.

### III. The Role of ICTs in Students with Special Need

The educational needs of people with disabilities are vastly diverse. In this context, ICT application is very important as it plays an essential role in providing high quality education for students with disabilities. ICTs have been introduced into the teaching-learning process in order to improve quality. In this way it is possible to meet the specific learning needs of different learner groups, including students with disabilities. Though specific applications of ICTs are extremely diverse and varied, they may be grouped into the following main categories.

- **ICTs for Compensation Uses:** That is the use of new technologies as a technical assistance that allows students with special needs to take active part in the process of interaction and communication. From this point of view ICTs develop the students’ ability to control their environment, make choices about their experiences and support problem-solving, give access to information, thereby enhance communication with others both in the immediate environment and around the world. In other words, technology can recoup or substitute the lack of natural functions.

- **ICTs for Didactic Uses:** ICTs used as a learning tool have prompted a new dimension of education and launched the transformation of the educational approaches. ICT application brings a variety of new teaching and assessment strategies for students with different educational needs. In order to enhance personal development, educational initiatives within the inclusive curriculum must aim at meeting unique needs, differences, and abilities of an individual. Hence they must be fully supported to achieve these goals at an appropriate pace. Information technologies, thereupon, will become a valuable resource for inclusion.

- **ICTs for Communication Uses:** Technologies can mediate communication with people having disabilities (often referred to as Alternative and Augmentative Communication -AAC). Assistive devices and software to meet the needs of students with definite communication difficulties are specific to every disability. Furthermore, where teachers are in short supply (as in special education) distance teaching methods can help provide special services between geographically dispersed students and teachers.

### Supporting Special Education through 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. Particularly speaking, these conditions are attained via the facilitation of ICT infrastructure for SNE, integration of ICTs into SNE curriculum and training of ICT specialists in SNE. Promoting ICT infrastructure for SNE is necessary in order to provide for the appropriate conditions of teaching and learning in the SNE context. The conditions in every type of inclusive educational area cannot be successfully created without the appropriate ICT tools applied. Assistive tools must be used to allow students with SEN to participate in the educational process based on special techniques and equipment.

### The main arrangements for successful inclusion of students with SEN:

The key ways in which ICTs can support educational opportunities for people with SEN are as follows:

- Identifying the preliminary level of personal development (experiences and skills), that is to say the starting point of a student.
- Assisting in personal development by shaping new skills or updating existing ones.
- Improving the access to information.
- Overcoming geographical or social isolation via communication support and networks.
- Improving the image/perception of an area by enhancing motivation and awareness regarding the ICT benefits in SNE.

### Benefits of ICT Use in Education for People with Special Need:

According to the research of British Educational Communications and Technology Agency (BECTA, 2003), ICT usage in schools to support students with SEN can enable learners to communicate, participate in lessons, and learn more effectively. Learning-impaired students may have problems with oral expression, listening, written expression, basic reading skills or comprehension, and maths. Moreover, this situation provokes complications in general schooling, e.g. acquisition and memorization, autonomous understanding of complex texts, problem solving. According to the recent scientific publications (Kaufman et al., 2001; Silver & Hagin, 2002), such difficulties stay on throughout life, though some improvement or recovery may happen over time. For this reason, to support education and rehabilitation some tricks to overcome them as well as some AT tools to avoid them are handy. The computer can effectively alleviate and help the schooling of these students and become their AT tool for learning.
AAC can enhance the development of expressive and receptive language, may reduce frustration, and increase personal empowerment (Grassman, 2002), as it provides the person with a means of communication. Consequently, social interactions improve individual learning and emotional development. The literature demonstrates that the use of an AAC system also increases an individual’s self-confidence and self-esteem.

There are several AT approaches to provide oral communication assistance to people with a hearing impairment. One approach grounds on a feedback, either visual or tactile, that represents the person’s speech patterns to typical speech. Regarding the tactile feedback, two types of haptic devices could be applied – systems for vector force feedback and devices that convey distributed sensations. The work of such tools is based on the skin sensation of human organism. Another approach provides alternatives to oral communication, such as visual displays (subtitles) read by the listener, or translation in the national sign language.

Students with visual impairment may need additional help with special equipment and modification in the regular curriculum students with low vision or those who are legally blind may need help in using their residual vision more efficiently and in working with special aids and materials. Keyboard shortcuts usages instead of menu selections make a lot of computer activities faster and more comfortable for blind students; it is also useful to associate auditory cues with certain keys. A Braille printer is bulky and noisy but needed for a young student learning to write to get the printed version of the screen text immediately. Later on it may be easier to connect the computer to a printer located outside the classroom.

A large screen is always necessary for a student with low vision. The screen should also be of high quality with emissions as low as possible, that it can be safely explored at a very close distance. A high resolution screen is preferable, since it helps enlarge objects on the screen. The user is involved in finding the most fitting combination of colours, fonts, and dimensions for his/her residual vision. The screen desktop must be simple and well-organized without decorative but uniform backgrounds instead. The shape of the mouse pointer is crucial, as to its dimension, colour, borders, tail, contrast with the background; some pointers can be found in the Windows system, however free software also exists (downloadable from the Internet) giving a wider choice of mouse pointers. Most solutions to the troubles experienced by people with physical impairments can be found as low-tech solutions in a very simple way. Altering the type of handle on many instruments for recreation and learning we can make them accessible, e.g. cameras with modified shutter releases, modified grips on scissors, modified grasping cuffs for racquets or paddles. A person with limited strength of manipulation can fly a kite by adding special hand cuffs to hold the string.28 In addition; some commercial educational tools can be used as AT (i.e. wooden letters, enlarged calculators, etc.) Various kinds of switches are available that can be connected with toys through a battery adapter and a ‘latch and timer’ switch. The more complex a toy is, the more complex the activity can be accomplished. Software systems based on an interface to create multimedia activities are also available to control electric toys at a distance. Low-tech approaches to the problem of writing include modified grippers that are attached to the hand and clamped to the pen, enlarged pens to make them easier to grasp, and weighted pens that help reduce tremor. Furthermore, clips and magnets can be used to stick the paper to the desk.

New technologies can provide the means to explore new forms of learning that break the traditional hierarchies of educational systems and develop genuine alternatives to rigid, passive approaches to learning of people with SEN. However, these technologies can turn up as obstacles to education if they are applied without a commitment to the principles of equality, participation, and responsibility. Use of voice communication aids encourages parents and carers to have higher expectations of children’s sociability and potential level of participation (Worth, 2001).

Recommendation: Inclusive education is not about placing students in mainstream classes to save money, it is about optimizing learning environments by providing opportunities for all learners to be successful. It is also about providing a range of resources such as teaching materials, equipment, additional personnel and differentiated approaches to teaching. UNESCO indicated that in countries where resources are scarce, some cost-effective measures have been identified. These include:

- Utilizing a trainer-of-trainer model for professional development.
- Linking university students in pre-service training institutions with schools.
- Converting special needs schools into resource centres to provide expertise and support to clusters of mainstream schools.
- Building capacity of parents and linking with community resources.
- Utilizing students themselves in peer programmes.

The World Bank study also highlighted the issue of increased achievement and performance for all learners, not just those with additional and special needs. Over the time, this increase in performance and achievement allows all students, including those with disabilities or special needs, to become productive and successful citizens, potentially reducing the cost to services in the future.
IV. Conclusion

The current period of educational system development is characterized by the increasing role of ICTs which have become an important new component of the curriculum, adding a valuable set of new resources and didactical tools suitable to support the learning process. Speedy development of the Information Age brings people with special needs a danger of losing their most basic rights, caused by new threatening barriers. In order to exploit the whole potential of the ICTs to provide for the equality, it is necessary to understand the barriers to learning faced by those who are seen to have SEN. Barriers to learning prevent students from getting sufficient level of knowledge as well as from giving a teacher a true evaluation of the students’ competence. Though the applications of ICTs in education of people with special needs are extremely diverse, there are three main areas for their use – compensation uses, didactic uses, communication uses. In order to implement inclusion in education there is a need to create appropriate conditions for students with SEN. The achievement of conditions for successful inclusion in all areas of education can be realized by means of providing for appropriate technological infrastructure, modification of the curriculum, and training of new specialists in special education, capable to use ICTs.

Information and Communication Technology plays a fundamental role in including students with some impairments and giving them the real opportunity to participate and to learn. The primary purpose of Information and Communication Technology for students with physical impairments is to let them write and communicate. It is achieved with a wide range of input devices, pointing devices, and software to support writing, reading, drawing, and studying. To respond to the needs of students with visual impairments, we offer them non-visual forms of communication, using the auditory or tactile senses. At the same time we should take into account the specifics of visual perception for persons with low vision: visual acuity (target size), visual range (field size), visual tracking (following a target), and visual scanning (finding a specific visual target in the field of several targets). There are several Information and Communication Technology approaches to assist persons with hearing impairments in oral co-immunization. One approach is to provide feedback, either visually or tactually, that represents and relates the person’s speech patterns to typical speech. A second approach is to provide alternatives to oral communication, such as visual displays, being read by the listener. Various Information and Communication Technology solutions are created to meet the educational needs of students with language and speech impairments. An Alternative and Augmentative Communication methodology is based on a communication rather than verbal code. Alphabetic devices support the user’s communication through the alphabet letters, symbolic devices are based on a symbolic or graphical code. Software products also exist which help create one’s own communication board on the computer screen by means of a symbolic or alphabetic code. The computer can be a good starting point to motivate the students with cognitive impairments to learn; it can support the learning process, acquisition of basic abilities, increased motivation and self-esteem. Various Information and Communication Technology solutions can be found to overcome slowness and inaccuracy of the eye-hand coordination, difficulties in stimuli elaboration, memory, and/or motion. Alternative access devices or access options can be adopted. There are some Information and Communication Technology tools to support learning skills (reading, writing, calculating, etc.) and other school activities for students with specific learning impairments. These students need assistance not only in learning but in organizing their material and computer related activities.

References