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# SIGNIFICANCE OF ICT'S AND AT'S IN RELATION TO THE EDUCATION OF MENTALLY RETARDED CHILDREN

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***Abstract***

***In this paper, we offer research that focuses on the value of Assistive Technologies (ATs) and Information and Communication Technologies (ICTs) for students with intellectual disabilities. The study's objective was to shed light on the potential for ICTs and ATs to improve and ease the teaching and learning of individuals with impairments, such as Mental Retardation and Syndrome Down. ICTs could be used as an instrument to help these people overcome their challenges. These kids require ICT and AT systems that can be easily customized and tailored to their unique requirements. Otherwise, they won't serve any purpose at all. Special educators teaching at institutions for children with intellectual disabilities in southern Tamilnadu districts made up 100 of the samples. Statistical analysis was performed by calculating Pearson's Product Moment Coefficient of Correlation. The research found a substantial link between learners with intellectual impairments' cognitive, psychomotor, and social abilities and ICTs and ATs.***

***Keywords:***

***Assistive Technology, Cognitive Performance, Psychomotor Performance, Social Performance and Intellectual Disability***

## 1. INTRODUCTION

Information and Communication Technologies (ICTs) and Assistive Technologies (ATs) are now crucial components of neighbourhood life, daily life, and education. In particular, the development of ICTs has made it possible for people with intellectual disabilities and other learning challenges to better work on their schooling and learning. When used to refer to mental impairment, the word "Intellectual Disability" (ID) is defined as having inadequate understanding or mental capability as well as a lack of skills necessary for daily life. Scholarly incapacitated people can learn new skills, but they do so incrementally. There are various degrees of academic impairment, from slight to substantial. A person should originally have below-the-norm insight, characterized by an intelligence level score of less than 70, as suggested by the ICD-10 and DSM-IV for order of academic incapacities. The following ID markers have been used to correlate different levels of mental impairment: Significant level of intelligence 20, Serious level of intelligence 20, Moderate level of intelligence 35, Mild level of intelligence 50, and Marginal academic labour 70. This should similarly be joined with limits in flexible working in somewhere near two districts (i.e., correspondence, dealing with oneself, local capacities, intelligent capacities, self-course, neighbourhood, capacities, work, unwinding, prosperity, and security), and starting going before age 18. In this survey, the impact of ICTs apparatuses and gadgets on individuals with ID leads in their correspondence, self-autonomy, and by and large in their approach to everyday life. By and by, this effect relies upon their intelligence level. To the extent that worried, Down Condition is a bunch of physical and mental qualities brought about by a quality issue that occurs before birth. They additionally have some level of scholarly inability. This changes from one individual to another. Yet, as a rule, it is gentle to direct. Down Disorder is a long-lasting condition. However, with care and backing, youngsters who have Down Disorder can grow up to have solid, blissful, useful lives. Consequently, somewhat recently products and utilization of ICTs and ATs have been created to help individuals with SD to be self-reliant and grow their abilities and information.

Assistive innovation assumes a fundamental part in the educational experience of people with handicaps. These people have trouble performing exercises autonomously, and frequently educators integrate AT into their ways of learning to help such understudies [1]. Because of the presence of AT in the learning/training process, understudies with handicaps can get help to work on their interactive abilities and take part in more friendly associations through improved ways of life.

## 2. LITERATURE REVIEW

### 2.1 IMPORTANCE AND EFFECTIVENESS OF USING ASSISTIVE TECHNOLOGY

Teachers can now use technological advances to help their students learn and attain the top most standards of education thanks to the rapid advancements in AT in education [2]. Many physically challenged students can complete necessary duties, but because they have specific disabilities, they are unable to give results successfully. With the aid of AT, physically challenged students can function more similar with their able-bodied peers in the classroom. Teachers must modify students' educational requirements in specific ways to fit learning or offer suitable classroom adjustments to students using technology that is adaptive [3].

By modifying the depth of the material covered by people with disabilities to suit their learning requirements, AT helps pupils with disabilities learn more effectively [2].

### 2.2 EDUCATION AND ASSISTIVE TECHNOLOGY

The use of technological instruments in the classroom necessitates a review of their efficacy in assisting students with impairments because digital transformation has produced remarkable remedies in AT for purposes of education [4]. Devices can show how well instructors interact with learners in ways that are relevant to the specific subject matter that is being covered in the classroom. Teachers have come to the conclusion that they need to acquire knowledge of how to use modern instruments. The evaluation of AT in schools demonstrates that teaching and learning methodologies have undergone a change [1]. Many people have a very favourable opinion of technological devices now that they have successfully been used in educational settings.

## 2.3 USE OF AT BY TEACHERS

In order to effectively interact with pupils who, have impairments, teachers must have good professional beliefs that they live by [5]. Preschool teachers typically have experience using assistive technology, having learned about, or adopted philosophies that influence the kind of AT implemented in the learning setting [6]-[8]. Teachers use technology to assist the learning of students with impairments for a variety of reasons. By using technology to support and promote equity, we can better meet the requirements of people with disabilities.

## 2.4 SPECIAL EDUCATION TEACHER'S TRAINING TO USE AT

A custom educational tool for instructors is prepared to provide extensive learning opportunities for pupils with deficiencies. According to [9], the real purpose of a custom educational program for teachers is to acquaint them with the embedded elements of AT and equip them with sincere preparedness to address the problems of all the kids in the homeroom. As a typical educational plan is a delicate problem to work on that requires the best engagement of arranged peculiar educational plan teachers in the distinctive developing experience [4], preparing projects ought to construct custom educational plan educators to solve the troubles drawn with showing learners with shortcomings in the review lobby through especially mentioning courses in a specific fascinating program to grow instructors' capacities.

Similarly, just as having appropriate assets and mentors helps educators learn how the advancement works [10], personalised education plan educators should move towards AT frameworks when they are ready to use them to be gratifying and confident about someone using AT to make students aware appropriately. As the specifically assigned and shaped direction of teachers during the readiness cycle offers excellent potentials in using advancement, extraordinary strategic plan should make it possible and, shockingly, customised for organization's teaching staff to cultivate potential in AT to help learners who have disabilities [11].

## 2.5 COMPETENCY-BASED TEACHER EDUCATION

Capacities are defined as "the organisation of facts, abilities, and delight in essential for the future, which occurs in athletics" [12]. Consequently, educators believe every one of the point-by-point gifts should acquire authority in skill fundamentally based coach preparation. Concerning the method for AT, it furnishes educators with sufficient abilities in directing and training all understudies steady with their own personal foundations through tutoring to guarantee satisfaction in the use of AT [13]. More is currently known about how educators make improvements in teaching youngsters with handicaps. Teachers become competent of learning about and employing specific skills [8], and educators' ownership of fundamental abilities, particularly pre-supplier ones, enables them to integrate AT into the workplace educational curriculum [14]. Mentor tutoring provides numerous gifts within the combining of innovation in displaying exercise, training trainers to combine and follow various types of time spent working with the building of a controllable school room atmosphere to become aware of. As a result, freely continue to form the learning strategy and equip all newbies with multiple configurations and skills to aid in the growth of talents.

# 3. METHODOLOGY

## 3.1 CONCEPTUAL AND THEORETICAL FRAMEWORKS

The algorithm we created for event detection and classification was effective, and we can now utilize it to create a commercial solution that will aid patients in recovering quickly.

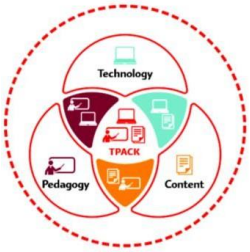


Fig.1. Technological Pedagogical Content Knowledge

The conceptual foundation for this study is provided by the Technological Pedagogical Content Knowledge (TPACK) paradigm [15]. With the information available in TPACK, instructors will be better equipped to handle the difficulties posed by their use of technology. This research is guided by this paradigm because it emphasizes education and preparation for successful technology integration.

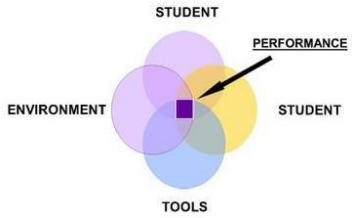


Fig.2. SETT framework model

The second conceptual paradigm is proposed by Zabala [16] for "students, the environment, tasks, and tools" (SETT) framework model. The SETT stresses the importance of understanding learners, surroundings, assignments, and tools to integrate AT into the conducive classrooms effectively. The SETT approach was created to assist and guide the IEP groups as they collected usable data before deploying AT [17].

## 3.2 RESEARCH PROBLEM

Depending on the nature and severity of the intellectual impairment, children who suffer from it and the problems that result from it typically get a certain kind of education. The development of knowledge, abilities, and learning habits rely on the children's motivation for learning as well as the accessibility of ICT devices, in addition to the disease itself. When utilized as an educational tool in accordance with pedagogical, didactic, and therapeutic criteria, ICT may be beneficial for the education and training of kids with developmental problems. Technology facilitates communication and helps to enhance communication skills, which leads to the growth of self-confidence. Also, the usage of AT can improve the capacities and independence of mentally impaired children both within and outside of the classroom. The technologies may be utilized for communication and productivity purposes as well as to give people

access to leisure activities. More than any other group of people, those with severe sensory impairments including mental retardation, physical disability, visual impairments, or hearing have profited from advancements in assistive technologies. ICT has the potential to significantly enhance e-learning, inclusiveness, and education for students with impairments.

## 3.3 SIGNIFICANCE AND PURPOSE OF THE STUDY

Many research work have been conducted to evaluate the level of AT utilization and identify these problems [18]. This research aims to discover more about special education instructors' perceptions of their AT skills and their curiosity about AT training. The findings of this study will assist policymakers and decision-makers in the Ministry of Education to come up with a plan of action to implement AT, as well as stakeholders and decision-makers in the educational sector to evaluate the extent to which improvements to the current AT training structure can be made. Furthermore, the results of this research are going to offer essential information to schools in order to enhance their educational offerings by utilizing numerous kinds of AT to improve future staff better.

## 3.4 RESEARCH QUESTIONS

The three following questions will serve as the key guiding principles for this study, which primarily focuses on special education instructors in Tamil Nadu's Southern districts:

- How do special education instructors see themselves in terms of their AT skills?
- Are these instructors open to receiving AT training?
- What are the most effective ways for instructors of special education to learn about AT?

## 3.5 DATA COLLECTION

A systematic questionnaire was used to gather information from 100 teachers in the southern regions of Tamil Nadu. Information was gathered from each of Tamilnadu's five districts: Virudhunagar, Madurai, Tirunelveli, Thoothukudi, and Nagercoil. The method for gathering data was convenience sampling.

The study was place between November 2022 and March 2023. The data was gathered using a Research Assistant supported by the Indian Council of Social Science Research (ICSSR). The study is descriptive in nature, and both primary and secondary data were employed.

The review of the literature was compiled from a number of reputable journals, online newspapers, and magazines. The financial situation of SVs across India was the primary topic of attention in the literature study. The inputs on numerous journal article outcomes that have been published and are directly cited in the study were used to create the structured questionnaire. The information gathered from the participants is displayed in Fig. 3.

The third area is concerned with educators' data and capabilities in AT, and it contains 11 items that examine educators' obvious statistics and abilities in the discipline of AT. At last, the fourth part space is made from four requests on AT progress needs as for teachers' benefit in getting more readiness in AT and their leaned toward strategy for planning.

# 4. DATA ANALYSIS

The researcher received feedback from 100 people in total, but 5 of those answers were discarded due to partial responses, leaving 95 valid surveys for data analysis. The data analysis process started with a representative socio-demographic profile and an examination of background data.

## 4.1 SAMPLE SOCIO-DEMOGRAPHIC PROFILE

The Fig.3 shows an examination of the sociodemographic traits of instructors, including gender, age, grade level of teaching, level of education and years of experience.

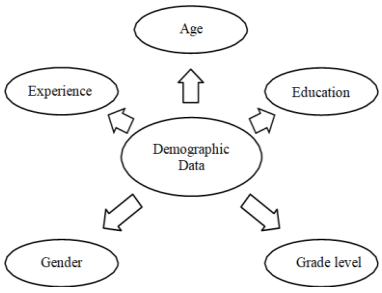


Fig.3. Demographic Details collected from teachers in Southern districts of Tamil Nadu ($n$ = 100)

Table.1. Socio-Demographic Characteristics of Teachers

| Demographic | Characteristic Frequency | Percent (%) |
|---|---|---|
| Age | | |
| 21–28 | 9 | 9.5 |
| 29–35 | 56 | 58.9 |
| 36–42 | 12 | 12.6 |
| 43+ | 18 | 18.9 |
| Gender | | |
| Male | 71 | 74.7 |
| Female | 24 | 25.3 |
| Highest education level | | |
| Bachelor degree | 73 | 76.8 |
| Master degree | 7 | 7.4 |
| Other | 15 | 15.8 |
| Years of experience in education | | |
| 0–6 years | 42 | 44.2 |
| 7–13 | 28 | 29.5 |
| 14–19 | 12 | 12.6 |
| 20 years or more | 13 | 13.7 |
| Grade level teaching | | |
| Pre-school | 4 | 4.2 |
| Pre - Primary | 63 | 66.3 |
| Primary | 22 | 23.2 |
| High/ Vocational | 6 | 6.3 |

### *4.1.1 General Information:*

The broad information about disability is examined in this part. Location of the school, AT training obtained, incidence of employing AT with children in distinct education, and AT expertise of the instructors. The Table.1 provides a summary of the findings.

Table.2. Type of Disability and its percentage

| Type of Disability | Frequency | Percent (%) |
|---|---|---|
| Autism | 12 | 12.6 |
| Deaf-blindness | 4 | 4.2 |
| Intellectual disabilities | 10 | 10.5 |
| Multiple disabilities | 19 | 20.0 |
| Speech learning disabilities | 7 | 7.4 |
| Speech or language impairment | 33 | 34.7 |
| Other | 10 | 10.5 |
| Total | 95 | 100.0 |

The Table.2 reveals that speech and/or language impairment is the most prevalent disability (34.7%), followed by autism (12.6%) and multiple impairments (20%). 10.5% of people have intellectual impairments, 7.4% have speech or learning problems, and 10.5% have other disabilities.

Table.3. Locations where Teachers teach

| Location | Frequency | Percent (%) |
|---|---|---|
| Rural | 8 | 8.4 |
| Suburban | 13 | 13.7 |
| Urban | 74 | 77.9 |
| Total | 95 | 100 |

According to Table.3, the majority of schools (77.9%) were situated in metropolitan regions. 8.4% of schools were in rural regions, while 13.7% were in suburban areas. According to Table.4, the majority of participants acquire training for teaching kids with autism out of a personal interest.

Table.4. Perceptions Teachers during the Training on Autism

| Perceptions Teachers during the Training on Autism | Frequency | Percent (%) |
|---|---|---|
| None | 19 | 20.0 |
| My own personal interest | 36 | 37.9 |
| Colleagues | 10 | 10.5 |
| Attending conferences | 12 | 12.6 |
| Attending a class at university | 12 | 12.6 |
| Other | 6 | 6.3 |
| Total | 95 | 100.0 |

Table.5. Perceptions of Teachers during formal Training in AT

| Perceptions of Teachers during formal Training in AT | Frequency | Percent (%) |
|---|---|---|
| 1–5 | 30 | 31.6 |
| 6–10 | 16 | 16.8 |
| 11–15 | 15 | 15.8 |
| 16–20 | 9 | 9.5 |
| 20 or more | 25 | 26.3 |
| Total | 95 | 100.0 |
| Mean ± *SD* | 2.83± 1.6 | |

Table.6. AT usage Students Count

| AT usage Students Count | Frequency | Percent (%) |
|---|---|---|
| Never | 12 | 12.6 |
| Rarely | 33 | 34.7 |
| Often | 32 | 33.7 |
| Always | 18 | 18.9 |
| Total | 95 | 100.0 |
| Mean±*SD* | 2.59±0.94 | |

Table.7. Self-Estimation of AT Knowledge with Teachers'

| Level of estimation | Frequency | Percent (%) |
|---|---|---|
| Poor | 21 | 22.1 |
| Fair | 19 | 20.0 |
| Good | 46 | 48.4 |
| Excellent | 9 | 9.5 |
| Total | 95 | 100.0 |
| Mean ±SD | 2.4 5±0.94 | |

**Research Question 1**: How do special education instructors see themselves in terms of their AT skills?

Table.8. Special Education Teachers' Perceptions of their Competency in using AT

| Assistive technology | 1 | 2 | 3 | 4 | 5 | Mean | *SD* |
|---|---|---|---|---|---|---|---|
| I be familiar with the concepts and terms regarding AT. | 10.9 | 26.6 | 25.0 | 25.0 | 12.5 | 3.02 | 1.21 |
| I am sure in my capacity to identify and operate software programs that meet the needs of students with disabilities Individualized educational plan goals. | 20.3 | 17.2 | 28.1 | 21.9 | 12.5 | 2.89 | 1.31 |
| I have the familiarity to assess students with disabilities to determine what AT would be appropriate. | 15.6 | 20.3 | 31.3 | 20.3 | 12.5 | 2.91 | 1.25 |
| I know how to organize the classroom environment to facilitate the use of AT. | 14.1 | 15.6 | 34.4 | 20.3 | 15.6 | 3.08 | 1.25 |
| I know how to assess whether AT is effective in meeting the needs of my students with disabilities. | 15.6 | 23.4 | 34.4 | 17.2 | 9.4 | 2.81 | 1.18 |
| I know that AT device options range from low to high tech. | 14.1 | 23.4 | 23.4 | 32.8 | 6.3 | 2.94 | 1.18 |
| I am confident in my capacity to identify a variety of AT devices (low tech-mid tech- high tech) that could be used for students with disabilities | 14.1 | 21.9 | 31.3 | 23.4 | 9.4 | 2.92 | 1.19 |
| I know how to operate a variety of AT devices (high tech- mid tech-low tech) to support students with disabilities. | 18.8 | 21.9 | 35.9 | 14.1 | 9.4 | 2.73 | 1.20 |
| I follow a methodical plan to ensure that AT is correctly implemented. | 18.8 | 20.3 | 34.4 | 17.2 | 9.4 | 2.78 | 1.21 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| I know how to identify resources for professional development related to AT. | 15.6 | 25.0 | 26.6 | 23.4 | 9.4 | 2.86 | 1.22 |
| I team up with IEP team members in selecting and implementing AT. | 20.3 | 15.6 | 34.4 | 21.9 | 7.8 | 2.81 | 1.22 |
| Overall mean value | | | | | | **2.86** | **1.06** |

For the first study question, 11 inquiries were used to collect data, with instructors asked to evaluate their views toward the subjects at hand on a 5-point Likert measure spanning from strongly disapprove to concur. The purpose of this study was to find out how special education instructors viewed their own AT competency (Table.7).

As can be seen in Table.8, the median value, in general, is 2.86, indicating that the majority of special education teachers need professional development courses to effectively employ assistive technology when directing learners who have disabilities. Special education teachers usually have a medium skill expertise and understanding about employing assistive technology in their classrooms. A thorough investigation was carried out to determine whether or not special education teachers' perceptions of their AT knowledge and skills suggested a requirement for professional development. The mean score for item 4, that instructors can set up the classroom environment to support the use of AT, is 3.08, showing that teachers have a reasonable degree of understanding of AT and that, as a result, they appear to value its role in their professional growth going forward. The mean value of teachers' perceptions was precisely 3.02 (SD = 1.21) and indicated that they had a reasonable degree of knowledge of the ideas and words related to AT. Professional growth is therefore essential in every way. The results show that practically all instructors had intermediate evidence, with a mean value of 2.94 (SD = 1.25), with regard to item 3 indicating teachers' expertise to assess kids with impairments in order to select suitable AT. Also, the total mean score for item 6—which examines teachers' knowledge of low- to high-tech AT device options—is 2.94 (SD = 1.18), demonstrating that most instructors have a moderate understanding of AT and that professional development is necessary to increase their knowledge. The mean value for item 10—how special education teachers locate resources for AT-related professional development—is 2.86 (SD = 1.22).

Table.9. AT Knowledge and Training with Teachers' interest in receiving more

| Teachers' opinion about AT Training | Frequency | Percent (%) |
|---|---|---|
| Yes | 86 | 90.5 |
| No | 2 | 2.1 |
| I do not know | 7 | 7.4 |
| Total | 95 | 100.0 |

Table.10. Teachers' Perceptions on Areas that need AT

| Areas that need AT option | Frequency | Percent (%) |
|---|---|---|
| Math | 36 | 37.9 |
| Writing | 2 | 2.1 |
| Reading | 21 | 22.1 |
| Speaking | 16 | 16.8 |
| Other | 16 | 16.8 |
| Total | 95 | 100.0 |

The mean score for item 8, which measured teachers' proficiency in using a range of assistive technology (AT) devices (low-tech, mid-tech, and high-tech) to serve students with disabilities, was 2.73 (SD = 1.20), showing that there is room for improvement in this area for teachers. So, we draw the conclusion that the majority of distinct education instructors require training of the AT for professional development on the effective utilization of auxiliary aids in the classroom for children with impairments. Instructors reported having a modest level of AT abilities and knowledge, which may be mostly due to the fact that most of them acquire training out of their own free will and there is little official AT training available.

## 4.2 PROFESSIONAL DEVELOPMENT

This section examines as to if special education educators require additional AT knowledge and training by having to look at their preferences, the regions of the education system in which they would like to see AT alternative solutions used, their favoured AT coaching technique, and when they recommend to be trained. The primary objectives of this investigative process are two sub-questions.

**Research Question 2**: Are these instructors open to receiving AT training?

The Table.5 lists the expressed interest in AT training among special education instructors. The widely held (90.5%) have a high curiosity in learning supplementary and getting additional training, as seen in Table.9. Just one instructor does not want to learn more about and receive training in AT, while 7.4% are unsure.

Table.11. Teachers' Perceptions of the Preferred Methods for AT Training by Learning Style

| Perception | Frequency | Percent (%) |
|---|---|---|
| Instruction as One-on-one individual | 48 | 50.5 |
| Attending Conference or Workshops | 39 | 41.1 |
| Online modules | 7 | 7.4 |
| Other | 1 | 1.1 |
| Total | 95 | 100.0 |

The Table.10 reveals that arithmetic is the AT choice that instructors would want to see implemented the most (37.9%), followed by reading (22.1%), speaking (16.8%), and writing (2.1%).

**Research Question 3**: What are the most effective ways for instructors of special education to learn about AT? The Table.9 summarizes special education instructors' opinions on the most effective ways to complete AT training. According to Table.11, more than half of the teachers prefer to obtain their AT training through one-on-one, customized training, while only one teacher mentioned using a different approach. The remaining teachers, 50.5%, prefer to attend workshops or conference meetings, and 7.4% prefer online sessions. Thus, one-on-one tailored teaching and attending workshops or conferences are the ideal approaches for distinctive education instructors to get AT training.

Table.12 Time duration to receive AT training are summer and school vacations

| | Frequency | Percent (%) |
|---|---|---|
| Summer | 37 | 38.9 |

| | | |
|---|---|---|
| Weekend | 13 | 13.7 |
| After school | 25 | 26.3 |
| Other | 20 | 21.1 |
| Total | 95 | 100.0 |

## 5. DISCUSSION

Special education has attracted a lot of attention recently around the globe, and initiatives are currently under way in India to increase access to a decent education for kids with disabilities. AT is crucial in advancing students' educational experiences in order to support this form of schooling. This study looked at how special education instructors perceived their own knowledge, skills, and professional growth related to utilizing Assistive Technology (AT) to teach children with incapacities.

From the foregoing, it is clear that AT, particularly for kids with impairments, can create psychological, scholastic, and social advantages. Yet, schools need to be mindful of the things that can make it difficult to successfully integrate AT into the teaching/learning process. Inadequate tools and training, as well as the difficulties of navigating various information sources, are some of these problems.

## 6. CONCLUSION

The findings from this study show that instructors of special education perceived their AT competence as having intermediate knowledge and skills. Also, instructors said they were familiar with how to set up the classroom such that a reasonable amount of assistive technology could be used. Also, most instructors were confident in their ability to recognize a range of AT devices (low-tech, mid-tech, or high-tech) used by students with disabilities and have a moderate understanding of the ideas and vocabulary associated with AT. 90% of educators are very interested in finding out more about and getting training in AT. Individualized teaching given one-on-one and participation in workshops or conferences are the recommended modalities of AT training.

## REFERENCES


[1] B. Walker, "Assistive Technologies to Support Students with Language-Based Learning Differences", *Proceedings of International Conference on Information Technology and Teacher Education*, pp. 2006-2011, 2018.

[2] O. Metatla and C. Cullen, "Bursting the Assistance Bubble": Designing Inclusive Technology with Children with Mixed Visual Abilities", *Proceedings of International Conference on Human Factors in Computing Systems*, pp. 346-354, 2018.

[3] A. Laumann, E.J. Roth and M. Ghovanloo, "Safety and Efficacy of Medically Performed Tongue Piercing in People with Tetraplegia for Use with Tongue Operated Assistive Technology", *Topics in Spinal Cord Injury Rehabilitation*, Vol. 21, No. 1, pp. 61-76, 2015.

[4] K. Holstein, "Intelligent Tutors as Teachers' Aides: Exploring Teacher Needs for Real-Time Analytics in Blended Classrooms", *Proceedings of International Conference on Learning Analytics and Knowledge*, pp. 257-266, 2017.

[5] S.C. Lin and R.S. Gold, "Assistive Technology Needs, Functional Difficulties, and Services Utilization and Coordination of Children with Developmental Disabilities in the United States", *Assistive Technology*, Vol. 30, No. 2, pp. 100-106, 2018.

[6] V.J. Shute and S. Rahimi, "Review of Computer- Based Assessment for Learning in Elementary and Secondary Education", *Journal of Computer Assisted Learning*, Vol. 33, No. 1, pp. 1-19, 2017.

[7] K. Koch, "Stay in the Box! Embedded Assistive Technology Improves Access for Students with Disabilities", *Education Sciences*, Vol. 7, No. 4, pp. 82-89, 2017.

[8] A. Laumann and M. Ghovanloo, "Safety and Efficacy of Medically Performed Tongue Piercing in People with Tetraplegia for use with Tongue Operated Assistive Technology", *Topics in Spinal Cord Injury Rehabilitation*, Vol. 21, No. 1, pp. 61-76, 2015.

[9] R. Erdem, "Students with Special Educational Needs and Assistive Technologies: A Literature Review", *Turkish Online Journal of Educational Technology*, Vol. 16, No. 1, pp. 128-146, 2017.

[10] K. De Witte, C. Haelermans and N. Rogge, "The Effectiveness of a Computer-Assisted Math Learning Program", *Journal of Computer Assisted Learning*, Vol. 31, No. 4, pp. 314-329, 2015.

[11] S. Saleem and M.B. Rauf, "Training Facilities provided by Special Education Schools to Students with Visual Impairment and Teachers to use Assistive Technology", *Training*, Vol. 10, No. 1, pp. 91-100, 2019.

[12] I. Katane, "Teacher Competence and Further Education as Priorities for Sustainable Development of Rural School in Latvia", *Journal of Teacher Education and Training*, Vol. 6, pp. 41-59, 2006.

[13] F.K. Ahmad, "Use of Assistive Technology in Inclusive Education: Making Room for Diverse Learning Needs", *Transcience*, Vol. 6, No. 2, pp. 62-77, 2015.

[14] R.O. Adebisi, N.A. Liman and P.K. Longpoe, "Using Assistive Technology in Teaching Children with Learning Disabilities in the 21st Century", *Journal of Education and Practice*, Vol. 6, No. 24, pp. 14-20, 2015.

[15] J. Courduff and J.L. Wendt, "Grounded in What Works: Exemplary Practice in Special Education Teachers' Technology Integration", *Journal of Special Education Technology*, Vol. 31, No. 1, pp. 26-38, 2016.

[16] D. Henriksen and P. Fisser, "Infusing Creativity and Technology in 21st Century Education: A Systemic View for Change", *Journal of Educational Technology and Society*, Vol. 19, No. 3, pp. 27-37, 2016.

[17] K.D.F. Alkahtani, "Teachers' Knowledge and Use of Assistive Technology for Students with Special Educational Needs", *Journal of Studies in Education*, Vol. 3, No. 2, pp. 65-86, 2013.

[18] A. Alfaraj and A.B. Kuyini, "The Use of Technology to Support the Learning of Children with Down Syndrome in Saudi Arabia", *World Journal of Education*, Vol. 4, No. 6, pp. 42-53, 2014.