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Assistive Technology in relation to Performance of Students with Intellectual Disability

Kalyani. K[1], Dr. Haseen Taj[2]
[1]Research Scholar, Department of Education, Bangalore University, Bangalore, Karnataka, India.
[2]Professor & Dean, Department of Education, Bangalore University, Bangalore, Karnataka, India.
Kalskavin2020@gmail.com[1], htaj001@gmail.com[2]

Abstract

The present study attempts to find the relationship between assistive technology and cognitive, psychomotor and social performance of students with Intellectual Disability. Assistive Technology Scale, Cognitive Performance Scale, Psychomotor Performance scale and social performance scale developed by the researcher were used to collect data. 200 Samples were drawn from special educators working at an intellectual disability school in Bangalore District. The statistical analysis was done by computing Pearson's Product Moment Coefficient of Correlation. The study showed a significant relationship between assistive technology and cognitive, psychomotor and social performance of students with intellectual disability.

Keywords: Assistive Technology, Cognitive Performance, Psychomotor Performance, Social Performance and Intellectual Disability.

1. Introduction

We live in a world of diversities and individual differences. However, the distribution of such individual differences among our population follows a well-known pattern known as a normal distribution in all the personality dimensions. Accordingly, most children are found to possess average abilities, capabilities, and potentialities with We see a few children occupy the end on the positive side. Others occupy the end on the negative side of this scale. Based on their developmental characteristics, the former is labelled as gifted or genius, and the latter are intellectually disabled. Previously, such children were referred to as mentally retarded, mentally handicapped, mentally challenged, etc. Whatever name we give them denotes a group of children with below-average mental functioning, which affects their behaviour and future development and causes severe problems for those responsible for their care.[1-4].

2. Intellectual Disability

According to the American Association on Intellectual and Developmental Disabilities, intellectual disability is defined as a type of disability marked by considerable limitations in intellectual performance and adaptive behaviour that affects much of their daily life and social skills.

2.1 The Educational Classification of Intellectual Disability

The Intellectually Disabled children can be grouped into the following categories:

a. Educable Intellectually Disabled (labelled as mild) individuals are those who possess I.Q.s between 50- 70.

b. Trainable Intellectually Disabled (labelled as moderate) individuals are those who possess I.Q.s between 25-50.

c. Custodial Intellectually Disabled (labelled as severe and profound) individuals are those who possess I.Q.s below 25.[3-7].

Educable Intellectually Disabled people are considered educable because, if the instructions and learning environment are appropriate, they can learn the fundamental academic skills of reading, writing, and arithmetic. However, their maximum academic achievement can be expected to be comparable to that of a typical eight to twelve-year-old child. The majority can quickly learn the vocational skills required for future employment, preferably of a semi-skilled nature. At this point, assistive technology serves as an effective tool in establishing an independent and better learning environment for intellectually disabled students.

3. Assistive Technology

According to World Health Organization's definition, "assistive technologies" are defined as "any device or equipment that allows individuals to perform tasks that cannot be performed independently or that facilitate the manner and security of activity performance. "Assistive technologies can include widely available or "home-made" devices, as well as technologies tailored to individual's needs. Within the context of definitions, the potential value of assistive technologies and devices is vast, encompassing services ranging from high technology (high-tech) to low technology (low-tech)."

a. Low-tech Assistive Technology: The devices or equipment that are less expensive and do not necessitate extensive training, and lack complicated or tactile features. Highlighter, Handheld magnifiers, large-print, coloured text, specialised pen or pencil gripper, canes and walkers, and so on are examples.

b. Mid-tech Assistive Technology: Assistive technology devices or equipment in the middle of the spectrum may have complex features, need more training and expensive than low-tech. Mid-tech devices such as audio recorders, portable note-takers, mp3 players, laptop computers manual, wheelchairs, talking spell checkers, talking calculator, Closed Caption Televisions (CCTV), amplifiers, alternate keyboard, mouse, touch screen for the computer, and much more are examples.

c. High-tech Assistive Technology: High-tech Assistive Technology applies to the most sophisticated devices or equipment with digital or electronic components, which may be computerised, will most certainly require training and effort to learn how to use, and expensive. Power wheelchairs and scooters, digital hearing aids, computers with specialised software such as voice recognition or magnification software, automated electronic aids to daily living, digital hands-free headsets, voice-activated telephones, communication devices with voices, blue-tooth integration and other examples are available.[8-11].

4. Objectives of the Study

The objective of the present study was to investigate the relation between assistive technology and cognitive, psychomotor and social performance of students with intellectual disability.

5. Variables of the Study

5.1. Cognitive Performance

The components of Cognitive Performance in the study are:
1. Memory
2. Learning Rate
3. Attention
4. Generalization of Learning
5. Motivation

5.2. Psychomotor Performance

The dimensions of Psychomotor Performance in the study are:
1. Daily living
2. Health care and safety
3. Employment

5.3. Social Performance

The dimensions of social performance in the study are:
1. Communication & Social Activities
2. Community living

5.4. Assistive Technology

6. Hypotheses of the Study

The null hypotheses formulated for testing were:
1. There is no significant relationship between assistive technology and the cognitive performance of students with intellectual disability.
2. There is no significant relationship between assistive technology and the psychomotor performance of students with intellectual disability.
3. There is no significant relationship between assistive technology and the social performance of students with intellectual disability.

7. Sampling Procedure

The sample for the study consisted of 200 teachers teaching in a special education school meant for intellectual disability in Bangalore city. The sample selected through the purposive sampling technique.

8. Tools for the Study

The four scales were used in the study. They were: Assistive technology scale, cognitive performance scale, psychomotor performance scale, and social performance scale developed and standardised by the researcher.

9. Analysis and Interpretation

Null Hypothesis 1: There is no significant relationship between assistive technology and cognitive performance (Viz., memory, learning rate, attention, generalisation and motivation) of students with intellectual disability.

The table 1 shows the Number, Degree of Freedom, "r" value and Level of Significance of Assistive Technology and Cognitive Performance and its Components.[12-15].

Table 1. The Number, Degree of Freedom, "r" value and Level of Significance of Assistive Technology and Cognitive Performance and its Components.

Variables Assistive Technology	N	Df	'r' Value	Sig. level
Memory	205	203	0.396	**
Learning Rate	205	203	0.126	NS
Attention	205	203	0.247	**
Generalization of Learning	205	203	0.221	**
Motivation	205	203	0.009	NS
Cognitive Performance (Total)	205	203	0.266	**

**Significant at 0.01 level (0.180)

From the table 1, it can be seen that the obtained 'r' 0.396, 0.247, 0.221 and 0.266 are higher than the table value 0.148 at 0.01 level of significance; therefore, the null hypothesis is rejected, and the alternate hypothesis has been formulated that "there is a significant positive relationship between assistive technology and cognitive performance (Viz., memory, attention, generalization and total) of students with intellectual disability. Further, the table also revealed that the obtained 'r' 0.126 and 0.009 are

lesser than the table value of 0.138 at the 0.05 level of significance. Therefore, the null hypothesis is accepted that there is no significant relationship between assistive technology and cognitive performance (Viz., learning rate and motivation) of students with intellectual disability.

Null Hypothesis 2: There is no significant relationship between assistive technology and psychomotor performance (Viz., daily living, personal care and safety and employability) of students with intellectual disability. The table shows the Number, Degree of Freedom, "r" value and Level of Significance of Assistive Technology and Psychomotor Performance and its Components.

Table 2. Significant at 0.01 level (0.180)

Variables Assistive Technology	N	Df	'r' Value	Sig. level
Daily Living	205	203	0.194	**
Personal care and Safety	205	203	0.362	**
Employability	205	203	0.486	**
Psychomotor Performance (Total)	205	203	0.431	**

From the table 2, it can be seen that the obtained 'r' 0.194, 0.362, 0.486and 0.431 are higher than the table value 0.148 at 0.01 level of significance; therefore, the null hypothesis is rejected, and the alternate hypothesis has been formulated that "there is a significant positive relationship between assistive technology and psychomotor performance (Viz., daily living, personal care and safety and employability) of students with intellectual disability.

Null Hypothesis 3: There is no significant relationship between assistive technology and social performance (Viz., Communication & social activities Community living) of students with intellectual disability.

**Significant at 0.01 level (0.180)

From the table 3, it can be seen that the obtained 'r' 0.219, 0.183 and 0.265 are higher than the table value 0.148 at a 0.01 level of significance; therefore, the null hypothesis is rejected. The alternate hypothesis has been formulated that "there is a significant positive relationship between assistive technology and social

performance (Viz., Communication & social activities and community living) of students with intellectual disability. The table shows the Number, Degree of Freedom, "r" value and Level of Significance of Assistive Technology and Social Performance and its Components.

Table 3 The Number, Degree of Freedom, "r" value.

Variables Assistive Technology	N	Df	'r' Value	Sig. level
Communication & Social Activities	205	203	0.219	**
Community Living	205	203	0.183	**
Social Performance (Total)	205	203	0.265	**

10. Discussion

The study sought to ascertain special educators' perspectives on the use of assistive technology in cognitive, psychomotor, and social performance. The data gathered from teachers revealed a positive relationship between assistive technology and cognitive, psychomotor, and social performance of students with intellectual disabilities. Furthermore, cognitive performance components such as memory, attention, generalisation, and cognitive performance are linked to assistive technology. This infers that assistive technology is required for students with intellectual disability. Students with intellectual disabilities may experience difficulties in various cognitive skills. People with poor cognitive performance such as attention, memory, and learning literacy are benefiting from new technologies. The complexity of available technologies is a significant technological barrier. Most technologies are not intended for people with cognitive impairment, and operational device requirements can be complex. Reduced-clutter visual displays are accommodations for people with poor cognitive performance. Information in non-text formats (e.g., graphics, video, and audio) reduces the number and complexity of decision-making points, presenting information sequentially reduced reliance on memory.

Furthermore, the study's findings revealed that psychomotor performance is correlated to assistive technology; dimensions of psychomotor performance such as daily living, personal care, safety, and employability are also highly correlated with assistive technology. Smartphones, digital navigation aids, portable and handheld electronic assistive technologies used by people with intellectual disabilities improved their navigation skills, independent task and job performance, and self-help tasks.

The correlation between social performance and its dimensions, such as communication, social activities, community living, and assistive technology, was significant. Digital technology has been defined as the social inclusion facilitator because it allows for the delivery of real-time capabilities that enable individuals to learn, work, travel, socialise, shop, and actively engage without being hampered by physical barriers (Manzoor Mirfa & Vimarlund, Vivian 2018).

Conclusion

Some cognitive disabilities, according to Scherer (2005), are transient and mild, affecting only one or two areas of function. Others, on the other hand, necessitate intervention. Assistive Technologies for Cognitive Disabilities directly impact daily functioning for people with significant, long-term deficits in attention, learning and memory, and planning. These difficulties affect daily activities and relationships, resulting in decreased social and vocational activities and a loss of personal independence. As a result, people with intellectual disabilities require assistive technology to maintain and improve their ability to function and freedom, promoting well-being. In addition, Assistive technology improves people with cognitive disabilities' ability to participate in and integrate into a diverse society.

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