

TEACHERS' PERSPECTIVES AND UNDERSTANDING OF THE USE OF TECHNOLOGY IN SPECIAL EDUCATION

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Abstract

The contemporary age is continuously witnessing rapid technological developments that are changing the outlook of the education sector. The modern scenario prioritises digital education and technology integration, especially in a special educational setting. The current research article focuses on investigating the perspectives of teachers and their understanding of technology in special education. Evidence shows that teachers specialising in teaching children with special needs are seeing a major potential of technology in facilitating academic growth. However, there are certain obstacles hindering the proper incorporation of education technology essentially in terms of resources inefficiency lack of knowledge and lack of confidence to accept new technology.

Keywords: Special Education, Special Needs Students, Technology Integration.

INTRODUCTION

In today's era of globalisation and digitalisation, technology has emerged as an integral component of education, given the numerous opportunities and solutions it provides for academic learning. As the fundamental guides of successful learning, teachers play a crucial role in ensuring students adhere to the curriculum and effectively adapt to technology-oriented learning environments. Although educational institutions are heavily investing in educational technology, the integration of tech-oriented solutions in education is rather limited. The current research explores the various factors influencing teachers' acceptance of technology and their perceptions of technology incorporation in special education.

Technology is being extensively used in the special education domain as it is shown to encourage engagement among students with special needs. For instance, over the past four decades, the number of special education students has nearly doubled in the United States: around "7.3 million students" were enrolled in special education in the 2021-22 academic year, rising from "3.6 million in" 1976-77 and "6.4 million" in 2010-11 (Pendharkar, 2023a; NCES, 2023). Given the number of students admitted in special education departments over the years, the need for technology-enabled education facilities has increased across emerging and developed economies. According to recent reports, the number of students with special needs has increased by 15% in some

countries as expressed in the proportion of the overall public-school enrolment (IES, 2022).

Countries all across the globe have taken initiatives to ensure no special needs individual is left behind in terms of accessing high-end education and getting equal opportunities. For instance, as per the 1975 “Individuals with Disabilities Education Act” (IDEA), all students of the US suffering from disabilities must have access to “free appropriate public education” (Pendharkar, 2023b). On the other hand, educational institutions in the UK follow the “504 plan” to ensure maximum in-school support for students with disabilities under section 504 of the “Rehabilitation Act” (Understood, 2023). Looking at prominent emerging economies such as India and China, the educational rights of special needs children are protected under the Persons with Disabilities Act, 1995 and the Protection of Persons with Disabilities (LPPD) act respectively.

With increased focus on digital learning and Technology enabled education it is crucial to incorporate Technology based learning systems for special students. However, in the COVID-19 aftermath, the NCES observed a 0.1% decline in the number of children with Individualised education programs IEP in the 2020-21 session and hitting 7.2 million from 7.3 million in 2019-20 (Pendharkar, 2023b). This decline might be attributed to certain academic challenges faced by special children and their educators regarding proper access to special educational resources. Another essential factor is staff shortage: several parts of the global education sector have reported experiencing poor access to technologically fluent teaching staff to properly adhere to modern guidelines and effectively use the learning resources. In this regard, the current research essentially identifies the root causes likely hindering the productivity of special teachers and analyses the educators’ understanding of technology.

Despite the availability of high-end technology and modern educational resources, the education system is unable to reach its potential due to staff shortages and teachers’ limited understanding of technology. This somewhat contradicts the UN’s initiatives regarding enabling proper education for students with special needs. This research aims to investigate teachers’ understanding of modern technology and their perceptions regarding the usage of technology in providing special education. To achieve this aim, the first objective of this study will be to investigate the significance of technology in teachers’ education and learning. The second objective is to identify the factors influencing special education teachers’ understanding and acceptance of technology. Thirdly, the research will explore the perceptions of teachers regarding technology incorporation in special education and pinpoint the key barriers to technology integration in special education from teachers’ viewpoints.

The following questions will be addressed in this research:

RQ1: What is the significance of technology in teachers’ learning and education?

RQ2: What are the key factors that influence special education teachers’ understanding and acceptance of technology?

RQ3: How do teachers perceive the incorporation of the technology within special education?

RQ4: What are the key barriers to the integration of the technology within the setting of special education?

This chapter established a ground for the research and provided an overview of the study's background. Followed by a background study, the chapter established the rationale for this research and briefly identified the problem statement, along with establishing the key aims, objectives and questions.

LITERATURE REVIEW

Significance of Technology in Teachers' Education and Learning

Technology has emerged as a significant component of special education courses to assist teaching and learning and facilitate communication between special students and their educators. In today's digital era, educational institutions are heavily investing in tech-oriented learning environments more out of necessity than motivation. As divulged by Tohara (2021), teachers working in special education domains now identify technology as solutions to facilitate better communication with these students. Considering the education system as a whole, modern education is now more progressive and prioritises introducing technology into education for a student-centric learning curve. The "UNESCO ICT Competency Framework for Teachers" (ICT CFT) highlights the importance of increasing technology incorporation in educational institutions as a part of the United Nations' "sustainable development goals" (UNESCO, 2023).

According to recent developments, "information and communications technology" (ICT) needs to be extensively adapted by educational institutions to ensure up-to-date learning which applies to all categories of students. To enhance the sophistication of the educational process, the ICT CFT highlights three essential areas of digital competency including "school administration", "teaching and learning" and "continuing professional development" (UNESCO, 2023). In order for this framework to work, the educational setting essentially requires for being supportive and resilient in the view of ensuring teachers' competency in technology and their understanding of the new changes. Accordingly, modern teaching education strives to fulfil the "18 ICT competencies identified" by UNESCO regarding incorporating technology within the teaching curriculum for teachers according to their specialisation. To make learning more achievable, the ICT competencies are further divided into 64 smaller targets, each prioritising a different element of education technology. As a result, technology has a significant influence on modern teaching and is pivotal in ensuring a long-term career in this field.

From a teacher's perspective, technology plays a pivotal role in strengthening networks across borders to identify the most beneficial teaching strategies according to students' needs. However, competency being a decisive component, modern teachers is expected to develop a sufficient understanding of the resources included in the teaching curriculum. A lack of training and development could significantly hamper the teacher's ability to

understand the facets of technology, thereby rendering their knowledge ineffective in an educational setting. Commonly known as the “first and second order barriers”, understanding and skills are interrelated factors that can engage and dissuade students from teaching and learning which can hinder their academic and personal growth (Winter *et al.* 2021, p.235).

The lack of competency can be even more alarming in a special educational setting as special teachers are expected to closely understand the learning issues of these students through verbal and non-verbal cues and make sure that they develop a clear understanding of a particular topic through easy descriptions. As such, inadequate teaching can majorly hamper the learning process and academic welfare of students with special needs. While technology brings in new opportunities to communicate and engage with special students, inadequate understanding from the teachers' end could end up contradicting IDEA.

Factors influencing acceptance and usage of technology among special education teachers

There is extensive literature available in a variety of educational contexts suggesting certain common factors that influence teachers' acceptance and usage of technology. Studies show that factors such as age, gender, years of experience and certain personality traits majorly influence the acceptability and adaptability of education among other underlying factors. Identifying similarities and common traits of teachers can help identify the thought process of specific groups of individuals and accordingly design professional development and training programs for different disciplines of teachers. One of the most notable elements of teaching training is to specify user attributes for instance studies highlight gender to be a notable component that can potentially forecast an individual's adoption of Technology. For instance, the research of Arkorful, Barfi, and Aboagye (2021) considered gender as a potential component that decides technology adoption and willingness to learn new technology. At the same time, Baturay *et al.* (2017) contend that there is no specific evidence that suggests gender-based notions affect the adoption of technology to the same extent in different sectors. Numerous researchers point out that the female gender in a teaching environment tends to show greater acceptance of Technology whereas other studies reveal consistent impacts of all gender towards Technology adoption. Age is another biological factor that often corresponds with a teacher's years of experience in an educational setting which can positively as well as negatively affect their willingness to change. As per the research of Shenoy, Mahendra and Vijay (2020, p.698), relatively lesser experienced teachers who are new to the teaching field are more inclined to learn new technology and adapt to technology-oriented teaching environments compared to those who have been in this profession for several years. On the other hand, other studies point out that experience has little to no effect on a teacher's way of perceiving educational technology; it rather depends on the extent to which the teacher shows an aversion to change. The lack of agreeability to change the traditional teaching process in turn relates to a teacher's years of experience in classroom-based teaching and traditional educational settings. The instructors who have

gained a substantial experience in our traditional setting over several years often show a lack of confidence in properly understanding a new technology which makes them avoid modern teaching techniques.

Personality traits are also crucial factors highlighted by researchers regarding Technology adoption among teachers. For instance, Ahmed & Opoku (2022) point out that certain specific personality traits such as flexibility and openness to experience new things and learn new approaches have a positive impact on the way teachers view new technology. on the other hand, the research of Siyam (2019, p.5) highlights a causal relation between a teacher's sociability and accepting scientific discoveries such as artificial intelligence robotics machine learning and augmented reality. Several other factors come to play when understanding the way an individual's perception of technology varies across contexts. For instance, the younger generation of teachers is more familiar with the digital and technological domain with more years of experience in working with the internet computers smartphones and social media. All of these elements contribute to building individuals and forging their perceptions to change. As per the research of Siyam (2019, p.5), some of the crucial user-oriented aspects influencing the adoption of Technology in a teaching environment include individual beliefs, visions motivation to change familiarity with technology ownership of Technology social media usage motivation and job relevance.

Teachers' perceptions of barriers to integrating technology in education

The research of Akram *et al.* (2022), Teachers in the contemporary educational scenario tend to prefer their existing views on teaching and align their teaching strategies based on the Technological Applications they are familiar with. Accordingly, it is crucial to understand the perception of individual teachers regarding using a particular Technology before deciding on technology integration in the learning classroom setting. In this respect, self-efficacy plays a vital role in ensuring how a teacher views technology integration as an advantage (Guoyan *et al.* 2021, p.5). the younger population of educators is more fluent in technology and digital solutions which increases their efficacy with advanced learning modules and digital education is likely to show contradictory behaviour regarding introducing a new technology in the learning process.

Even though technological innovations have brought forth numerous opportunities in the teaching and learning domain, several factors have been identified to hinder the productive incorporation of Technology in the classroom. According to Ertmer's theory, the two major barriers faced by teachers in a teaching environment can be categorised as first-order and second-order barriers which can otherwise be stated as external and internal factors affecting education (Tarman, Kilinc & Aydin, 2019, p.738). While "first-order barriers" or external factors comprise the lack of resources that could hamper classroom activities which are not controlled by the teacher (Tarman, Kilinc & Aydin, 2019, p.738). For instance, some of the first orders barriers are caused by a lack of adequate resources insufficient professional training and a scarcity of support from authorities and administrations.

As articulated by Mohammadi et al. (2021, p.5165), some of the essential external factors hampering technology-oriented education in the modern scenario include poor support from the administration technical glitches and a lack of resources in the training process. these factors also include issues such as poor access to advanced technology and a lack of availability of resources online. The research of Akram *et al.* (2022) also points out that the quality and quantity of technology equipment in the teaching training process along with poor Maintenance Services and inadequate technical support also significantly Hinder the ability of individuals to learn how to interact in a classroom and therefore affects the quality of education that these teachers can provide to students in the future. The extent to which teachers can use the available Technology also depends on these factors. In this regard, Ferri et al. (2020, p.86) points out that the scarcity of equipment can be as basic as the lack of computer Laboratories as well as issues with internet connectivity. Educators, aspiring teachers and educational authorities have pointed out several impediments including inadequate planning of training methods of casual approach to in-service training and lack of proper software and equipment.

Even though these external factors are always present there are circumstances where the internal construct of teachers as individuals can also significantly affect the teaching process. Studies point out that the underline beliefs of individuals towards change and Technology integration along with their levels of confidence often become the key driving forces hindering productive education. In this regard, Akram *et al.* (2022) points out that the education system and the teaching training process need to be revised in a way that addresses these internal barriers rather than solely focusing on eradicating the first-order hindrances. To achieve these higher skills and deeper research are needed to effectively address an individual's perceptions and successfully change their attitude and beliefs to be flexible to change and adopt Technologies. In the scenario of special education internal factors can be a major hindrance to availing students of proper education as teachers tend to agree to use a particular Technology when they are able to see the usefulness of the technology in improving teaching (Akram *et al.* 2022). Another crucial issue facing the teaching industry in the present age is that even though several instructors are willing to cooperate and implement Technology in the teaching plan they suffer from severe lack of confidence regarding its proper implementation due to a lack of equipment or insufficient training.

THEORETICAL UNDERPINNINGS

Technology Acceptance Model (TAM)

The TAM was devised in 1986 by Davis as a framework to understand the way a user gradually accepts a new technology. As divulged by Siyam (2019, p.3), the “Technology Acceptance Model” was originally devised to investigate the thought process of users and understand their beliefs and attitudes towards technology. According to this framework, the extent to which the user is willing to accept technology depends on their beliefs and preconceptions regarding the possible advantages of adopting and using the technology. Likewise, the concept of technology acceptance suggests that individual’s willingness in

accepting technology depends on two external variables: “perceived usefulness” (PU) and “perceived ease of use” (PEU) (Hong, Zhang & Liu, 2021, p.691492). Both of these variables are further linked with the customer’s “attitude towards using” (ATU) the technology which in turn determines the ultimate behavioural intentions of the user.

Out of the two external variables, the PEU variable is seen to have an impact on perceived usefulness. This indicates that individuals tend to view a technology's usefulness only when they are satisfied with the perceived utility it promises. According to the theory, the PU element is used to analyse the degree that customers believe that incorporating particular technology can improve their lifestyle and enhance their ability to accomplish duties.

The same applies to the teaching-learning scenario: technology integration in education requires teachers to perceive the usefulness of technology in engaging with students and enhancing the teaching process. This brings in the next important element of **“the technology acceptance framework”**: “perceived ease of use” (PEU). As opined by Siyam (2019, p.5), the TAM defines PEU as the extent to which the user can see the usefulness of technology in terms of simple handling. In a special education scenario, the teachers' opinions about technology integration can be changed by making them see the ease of using the technology. These factors can gradually change their attitude towards technology and lead to behavioural intentions to use, which finally complete the system when the technology gets implemented in the educational setting regularly. Hence, the TAM framework is highly relevant to the concept of technology integration in special education.

Social learning theory

This theory builds up the notion of self-efficacy in teachers’ acceptance of technology in a modern educational setting. Theorised by Albert Bandura in 1977, the social learning theory or “cognitive theory” considers observation and self-efficacy as crucial precursors of social learning and cognitive development. According to this theory, social cognitive procedures and their significance is closely associated with model observations (Ahn, Hu & Vega, 2020, p.4). Moreover, an individual’s self-efficacy is related to socio-cultural factors identified as “facilitators” and “impediments”. Self-efficacy also has an influence on an individual’s expected outcomes in terms of physical social and self-evaluative goals. In the domain of teaching and learning the teacher's self-efficacy can be considered a key determinant of technology acceptance in terms of how easily hurdles can be conquered and the amount of effort that needs to be expended (Koutroubas & Galanakis, 2022, p.316). Self-efficacy also determines the extent to which teachers are willing to utilise technology in their daily practice and create a positive learning environment in the special education setting.

Conceptual framework

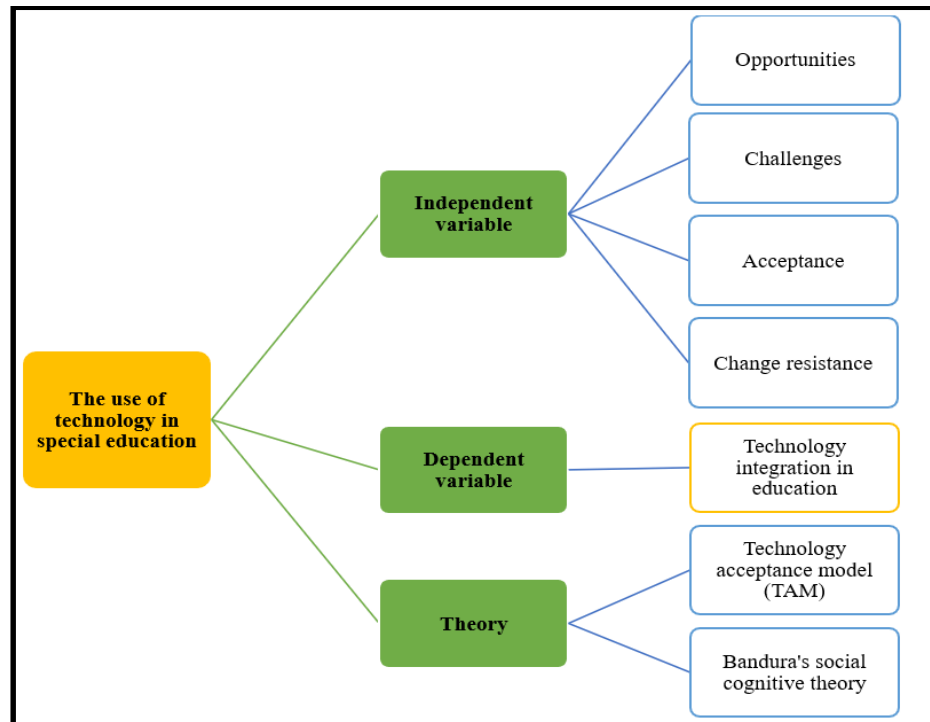


Figure 1: Conceptual framework

Summary of the Chapter

This significant chapter focused on topic of research based on existing literature and works of previous researchers to identify the way teachers perceive Technology integration in a special education setting. Both social learning framework, as well as, the **“technology acceptance model”** plays a crucial role in understanding the way technology is perceived and incorporated through a gradual learning process. This chapter also developed a conceptual framework for the overall research identifying the dependent and independent variables.

METHODS AND MATERIAL

This particular chapter bestows a synopsis possessed by main methods along with approaches guiding researcher to collect information interpret evidence and generate conclusions specific to this study. The research philosophy forms the outermost layer of Saunders’ research onion and is considered the component that binds the research together. As articulated by Al-Ababneh (2020, p.77), research philosophy entails the underlying assumption guiding a study in terms of collecting, analysing and interpreting data to generate relevant conclusions. Essentially, research philosophy is categorised into positivism, interpretivism, realism and pragmatism based on the type of data required for a particular study.

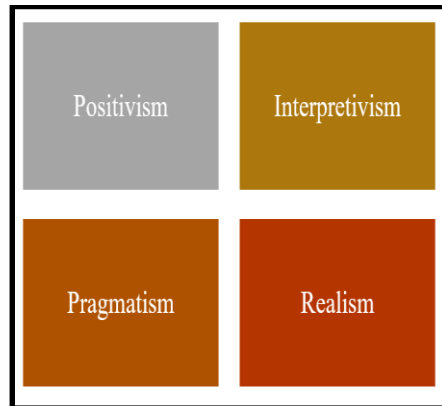


Figure 2: Research philosophy

The positivist philosophy views the world from an objective and factual viewpoint, isolating observations from phenomena. Hence, this philosophy is more suited for studies involving large samples and highly structured data. Contrarily, interpretivism views social realities through a subjective spectacle and is suitable for qualitative investigations involving small samples (Al-Ababneh, 2020, p.80).

Realism, on the other hand, builds on both positivism and interpretivism to develop knowledge about a phenomenon's subjectivity using a set of predetermined assumptions and evidence. In realist studies, the nature of data is chosen to fit the subject matter. Lastly, pragmatism deals with factual knowledge and claims that the research problem determines the choice of philosophy. Focusing more on practical outcomes, pragmatist research often takes on a mixed approach involving qualitative, as well as, quantitative data for generating conclusions.

The present research carries out scientific evidence and quantifiable information to address the identified problem and objectives. **Positivism** has been chosen as the most suitable philosophy for this study to gather factual information and scientifically analyse data for conclusions. Design of the Research can be delineated as the master plan that decides choice of data collection and data analysis methods (Mbaka & Isiramen, 2021, p.28). The exploratory Teachers' perspectives and understanding of the use of technology in special education

Design is suitable for studies aimed at generating insights into a situation through observations and does not require well-defined data. The researcher can work with open-ended information collected from subjectively selected samples typically using non-quantitative methods. Contrarily, conclusive research works with well-defined information and close-ended data collected using a properly structured procedure from a relatively large sample. The **conclusive design** has been used in this study to collect quantitative information regarding the viewpoints of special teachers and formally analyse the collected data to generate inferences.

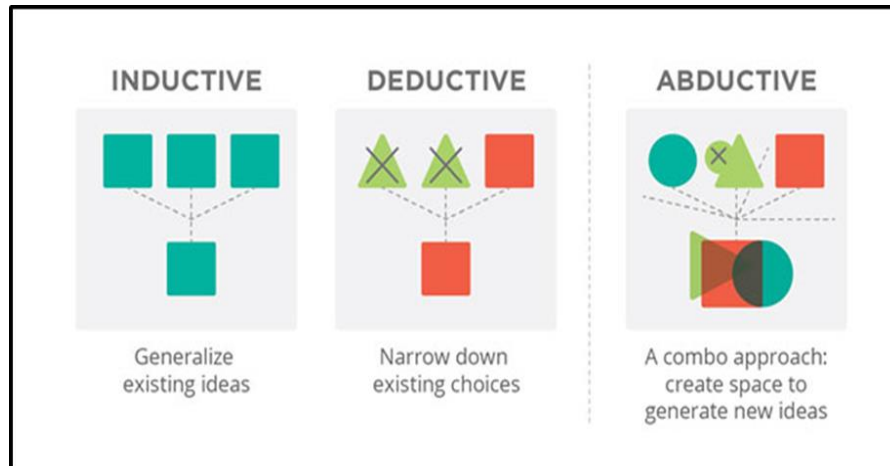


Figure 3: Research approach

The “**research approach**” is the general framework followed to conduct a study and is categorised into the inductive, deductive and abductive approaches. In inductive reasoning, existing information and specific insights are used to explore a situation to generate conclusions. Deductive studies are concerned with generating specific conclusions from general premises and existing theories. Abductive reasoning is a combination of Inductive and deductive inference where testable conclusions are generated using known premises and data collection is intended to test existing theories identify patterns and test the appropriateness of existing notions (Proudfoot, 2023, p.312).

Deductive reasoning has been used in this research to collect data and test existing constructs using scientific evidence.

The data collection method refers to the process of collecting relevant data for a study from different sources to explore the research problem and address the questions. Collection of data is broadly classified into both primary, as well as, secondary data collection techniques based on the type of data and samples required (Pandey & Pandey, 2021).

The secondary data collection method entails working with existing research on the topic of interest and analysing pre-existing literature on the research problem. On the other hand, primary data collection is the researcher's original work and involves the collection of first-hand accounts of the samples to substantiate existing constructs with original evidence.

In the current research, the **primary method** has been chosen to collect empirical information on the research topic from real-life special teachers and collate the data with existing information. The primary data have been collected in the form of survey responses: the participants were sent an **online survey questionnaire** including **9 close-ended questions** regarding the perspective of teachers on technology integration in special education.

As articulated by Sileyew (2019, p.8), data analysis refers to the process employed by the researcher to analyse the collected data addressing the research objectives. Data analysis is categorised into qualitative and quantitative methods based on the type of data the research is working with.

In studies involving open-ended information and non-quantifiable data such as documents, recordings and interview transcripts, qualitative methods are used to detect patterns, identify themes and generalise findings. On the other hand, quantitative methods are used to work with scientific evidence and close-ended responses collected through surveys, interviews and questionnaires.

In this specific study, “**quantitative method**” is utilized to analyse data collected in form of survey responses through close-ended questions. The **SPSS software** has been used to statistically analyse the data and identify relations between variables.

The population refers to the chosen group to research to generate specific conclusions. Choosing a population is crucial for studies involving developing specific ideas about a particular group, which in this case the teachers is specialising in special education. As such, **real-life teachers** currently working on students with special needs have been chosen as the target population for this study.

Contrastingly, a sample mentions the group of candidates out of the chosen population to collect data for primary research. The sample size in quantitative research refers to the number of individuals taking part in a questionnaire to accomplish a research endeavour and accurately represents the audience of interest.

The sampling method is broadly classified into probability and non-probability sampling based on the way responses are chosen for data analysis. Non-probability sampling involves subjectively selecting responses from a population in a non-random manner. Contrarily, probability sampling provides equal chances for the population’s members to get selected for data collection through a random approach (Rahman *et al.* 2022, p.45). In this specific study, the technique of probability sampling, especially “**simple random sampling**”, has been practised for reducing chances of bias and provide equal chances to each member of the population.

A total of **51 responses** have been randomly selected to scientifically calculate the primary data. In terms of ethical considerations, no participant was forced to take part in this research and all individuals voluntarily contributed to the study. The participants were given free will to opt out at any point during the study.

The purpose of data collection has been transparently communicated to the participants. Anonymity has been maintained in collecting online survey responses. The information has been collected solely for research and no personal information has been disclosed. The collected responses were stored in encrypted folders in password-protected laptops and have not been used for any purpose other than this research.

DATA ANALYSIS

Primary Data Analysis

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25-30	20	39.2	39.2	39.2
	31-35	10	19.6	19.6	58.8
	36-40	10	19.6	19.6	78.4
	Above 40 years	11	21.6	21.6	100.0
Total		51	100.0	100.0	

Figure 4: Age of the Respondents

It has been understood that the teachers who are teaching special children are majorly of 25-30 years age, respectively. The above table has represented this, and 10 teachers each are there amidst age group possessed by 31-35 years, as well as, 36-40 years within schools giving special education. 11 educators having more than 40 years are working in the schools of special education. This data has been acquired from the 51 participants who have been selected for this particular study.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	21	41.2	41.2	41.2
	Female	30	58.8	58.8	100.0
Total		51	100.0	100.0	

Figure 5: Gender of the Participants

The above table shows that both male and female teachers are interested in providing knowledge to the children taking special education. However, it has been understood that female teachers are more involved with special education as compared to the male educators. The numbers of male and female educators have specified this as 30 females, as well as, 21 male teachers have been observed from the 51 participants.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2-4 years	21	41.2	41.2	41.2
	5-7 years	18	35.3	35.3	76.5
	Above 8 years	12	23.5	23.5	100.0
	Total	51	100.0	100.0	

Figure 6: Teaching Experience in Special Education Schools

Most teachers have experience between 2 years to 4 years, and the above table has demonstrated this. 21 teachers have experience between 2-4 years, and 18 teachers possess experience in the middle of 5 years to 7 years. Experience of more than 12 years is acquired by 12 teachers among 51 respondents.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	38	74.5	74.5	74.5
	No	13	25.5	25.5	100.0
	Total	51	100.0	100.0	

Figure 7: Preference for Teaching Special Children

Most of the educators have preferred to teach special children; however, a few of them have either little or no interest in giving education to the special children. The above table has specified that 38 educators are interested in providing education to the students who are taking instruction from special schools. On the other hand, 13 educators are not interested in providing knowledge to the special children.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	36	70.6	70.6	70.6
	No	15	29.4	29.4	100.0
	Total	51	100.0	100.0	

Figure 8: Necessity of Utilization of the Technology within Special Education

It has been understood from the above-table is that there has been a necessity of utilizing technology within special education. 36 teachers have agreed with the fact that technology is integral for the special children. On the contrary, 15 educators do not agree with the fact that there has been importance of technology for special education.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	44	86.3	86.3	86.3
	No	7	13.7	13.7	100.0
	Total	51	100.0	100.0	

Figure 9: Capability of Adopting the Use of Technology by Special Children

Most educators have believed that the special children can be competent in adopting the utilization of the technology for their education purpose. However, a few of them do not have any trust in special children in the matter of adoption of the utilization of technology. The above table has picturized the view that 44 teachers think that special children can possess the efficiency of adopting the utilization of technology for their betterment.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	39	76.5	76.5	76.5
	No	12	23.5	23.5	100.0
	Total	51	100.0	100.0	

Figure 10: Hindrances to the Technology Integration within Special Education

It has been analysed that many hindrances have been there at the time of incorporating technology within special education. 39 educators have thought that barriers are there during the incorporation of technology in the special education. On the other hand, 12 teachers have considered that there are no hindrances have been there in incorporation of the technology in the schools providing education to special children.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	40	78.4	78.4	78.4
	No	11	21.6	21.6	100.0
Total		51	100.0	100.0	

Figure 11: Adoption of the Technology by Schools Bestowing Special Education

The above table has depicted that a huge number of respondents have confessed that the requirement for adopting of the technology into special education schools is there. 40 respondents are coordinated with the fact that schools giving special education must embrace the technology. On the contrary, 11 participants agreed that it is not essential in schools providing special education.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	40	78.4	78.4	78.4
	No	11	21.6	21.6	100.0
Total		51	100.0	100.0	

Figure 12: Advantages of Technology within the Education of Special Children

A considerable number of teachers have agreed with the advantages of technology within the education of exceptional children. However, a few of them have discarded the merits of technology in the teaching of the special children. This has been well acknowledged from the above-table as 40 teachers have agreed with the benefits, and 11 have disagreed among 51 participants.

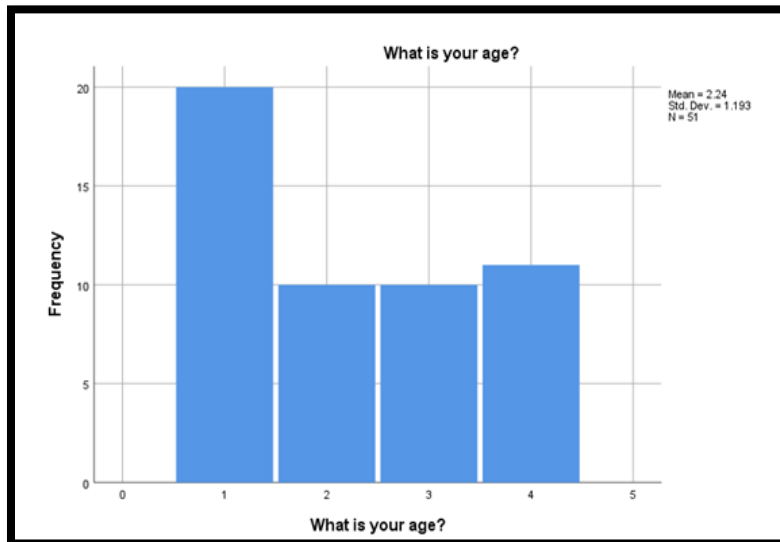


Figure 13: Age of Respondents

The mean in the above chart is 2.24, and Standard Deviation is 1.193. This depicts the respondents who have their ages between 25-30 years have depicted a lot of interest in providing their response regarding the special children. Contrastingly, the participants who have age more than 40 years were less involved in giving answer. This states that the teacher having age more than 40 years are less in schools providing special education.

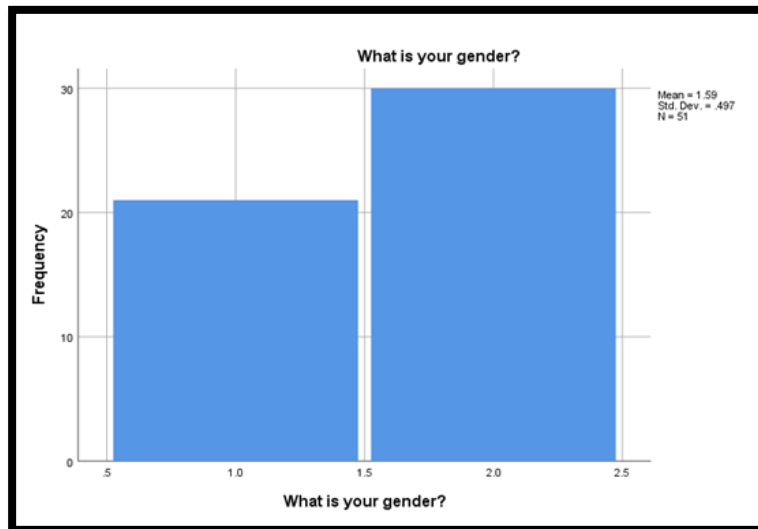


Figure 14: Gender of the Participants

The mean is 1.59, and Standard Deviation is 0.497 in the above chart. The graph indicates that female teachers are present in a massive number within schools providing special education than male educators.

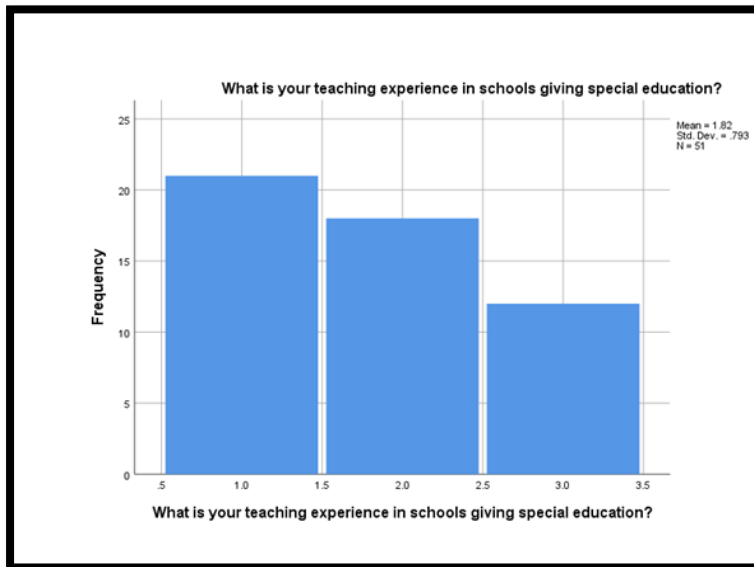


Figure 15: Experience of Respondents in Special Education Schools

The mean is 1.82, and Standard Deviation is 0.793 in the above chart. It depicts that maximum teachers have experience between 2-4 years, and only a few educators possess experience more than 8 years.

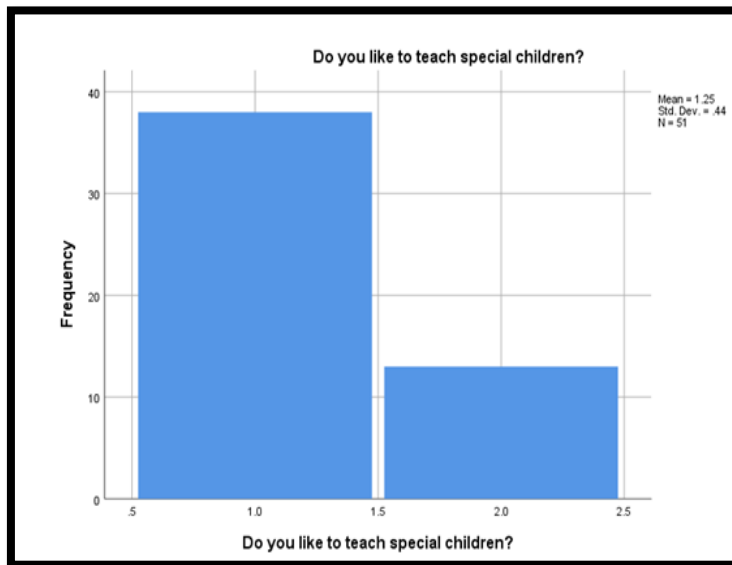


Figure 16: Preference of Participants in Teaching Children Getting Education from Special Schools

The respondents mostly preferred to teach the children acquiring education from the special schools. It has been evaluated from the above graph as the mean value is 1.25 and Standard Deviation is 0.44.

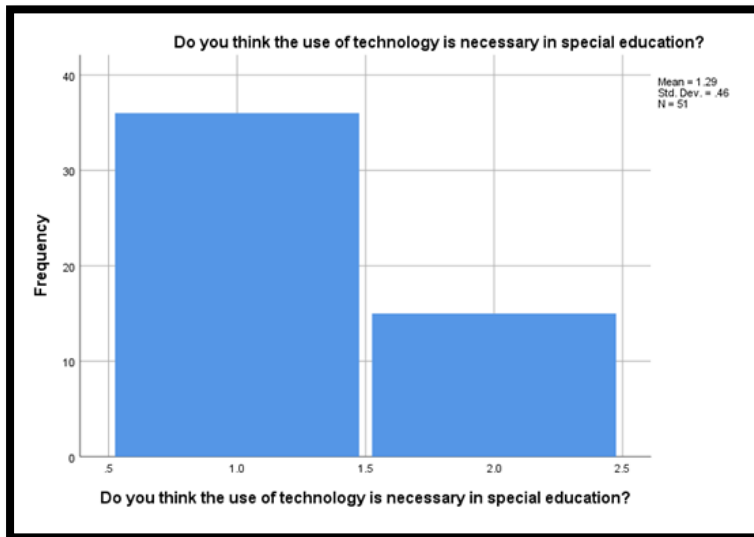


Figure 17: Need of the Technology Utilization in the Schools Providing Special Education

Most of the respondents have agreed that technology is of utmost importance in special education, which has been stated in the above graph. The graph has indicated that the mean value is 1.29 and 0.46, which represents the necessity of the utilization of technology within special education.

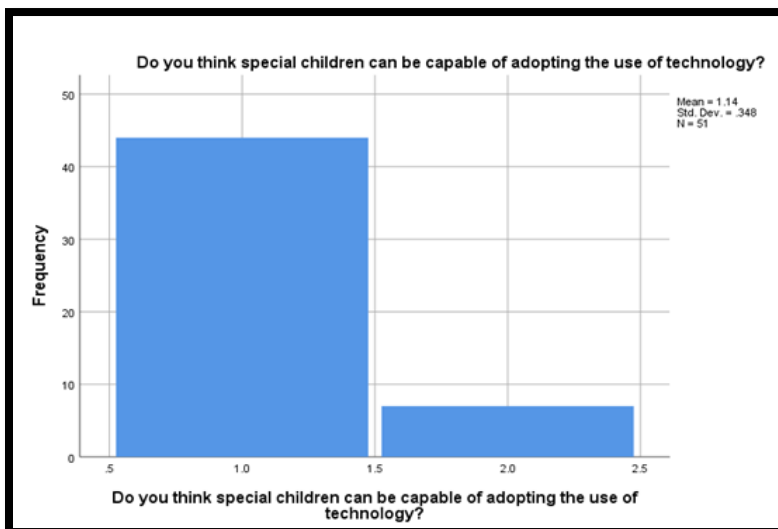


Figure 18: Efficiency of Special Children in Adopting the Technology

It has been analysed from the above graph that a considerable number of respondents have believed in the fact that the special children bear the capability of adopting the technology. The mean value and the value of Standard Deviation has depicted the trust

of the majority of participants on the special children as the values are 1.14 and 0.348, respectively.

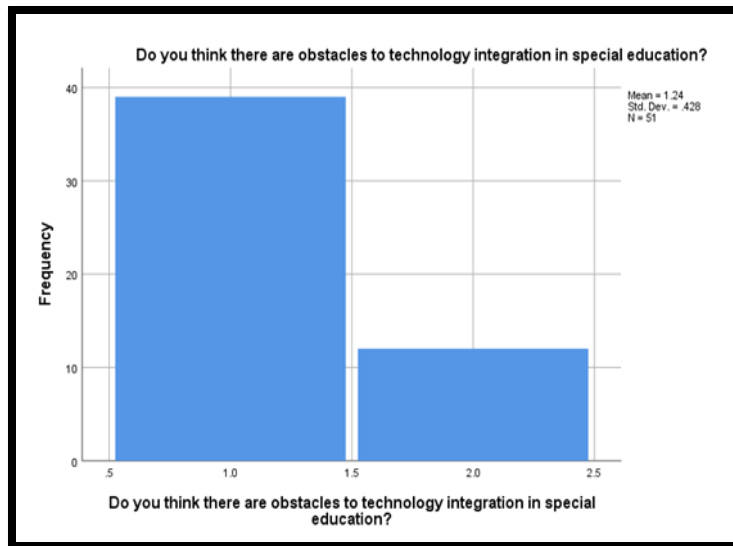


Figure 19: Hindrances to Incorporation of Technology in the Special Education

The values of Mean and Standard Deviation are 1.24 and 0.428. It has been analysed from the above graph that there are several barriers in integrating the technology in the schools providing special education.

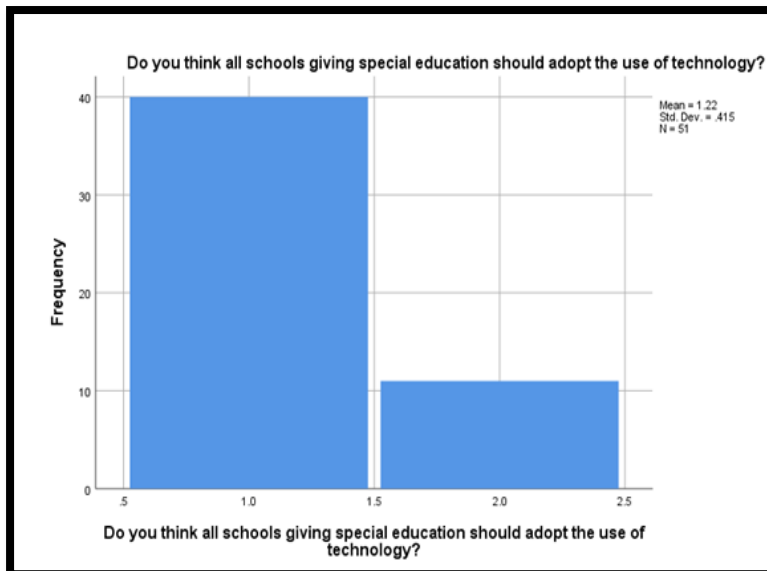


Figure 20: Adoption of the Utilization of the Technology in Schools Providing Special Education

The Mean value and Standard Deviation in the graph above are 1.22 and 0.415. It has been indicated by the graph that there should be an adoption of technology by the schools bestowing education to the special children.

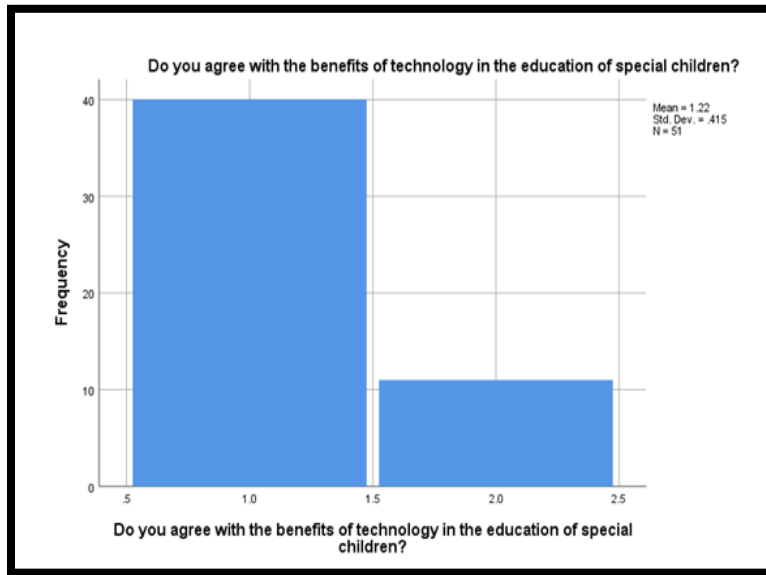


Figure 21: Advantages of Technology within the Education of Special Children

The Standard Deviation and Mean values are 0.415 and 1.22 in the above-graph. It has been understood from the graph that a massive number of advantages have been there in the case of education of the special children.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
What is your age?	51	1	4	2.24	1.193
Do you like to teach special children?	51	1	2	1.25	.440
Do you think there are obstacles to technology integration in special education?	51	1	2	1.24	.428
Do you agree with the benefits of technology in the education of special children?	51	1	2	1.22	.415
Valid N (listwise)	51				

Figure 22: Descriptive Statistics

Descriptive Statistics refers to the statistics that elucidate a central tendency of the variable (Mishra *et al.* 2019). It has been recognized from the above-table that the teachers who are between 25-30 years of age possess a lot of interest in teaching special children. This has been understood from the values of Mean and Standard Deviation that are 2.24 and 1.193. The respondents are fond of teaching the special children as

interpreted from the importance of Mean and Standard Deviation is 1.25 and 0.440. These values have demonstrated the fact that special education is essential in the case of special children. The obstacles can be more at the time of the integration of the technology in the schools bestowing special education. It has been analysed from the above table that special children have been highly benefitted from the use of the technology within the education. The mean value and the Standard Deviation are 1.22 and 0.415 that indicates the utility of technology for building their career of special children.

	N	Mean	Std. Deviation	Std. Error Mean
What is your age?	51	2.24	1.193	.167
Do you think special children can be capable of adopting the use of technology?	51	1.14	.348	.049
Do you agree with the benefits of technology in the education of special children?	51	1.22	.415	.058

Figure 23: One-Sample Statistics (T-Test)

Descriptive statistics has been shown by One-Sample Statistics for the specific sample, involving the mean that is compared to the mean value (Barry *et al.* 2021). It has been understood from the above-table that the teachers who belong to the age group of 25 years and 30 years are primarily fond of teaching students who are taking special education. Immense benefits can be gathered by children having technology within their schools.

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference Lower
What is your age?	13.379	50	.000	2.235	1.90
Do you think special children can be capable of adopting the use of technology?	23.369	50	.000	1.137	1.04
Do you agree with the benefits of technology in the education of special children?	20.900	50	.000	1.216	1.10

	95% Confidence Interval of the Difference Upper
What is your age?	2.57
Do you think special children can be capable of adopting the use of technology?	1.24
Do you agree with the benefits of technology in the education of special children?	1.33

Figure 24: One-Sample Test

It has been acknowledged from the above tables that technology should be utilized in schools providing special education. It is beneficial for upgrading their knowledge and the teachers who are in the middle of 25 years and 30 years are mostly interested in bestowing education to special children.

	Mean	Std. Deviation	N
What is your age?	2.24	1.193	51
Do you think the use of technology is necessary in special education?	1.29	.460	51
Do you think all schools giving special education should adopt the use of technology?	1.22	.415	51
Do you agree with the benefits of technology in the education of special children?	1.22	.415	51
Do you think there are obstacles to technology integration in special education?	1.24	.428	51
Do you think special children can be capable of adopting the use of technology?	1.14	.348	51
Do you like to teach special children?	1.25	.440	51

Figure 25: Descriptive Statistics

It has been analysed that the integration of technology in the schools providing special education can assist the special children in enhancing their knowledge. It is essential for those schools to integrate the technology, and therefore, adoption of the technology is required. Capability of adopting the utilization of technology can be acquired by special children by guidance of teachers. It is understood that aged teachers are not much interested in teaching exceptional children.

		What is your age?	Do you think the use of technology is necessary in special education?	Do you think all schools giving special education should adopt the use of technology?
What is your age?	Pearson Correlation	1	.819 ^{**}	.783 ^{**}
	Sig. (2-tailed)		.000	.000
	N	51	51	51
Do you think the use of technology is necessary in special education?	Pearson Correlation	.819 ^{**}	1	.812 ^{**}
	Sig. (2-tailed)	.000		.000
	N	51	51	51
Do you think all schools giving special education should adopt the use of technology?	Pearson Correlation	.783 ^{**}	.812 ^{**}	1
	Sig. (2-tailed)	.000	.000	
	N	51	51	51

Do you think the use of technology is necessary in special education?	Pearson Correlation	.819 ^{**}	1	.812 ^{**}
	Sig. (2-tailed)	.000		.000
	N	51	51	51
Do you think all schools giving special education should adopt the use of technology?	Pearson Correlation	.783 ^{**}	.812 ^{**}	1
	Sig. (2-tailed)	.000	.000	
	N	51	51	51
Do you agree with the benefits of technology in the education of special children?	Pearson Correlation	.783 ^{**}	.812 ^{**}	1.000 ^{**}
	Sig. (2-tailed)	.000	.000	.000
	N	51	51	51
Do you think there are obstacles to technology integration in special education?	Pearson Correlation	.789 ^{**}	.859 ^{**}	.945 ^{**}
	Sig. (2-tailed)	.000	.000	.000
	N	51	51	51
Do you think special children can be capable of adopting the use of technology?	Pearson Correlation	.596 ^{**}	.618 ^{**}	.761 ^{**}
	Sig. (2-tailed)	.000	.000	.000
	N	51	51	51
Do you like to teach special children?	Pearson Correlation	.798 ^{**}	.906 ^{**}	.897 ^{**}
	Sig. (2-tailed)	.000	.000	.000
	N	51	51	51

Correlations		Do you like to teach special children?
What is your age?	Pearson Correlation	.798 ^{**}
	Sig. (2-tailed)	.000
	N	51
Do you think the use of technology is necessary in special education?	Pearson Correlation	.906 ^{**}
	Sig. (2-tailed)	.000
	N	51
Do you think all schools giving special education should adopt the use of technology?	Pearson Correlation	.897 ^{**}
	Sig. (2-tailed)	.000
	N	51
Do you agree with the benefits of technology in the education of special children?	Pearson Correlation	.897 ^{**}
	Sig. (2-tailed)	.000
	N	51
Do you think there are obstacles to technology integration in special education?	Pearson Correlation	.948 ^{**}
	Sig. (2-tailed)	.000
	N	51
Do you think special children can be capable of adopting the use of technology?	Pearson Correlation	.682 ^{**}
	Sig. (2-tailed)	.000
	N	51
Do you like to teach special children?	Pearson Correlation	1
	Sig. (2-tailed)	
	N	51

Figure 26, Figure 27, Figure 28: Table 4.1.14: Correlation

(Source: IBM SPSS)

It has been analysed from the table that technology in the schools bestowing education to the special children can increase the efficiency of these learners. This is clear from the Pearson Correlation of each collected data. Correlation is significant as the value of the Pearson Correlation is not negative.

Variables Entered/Removed ^a			
Model	Variables Entered	Variables Removed	Method
1	Do you agree with the benefits of technology in the education of special children?, Do you think special children can be capable of adopting the use of technology?, Do you think the use of technology is necessary in special education?, Do you like to teach special children?, Do you think there are obstacles to technology integration in special education? ^b	.	Enter

a. Dependent Variable: What is your teaching experience in schools giving special education?
 b. Tolerance = .000 limit reached.

Figure 29

Model Summary							
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.849 ^a	.721	.690	.441	.721	23.309	5

Model Summary		
Model	df2	Change Statistics
		Sig. F Change
1	45	.000

a. Predictors: (Constant), Do you agree with the benefits of technology in the education of special children?, Do you think special children can be capable of adopting the use of technology?, Do you think the use of technology is necessary in special education?, Do you like to teach special children?, Do you think there are obstacles to technology integration in special education?

Figure 30: Regression

(Source: IBM SPSS)

It has been analysed from the above tables that most respondents have been agreed about the need of technology in the enhancement of the knowledge of the special children. Most of them are interested in teaching students studying in special education schools. They are aware of the fact that hindrances may come in integrating technology in special education schools that do not have it. This has been understood from the values of R square and Adjusted R Square that are 0.721 and 0.690, respectively.

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22.662	5	4.532	23.309	.000 ^b
	Residual	8.750	45	.194		
	Total	31.412	50			

a. Dependent Variable: What is your teaching experience in schools giving special education?
 b. Predictors: (Constant), Do you agree with the benefits of technology in the education of special children?, Do you think special children can be capable of adopting the use of technology?, Do you think the use of technology is necessary in special education?, Do you like to teach special children?, Do you think there are obstacles to technology integration in special education?

Figure 31: ANOVA

The ANOVA table has depicted that special children can gain education through technology after being taught by experienced teachers. The Mean Square and the F-value are 4.532 and 23.309 that has demonstrated this fact.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.167	.222		-.750	.457
	Do you like to teach special children?	9.397E-15	.540	.000	.000	1.000
	Do you think the use of technology is necessary in special education?	.583	.320	.339	1.821	.075
	Do you think special children can be capable of adopting the use of technology?	-2.857E-16	.276	.000	.000	1.000
	Do you think there are obstacles to technology integration in special education?	1.000	.624	.540	1.604	.116
	Do you agree with the benefits of technology in the education of special children?	4.237E-16	.493	.000	.000	1.000

Figure 32: Coefficients

It has been analysed from the above table that the special children need special education, and a lot of experience is required for teaching them. However, it has been acquired from the collected that teachers having 2-5 years of experience are interested in teaching the special children. Technology can change their life, and they can develop their skills as well. Therefore, it is necessary in the special education schools for improving their learning and pattern of education.

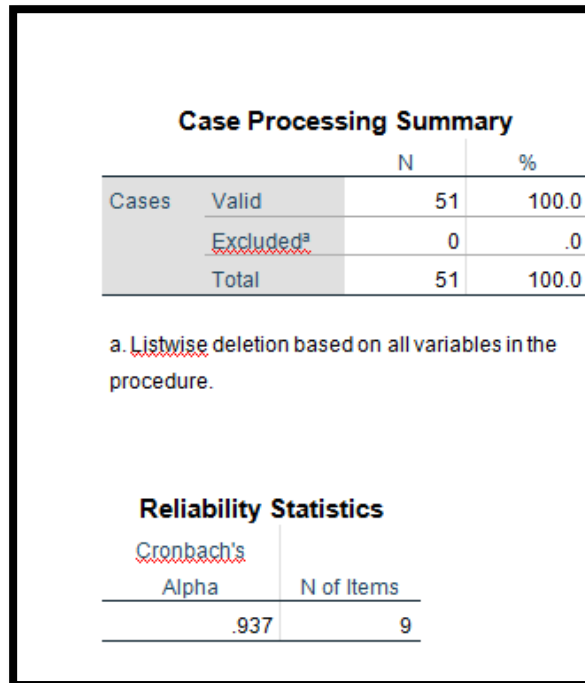


Figure 33: Reliability Statistics

(Source: IBM SPSS)

Cronbach Alpha refers to the measure of the internal consistency, which has been associated with the type of the set of the items within the group (Amirrudin *et al.* 2021 p. 225). Cronbach Alpha is 0.937 that refers to the fact that data is reliable.

FINDINGS AND DISCUSSION

The primary survey was conducted among teachers specialising in special education to investigate their viewpoints regarding the usefulness of the technology within special education and their understanding possessed by education technology. Based on the survey responses, it has been gathered that most teachers enjoy teaching children with special needs and considered technology an essential component of facilitating special education through new opportunities to learn and engage with students. On asking whether children with special needs might be capable of adopting new technology and understanding better a majority of the sample agreed to the notion. On the other hand, the sample was asked whether or not there are some obstacles to integrating technology

in special education nearly 76% of the respondents agreed facing difficulties. This suggests that even though teachers, as well as students, are willing to collaborate with the modern education system and adopt advanced technology in the academic curriculum, certain barriers are hinting at the potential of Technology integration in special education. The sample was also asked whether schools and educational institutions specialising in education for children with special needs should adopt new technologies. Based on the empirical evidence, a majority (78.4%) of the population agreed to the fact that Technology can significantly improve the classroom activities of special education students. Lastly, the target sample was questioned regarding their agreeability with the potential benefits of technology in educating students identified as Special children. The empirical evidence suggests a positive outlook of teachers on technology and its benefits in special education.

The overall findings yield some meaningful insights into the real-life scenario of special education and how modern educators perceive the implementation of technology in facilitating academic success. Prior research on technology integration suggests that educators with a huge experience have shown resistance in adopting new approaches to education. Secondary evidence also points out that the relatively younger groups of individuals employed in the teaching field are more likely to welcome new opportunities and contribute to academic breaks through the help of technology integration (Siyam, 2019, p.6). However, the empirical evidence in this study points out that a majority of special educators in the present times are willing to change their traditional teaching methods and adopt technology as it promises a greater learning potential for students with special needs. For instance, the research of Tohara (2021, p.3345) highlights that teachers and aspiring teachers who are fluent in technology and have a background in instructional technology and Computer Education accounts for showing a huge amount of positive attitude in the case of technology integration in a classroom setting compared to those who have not mastered technology and internet usage. In the present study, however, there is no specific evidence indicating that teachers with less experience in computers show a negative approach to educational technology.

In terms of students' potential to adopt education technology, empirical findings recommends that educators are showing positive attitude in case of students' understanding, even in the special needs segment. As gathered from the research of Tohara (2021, p.3345), 21st-century education makes it pivotal for students to possess advanced learning skills alongside adequate media literacy to grow in their academic careers. This applies to all categories of students, specifically to those with special needs as technology integration can significantly help them gain their digital literacy and advance their skillsets. It is the duty of the teacher and the education system to make sure that special needs students are getting access to adequate learning resources and guidance to excel in the digitalised learning environment and grow as autonomous individuals (Tarman, Kilinc& Aydin, 2019, p.737). However, the finding also points out that for special needs students to effectively understand and adopt technology, it is crucial to have the essential external resources. This is also the most critical issue identified from

primary information where the participants pointed out the lack of adequate external resources in special educational settings.

Based on the empirical observations, it can be affirmed that external barriers are an important issue in the educational sector that are hindering effective technology integration in the educational setting. Going by Ertmer's theory, extrinsic barriers also called first-order barriers are a major obstacle to adopting technology that is not under the control of the teacher. Considering the information generated from primary evidence, despite the numerous initiatives to become technology oriented, the schooling system of special needs students is still lacking in terms of provisioning adequate resources. This issue has become even more evident in recent years when most of the process of teaching-learning, became digitalised by cause of pandemic scenario. As divulged by Akram *et al.* (2022, p.8), technology integration and virtual learning are significantly hindered by the lack of resources and subsequent changes in teachers' perspectives regarding digital education. In the present scenario, some of the most common external impediments include poor teacher training, lack of timely technical support, poor access to technological resources and inefficient administration.

Past research highlights first-order hurdles to be the main impediments to integrating technology in education. For instance, the research of Rahiem (2020, p.6125) points out that the ability of teachers to use a particular technology is often constrained by issues in internet connectivity or technical issues in the available computer equipment. In a special education scenario, these issues can cause a major hindrance in effectively engaging with special needs students who require patience and proper understandability from the teachers' end. In recent years, most educational institutions have addressed these external hindrances by focusing on improving internet bandwidth and wireless connectivity within buildings and taking on initiatives for "one-to-one computing" (Tawfik *et al.* 2021, p.926). However, while these initiatives have greatly decreased the physical obstacles in schools and educational institutions, first-order barriers still remain a major obstacle in a home-based scenario where teachers communicate through a virtual medium. As such, the education setting is still in dire need of changes in external resource considerations for technology-oriented learning in terms of student support, special education networks, online mentorships and professional teacher training strategies.

Considering the second-order barriers or internal impediments, the primary evidence points out those teachers do not prefer to show much reluctance to the technology within special education; even those with more years of experience showed a positive outlook towards technology integration. However, it has been observed significantly that the participants selected for this particular study are mostly at their young age and they are aged between 25 and 35 years. Hence, it is debatable whether the older group of teachers show the same extent of agreeability regarding technology integration. Regardless, it is important to discuss some essential intrinsic barriers that are common among all groups of teachers and can result from external hindrances. Oftentimes, individual dispositions and attitudes regarding how technology needs to be used in classrooms are worsened by a dearth of training assistance or administrative support (Tawfik *et al.* 2021, p.927).

Considering the fundamental differences between digitalised education and traditional classrooms, intrinsic obstacles are likely to surface in a variety of ways. In a special education setting, these obstacles could significantly affect the way students view the functionality and benefits of technology in classrooms.

CONCLUSION

The study has focused on investigating the perspective of teachers of special education regarding incorporation of the technology in education, as well as, analysing their understandability. Information and communications technology have become an integral part of modern education and governments across the globe are prioritising digital education. Considering the special education sector, **“the Individuals with Disabilities Education Act”** protects rights of the special needs students to access “appropriate public education”. Technologies being a key component of modern education, initiatives are being taken to improve the teaching-learning process of special needs students. It has been gathered that advancements in the technological domain indicate a greater potential for teachers to communicate verbally as well as non-verbally with special needs students and effectively engage with them. The focus of this research paper has been on understanding perspectives that teachers possess with reference to technology integration and various hindrances they face in shifting completely towards a technology-driven classroom.

Linking with the objectives

The primary objective possessed by this study refers to the investigation of the significance of technology in education and learning during teachers’ training. Based on the discussion so far, it has been gathered that technology has a pivotal role to play in building a teacher’s internal construct and can significantly change their outlook on digital learning.

The second objective was to pinpoint the various factors affecting teachers’ acceptance and understanding of technology. It has been observed that teachers who receive inadequate education and training regarding technology-oriented instructions are less likely to show enthusiasm in adopting technology in the classroom. These internal issues often stem from external hindrances such as a lack of access to technology during the training phase, poor connectivity issues and insufficient technical support. All of these factors can exacerbate an individual’s attitudes towards using technology in the classroom setting.

The third objective of this research was to analyse how teachers perceive technology integration in special education. Past research highlights that teachers with greater years of experience in teaching are likely to show negligence in adopting advanced teaching methods. However, empirical evidence suggests that most teachers in the special education segment showed a positive outlook towards implementing technology to improve special teaching. Regardless, it is vital to observe that participants selected from

this specific study are mostly young. There was limited evidence regarding how the older group of teachers viewed the usefulness of technology in special education.

The fourth objective was to specify the key hindrances affecting technology integration in special education settings based on teachers' viewpoints. To address this, the selected sample of this study was asked whether they faced some obstacles in making the maximum use of technology in special education classrooms. Empirical evidence suggests that a considerable number of teachers are facing obstacles in effectively incorporating technology. The research highlights that extrinsic impediment such as poor administrative support, limited availability of resources; connectivity and tech-support inefficiency are the major hindrances to pepper technology integration in classrooms.

Recommendations

Based on the discussion so far, the following possible solutions can be considered to improve technology integration in special education:

- Schools need to have clear policies regarding new changes and communicate them transparently with the teaching faculty.
- Teachers need to be given autonomy and space to decide directions to problems.
- Connectivity and technological support need to be improved.
- Access to technology, tools and software needs to be improved using standardised platforms, stable internet connections and communications with special needs students' caregivers.

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