

Open, Adapt, and Achieve Digital Doors to Learning: Exploring How E-Learning Platforms and Professional Growth Transform Learning for Students with Special Needs

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ABSTRACT

Aim of the Study: This study examines the integration of e-learning platforms for students with special needs in educational settings and how professional development training of educators, therapists, or other professionals influences the effective utilization of e-learning in the classroom for students with special needs.

Methodology: Through a systematic sampling technique, a sample of 250 special needs educators, therapists, or related professionals with a minimum of 3 years of experience in the field was selected. Self-constructed questionnaire based on 20 items on a 3-point Likert scale: 'yes', 'no', and 'to some extent', and its reliability was found to be very strong (Cronbach's Alpha = .844).

Findings: The study found that a significant difference was found in the academic performance and inclusivity of students with special needs with the integration of e-learning in academic settings, and the availability and participation of the educators, therapists, or other professionals in various forms of professional development positively influence the effectiveness of the incorporation of e-learning for students with special needs.

Conclusion: The study concludes that e-learning holds significant promise in enhancing academic outcomes and inclusivity for students with special needs and emphasizes equitable access to technology and training to fully harness the potential of e-learning for educators, therapists, or other professionals. Professional development, which is crucial to equip educators with the necessary skills to effectively use e-learning tools in special education, should be supported by upper management, policymakers, stakeholders, and the government.

Keywords: E-learning, Digital Learning Platforms, Accessibility, Technology, Students with Special Needs, Professional Development, Training.

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1. INTRODUCTION

With the rapid expansion of cyberspace, e-learning has become an essential means of imparting knowledge in educational settings worldwide (Elfaki et al., 2019). Nowadays, technology has significantly enhanced our lives in numerous areas, particularly in academics. E-learning has gained global recognition in the last few years. The incorporation of interactive media advancements and the internet in education has been perceived as a method of improving accessibility and the standard of imparting and acquiring education (Rehman et al., 2023). The widespread applications of e-learning have made significant changes in academic learning by making it easier for students and educators to attain knowledge (Bogdanova et al., 2024; Rabelo et al., 2024). The term e-learning is comparatively young, and countless other terms are used to express the aforementioned. For example, computer conferencing, virtual learning, web-based learning, open learning, blended learning, distributed learning, and flexible learning (Mustafa, 2021; Ullah et al., 2023; Shahid et al., 2024). So, there is an important role of e-learning in any field of education for students as well as for educators.

The integration of e-learning in special needs education marks a significant shift from traditional teaching methodologies, which often struggle to accommodate the diverse needs of students (Saleem & Sajjad, 2016). Historically, these conventional approaches limited accessibility and inclusivity, leaving many learners underserved. However, the advent of e-learning has opened new avenues for personalized and flexible education, enhancing the learning experiences for students with disabilities. This study aims to explore the effectiveness of e-learning platforms, assess the challenges faced by educators, and highlight strategies for improving educational outcomes in special needs settings. By focusing on this evolving landscape, the research seeks to contribute valuable insights into the future of inclusive education.

The ongoing dispute between modernization and traditionalism in education has reached an impasse. No educational institution strictly adheres to one philosophy, as each is influenced by the other (Alanazi et al., 2023; Rabelo et al., 2024). Schools are now adopting a hybrid of approaches, integrating elements from both philosophies. Despite this, it is essential to recognize that while the traditional method was effective for students in the past, it no longer caters to the diverse needs of 21st century learners, including those in special needs education (Warsi and Rani, 2024; Chinyere, 2024; Elfaki et al., 2019) who require tailored approaches and innovative interventions to thrive academically and socially (Rehman & Sajjad, 2024). However, in some circumstances, the traditional educational paradigm now fall short for contemporary learners in addressing their diverse needs (Rabelo et al., 2024; Imran et al., 2025; Safdar and Khan, 2020).

As educational discourse reached the crossroads between both methods, traditionalism and modernization, it became important to blend traditional wisdom with modern methodologies through prioritizing adaptability and inclusivity in their teaching and learning process (Sajjad et al., 2019). Similarly, Fülöp et al. (2023) mentioned in their study that support is needed to ensure all learners' needs and opportunities to succeed in an ever-changing world. However, it was observed that the traditional educational paradigm was no longer adequate in addressing the diverse needs of 21st-century students (But et al., 2020), once effective for a more homogeneous student population (Anastasiou et al., 2024). Moreover, Utomo (2021) and his colleagues demonstrated that the inclusion of both methods covered special needs learners across a spectrum of abilities who required innovative interventions and a tailored approach (Andajani & Wijastuti, 2020). Consequently, educational institutions began implementing a fusion approach that blended both philosophical elements to integrate innovative strategies and cater to the evolving needs of all learners (Mustafa, 2021). The adoption of modern e-learning is a remarkable change that represents a pivotal moment in educational literature and emphasizes the importance of adaptability and inclusivity to foster academic success (Alanazi et al., 2023; Bogdanova et al., 2024).

The current study highlights the role of e-learning in special needs education in determining the integration of different e-learning platforms in educational settings. Further, the availability and participation of educators in various forms of professional development influence the effectiveness of incorporating e-learning for students with special needs. Through a comprehensive exploration, this

research seeks to contribute actionable knowledge that will guide the integration of e-learning effectively, creating an enhanced educational experience for teachers, professionals, and students with special needs. In contrast, the study highlights the knowledge and usage of e-learning in the field of special education.

1.1 Scope

In Pakistan, to meet the demands of time, the special education system faces an arduous challenge in updating its teaching methodology. Many educators and professionals working with students with special needs heavily rely on traditional methods over modernized teaching, e-learning in particular. This reluctance to use e-learning tools and strategies greatly deprives students of the benefits they have to offer. For this reason, it is of extreme importance to explore the hindrances to the incorporation of e-learning and to come up with strategies and suggestions to promote its usage. The study findings may highlight the importance of e-learning, its awareness, and training for educators, therapists, or related professionals to use it in the field of special and inclusive educational settings. Furthermore, the study will be helpful to promote continued professional development among professionals in the field. Additionally, the study will be helpful for IT developers to develop need-based technologies, and stakeholders and educational management will gain awareness for providing and updating professional development training for e-learning.

1.2 Research Gap

A limited number of empirical studies in developing countries like Pakistan exist in the literatures that focus only on the integration of e-learning platforms specifically for students with special needs. In developing countries, few studies have focused on a comprehensive model of learning for students with special needs that combines e-learning with the traditional approach of teaching, e.g., Alanazi et al. (2023) and Meskhi et al. (2019). Besides, limited literature exists on how professional development training directly affects the effective use of e-learning tools in special education settings, such as Shahzad et al. (2023). No literature exists on the professional development of educators dealing with students with special needs. It is also worth noting that there was a gap in understanding the impact of e-learning on academic performance and inclusivity for students with diverse disabilities. Moreover, minimal research on the perceptions and readiness of special educators, therapists, and related professionals toward digital learning platforms was observed. Additionally, few studies have offered strategies to promote ongoing professional development for inclusive digital teaching practices, such as Alanazi et al. (2023). There is a need to develop an understanding of context-specific challenges and solutions related to e-learning integration in Pakistan's special education system.

2. RESEARCH METHODOLOGY

The study population for this quantitative descriptive study consisted of special needs educators, therapists, and related professionals who deal with students with special needs. The research philosophy aligns with 'positivism' that emphasizes objective measurement, data collection, and the belief that the social world can be studied with observable facts and relationships in the same way as the natural world.

2.1 Sample Size

The sample size consisted of 250 special needs educators, therapists, or related professionals who were selected through a systematic sampling technique, with the criterion that a minimum of 3 years of experience in the field was required.

Table 1: *Demographic Characteristics of the Participants (N=250)*

		N	%	M	SD
Gender	Male	55	22	1.22	.415
	Female	195	78		
Age	18-24 years	40	16.0	2.39	.825
	25-34 years	87	34.8		
	35-44 years	110	44.0		
	45-54 years	12	4.8		
	55-64 years	1	.4		
Years of Experience	3 – 4	104	41.6	2.76	.739
	5 – 6	105	42.0		
	7 – 8	39	15.6		
	9 – 10	2	.8		

2.2 Research Instrument

The tool for this study was self-constructed by the researcher based on the objectives designed for this study. There were 20 items in the questionnaire in addition to the demographic characteristics. The tool was divided into 2 sections: the first section highlighted the utilization of e-learning among special needs educators and professionals associated with special needs education (12-items), and second section was based on the professional development acquired by educators and professionals for the successful incorporation of e-learning and asked for strategies for promoting training in its usage (8 items), on 3-point Likert scale from yes, no, to some extent. The questionnaire's reliability was assessed using the internal consistency measures to ensure the reliability of the questionnaire, which was found to be strong (Cronbach's Alpha = .844).

2.3 Data Collection

The questionnaire was easily accessible online through Google Forms, which was shared with the different participants by the researcher. The researcher strictly followed the ethical guidelines during data collection and kept the records confidential.

3 FINDINGS

3.1 Research Question 1: *Does the integration of different e-learning platforms in educational settings impact the academic performance and inclusivity of students with special needs?*

Table 2 demonstrates the descriptive statistics of the impact of e-learning on the academic performance and inclusivity of students with special needs. The table represents the items (12 items) in tools regarding the incorporation and perceived effectiveness of e-learning tools and strategies. Results indicate that the majority of the participants answered 'No' (50.26%) to incorporate e-learning for special needs students as compared to 'Yes' (36.6%) and 'to some extent' (13.13%), with the mean score of 1.7 and SD = .606. However, the responses specify a positive perception of e-learning's impact on special needs students. The majority believe that e-learning improves academic performance (60.4%), helps in increasing engagement (56.8%), has potential for personalized learning opportunities (31.2%), and has the ability to track individual progress (49.6%). While many recognize its potential for academic success and engagement, variability can be seen in the adoption and awareness of diverse platforms. A significant number are yet to fully embrace e-learning or explore alternative tools beyond mainstream platforms like

Google Classroom or YouTube (7.2% using others, 11.2% aware of alternatives).

Table 2: *Descriptive Statistics of the Usage of E-Learning in Academic Settings*

Questions	Yes	No	To some extent	M	SD
1 Incorporate e-learning tools and strategies for your special needs students/clients.	76 (30.4%)	96 (38.4%)	78 (31.2%)	2.01	.786
2 The use of e-learning increases the rate of success of students with special needs	73 (29.2%)	150 (60%)	27 (10.8%)	1.82	.606
3 The use of e-learning improves the academic performance of students with special needs	151 (60.4%)	77 (30.8%)	22 (8.8%)	1.48	.654
4 The use of e-learning increases student engagement	142 (56.8%)	102 (40.8%)	6 (2.4%)	1.46	.545
5 The use of e-learning provides personalized learning opportunities for special needs students	78 (31.2%)	136 (54.4%)	36 (14.4%)	1.83	.655
6 The use of e-learning offers better tracking & monitoring of individual progress	124 (49.6%)	112 (44.8%)	14 (5.6%)	1.56	.600
7 Use of e-learning increases the level of support for students with special needs	96 (38.4%)	121 (48.4%)	33 (13.2%)	1.75	.674
8 The use of E-learning creates a more inclusive environment	105 (42%)	119 (47.6%)	26 (10.4%)	1.68	.653
9 The use of e-learning increases interaction and collaboration among students	92 (36.8%)	97 (38.8%)	61 (24.4%)	1.88	.774
10 The use of e-learning accommodates various learning styles by offering a flexible and adaptable learning environment	115 (46%)	90 (36%)	45 (18%)	1.720	.7509
11 Have you incorporated e-learning platforms other than Google Classroom, Microsoft Teams, YouTube, or Zoom for teaching students with special needs?	18 (7.2%)	219 (87.6%)	13 (5.2%)	1.98	.352
12 Are you aware of e-learning platforms other than Google Classroom, Microsoft Teams, YouTube, or Zoom for teaching students with special needs?	28 (11.2%)	189 (75.6%)	33 (13.2%)	2.02	.495
Total	1098 (36.6%)	1508 (50.26%)	394 (13.13%)	1.7	.606

Research Hypothesis 1 (H₁): A significant difference exists in the academic performance and inclusivity of students with special needs with the integration of e- learning in academic settings.

Null Hypothesis (H₀): There is no significant difference in the academic performance and inclusivity of students with special needs with the integration of e- learning in academic settings.

The results of the chi-square test indicate that there is a strong association between the usage of e-learning in academic settings regarding academic performance and inclusivity of students with special needs (Table 3). The Pearson Chi-Square value of 181.370 with 68 degrees of freedom yields an extremely low *p*-value of .000, suggesting a strong association between the variables. Therefore, the findings reject the null hypothesis and support the research hypothesis that there is a significant difference exists in the academic performance and inclusivity of students with special needs with the integration of e-learning in academic settings.

Table 3: Chi-Square Test for the Usage of E-Learning in Academic Settings

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	181.370 ^a	68	.000
Likelihood Ratio	123.806	68	.000
Linear-by-Linear Association	43.641	1	.000

a. 74 cells (82.2%) have expected count less than 5. The minimum expected count is .00.

3.2 Research Question 2: Do the availability and participation in various forms of professional development influence the effectiveness of incorporating e-learning for students with special needs?

Table 4 presents descriptive statistics related to the lack of training of special needs educators and therapists regarding e-learning platforms. The majority of the participants (71.6%) responded ‘yes’ to the statements, while 28.4% of respondents responded ‘no’. Overall mean scores observed for this professional development among participants were $M = 1.37$ with $SD = .414$. However, the majority (92%) expressed strong belief in collaboration with special education associations to enhance awareness and knowledge about e-learning, offer incentives to teachers for training participation (86%), on comprehensive workshops and webinars (80.8%), and collaboration with e-learning platforms (79.6%). However, 10.4% reported receiving formal training or professional development on this topic.

Table 4: Descriptive Statistics of E-learning Professional Development

Questions	Yes	No	M	SD
1 Have you received any formal training or professional development related to incorporating e-learning?	26 (10.4%)	224 (89.6%)	1.90	.306
2 Do you believe comprehensive workshops and Webinars should be developed to increase knowledge- based on training about e-learning?	202 (80.8%)	48 (19.2%)	1.19	.395
3 Do you believe collaboration with Special Education Associations should be made to increase knowledge- based on training about e-learning?	230 (92%)	20 (8%)	1.08	.272
4 Do you believe Online Resources should be created to increase knowledge-based training about e-learning?	176 (70.4%)	74 (29.6%)	1.30	.457
5 Do you believe social media Campaigns should be started to increase knowledge-based training about e- learning?	192 (76.8%)	58 (23.2%)	1.23	.423
6 Do you believe collaboration with universities should be made to increase awareness and training about e- learning?	192 (76.8%)	58 (23.2%)	1.23	.423
7 Do you believe collaboration with e-learning platforms should be made to increase awareness and training about e-learning?	199 (79.6%)	51 (20.4%)	1.20	.404
8 Teachers should be offered incentives for participating in training related to e-learning?	215 (86%)	35 (14%)	1.14	.348
Total	1432 (71.6%)	568 (28.4%)	1.37	.414

Research Hypothesis 2 (H₂): The availability and participation in various forms of professional development positively influence the effectiveness of incorporating e- learning for students with special needs.

Null Hypothesis (H₀): The availability and participation in various forms of professional development have no influence on the effectiveness of incorporating e- learning for students with special needs.

The result of the ANOVA test in Table 5 indicates that the e-learning professional development among professionals showed significant results ($F(4, 245) = 5.477$) at the .000 level ($p < .001$). It shows that there is a significant difference in e-learning professional development among professionals across various groups, and the variation in mean scores between groups is statistically significant. This suggests that factors such as different types of professional development or levels of engagement may have influenced the participants' e-learning training outcomes.

Table 5: ANOVA Test for E-learning Professional Development among Professionals

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	64.470	4	16.117	5.477	.000
Within Groups	721.034	245	2.943		
Total	785.504	249			

4 DISCUSSION

By gauging the findings presented and measured above, this study places special educators and other professionals catering to students with special needs in a pivotal position, where their perspectives are a means of insight. It reveals that personalized resources, flexible learning environments, a comprehensive teaching approach, and interactive tools within e-learning platforms can cater to individual needs, thereby promoting inclusivity and improving students' learning outcomes. The increasing demand and importance of e-learning integration for students with special needs not only highlight its effectiveness for students with special needs but also showcase some challenges for students, educators, and other administrators. The use of e-learning can be an effective option for meeting global education standards and achieving better educational outcomes. A systematic review conducted by Al-Taweel (2024) demonstrates how various e-learning platforms can positively impact learning outcomes through engagement, motivation, and academic performance. In this regard, the importance of proper professional training is essential because it advocates the integration of e-learning in special education to support the diverse needs of all learners. Similarly, Basham and Lu (2021) emphasized a tailored approach to meet the diverse needs of all students, specifically focusing on e-learning, which has many benefits and positive educational outcomes. Whereas Çakiroglu and Aydin (2021) presented a meta-analysis on distance education through e-learning platforms, they highlighted the benefits of distance education on academic achievement among students with special needs through technology-based learning. Collectively, these studies not only provide valuable insights into effective practices but also the ongoing challenges faced in the integration of e-learning by educators, therapists, or other professionals. However, the results from the literature indicate a largely positive perception of the impact of e-learning on the educational model for students with special needs, in spite of the low adoption rate. Among students with special needs, to improve academic performance, e-learning garners greater engagement in lessons, and personalized learning opportunities are clear benefits of the e-learning model. Thus, the current and previous studies provide evidence that e-learning integration significantly affects the academic performance, educational outcomes, and inclusivity of students with special needs.

Similar to the current study, Deveci Topal et al. (2023) studied the effects of e-learning on students with intellectual disability and found that the integration of e-learning tools contributed to improvements in academic performance. The same study also measured and found better student engagement when e-learning was integrated into the lesson, and the participating students expressed a desire for more technological involvement in their education.

Reyes et al. (2023) examined a sample of students with sensory as well as cognitive disabilities and found that academic success was attributable to the provision of greater accessibility from the technology as well as the professionals in charge, the support systems in the form of assistive technologies and psychological and emotional support, socialization among peers via online platforms, and inclusivity practices implemented by the educators. The findings of both of these studies further solidify the results of the current

research, which also prove a significant impact of e-learning as a tool in the special education process.

The study findings reveal that the professional development programs significantly promote e-learning utilization by special education professionals. Many participants stated that collaboration with Special Education Associations, universities, and organizations that develop and maintain e-learning platforms is justified. The findings also suggest that training and acquisition of e-learning skills should be incentivized more heavily than they presently are. This is likely a representation of a lack of incentives as well as a lack of acceptance towards e-learning felt by professionals in the field.

Heng and Sol (2021) stress the effectiveness of pre-service training of staff as an asset to ease adaptation to the e-learning atmosphere, while Zamarripa (2022) highlighted the sparseness of training provided to teachers as they transitioned to e-learning in even the most developed societies of the world. The findings yielded by these studies, and the results of the paper in question, all contradict the null hypothesis and answer the research question with proof of the need and effectiveness of professional development measures where and when e-learning is to be incorporated into special education.

Sound and interesting reasoning is provided by Smith et al. (2022), whose work can be used as scientific proof that technology and digitalization are not the only aspect that contributes to pedagogical challenges in e-learning in special education. The paper emphasizes that the element of inclusivity is capable of inducing significant conscious or unconscious resistance within professionals in the field. It cites a narrowness in general educator training programs and the absence of sensitive and caring teaching styles as the causes. However, a contradictory finding is stated in the literature review conducted by Cheng and Lai (2020), that computer-assisted instruction of disabled students is adapted by teachers without much difficulty. This conclusion, discrepant to the papers already discussed, reflects an ease of e-learning use that may be attributed to differently-modeled teacher training programs in the Republic of China (Ghali & Amari, 2024), as well as other factors such as relatively younger ages of teachers as well as students, a limitedly-diverse student body (Chen, et al., 2020; Hakimi et al., 2024), and availability of technicians and teaching resources (Rehman et al., 2024; Zhou et al., 2024).

The professional community of special educators as well as larger administrative bodies and policy makers concerned with education and inclusivity are advised by the current study and cited works to take note of the required professional development as well as training techniques that produce professionals who are apt educators of students with special needs and able operators of e-learning platforms and tools.

Hybridization of the e-learning education model with existing special needs education models can become a challenge without proper planning. The following are steps scientifically proven to make the use of e-learning for students with special needs maximally fruitful: Teachers should use e-learning platforms that are designed with universal design for learning (UDL) principles and prioritize accessibility features so that students can have multiple means of expression and engagement. Make assistive technologies available for students, allowing them to access tailored content based on individual needs, which is also highlighted by Nardacchione and Peconio (2022). Present information through a variety of formats, including text, images, audio, gamified elements, videos to support different learning styles and accommodate special needs students, as also highlighted by Saleem et al. (2019). Equip schools to provide professional training to educators to familiarize them with various e-learning domains and the use of assistive technology (Sajjad, 2007). Mention specific accommodations and modifications within the child's Individualized Learning Plan to ensure full participation (Mustafa, 2021). Foster an inclusive learning community by the implementation of online collaboration tools to support communication among students, educators, and parents (Nardacchione & Peconio, 2022).

5 CONCLUSION

Despite the low adoption rate, there is a positive perception of e-learning's impact on academic performance and engagement among students with special needs, with numerous advantages acknowledged by most. Classrooms with extended capabilities, with accessibility options to bypass

sensory deficits, increased engagement and interactivity, and flexible pacing and scheduling are enough to make a traditional classroom exponentially more desirable, let alone one that can be accessed from the comfort of one's own room. But alongside the benefits, challenges such as communication barriers, dependency on technological variables often out of the operators' hands, and a lack of professional development require thoughtful planning for the future. As a vital part of our preparation for the future, equitable access to technology must be ensured by the educational management to achieve better educational standards. By this means, with regular professional development, educators, therapists, and other professionals can be sufficiently equipped to leverage e-learning to usher in a new era of inclusivity and revolutionize the field for the betterment of society. Though in special needs education, the potential for e-learning is evident, recognizing this potential requires an intensive effort to overcome prevailing barriers. By addressing the challenges and fostering an environment conducive to e-learning, stakeholders and educational management can enhance the educational experiences of students with special needs, which ultimately improves learning outcomes in the educational landscape and encourages inclusivity.

6 RECOMMENDATIONS

The following few recommendations can improve the level of incorporation of e-learning in the domain of special needs education, in light of the current study's findings. It is recommended that professional development training programs be provided to special needs educators, therapists, and other professionals working with students with special needs so that they can develop and enhance their skills in integrating e-learning. Implement comprehensive training programs that focus on effective e-learning strategies, assistive technologies, and methods to engage students with diverse learning needs, and facilitate training on how to manage IT challenges. Ensure that special needs educators have access to the necessary technology and resources, for example, hardware, software, and reliable internet connections to facilitate e-learning in classrooms. Encourage collaboration among different stakeholders, curriculum developers, special educators, therapists, and technology experts to create adaptable and inclusive online learning materials to foster e-learning. This will ensure that content is relevant and accessible for students with diverse needs in special education. Besides all this, all educators can access the latest resources and practices and have a chance to share knowledge and collaborate by ensuring their participation in the special education associations. This partnership should be made with middle schools, high schools, and universities for future collaboration.

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