ONLINE LEARNING: A 21st CENTURY APPROACH TO EDUCATION

WITH SPECIFIC EMPHASIS ON E- LEARNING PLATFORMS WITH

REFERENCE TO INDIA

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ABSTRACT

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ABSTRACT

Online learning, particularly in the twenty-first century, has become a significant paradigm shift in education, introducing new techniques of teaching and learning. The goal of this study is to investigate the situation of online education in India, with a focus on e-learning platforms. The research conducts a detailed investigation of the issues students have while using these platforms, the variety of online course topics, the competitiveness of e-learning platforms, the benefits of online learning, and ways for overcoming the challenges these platforms face.

With the success of online learning as the dependent variable, the study employs a mixed-methods approach that includes surveys, interviews, and a literature review to investigate the relationship between independent variables such as the difficulties in implementing e-learning platforms, their efficacy, the benefits of online learning in the modern world, and the impact of e-learning platforms on the quality of education in India.

The findings reveal that, although there are still challenges to overcome, such as infrastructural shortages and technological limitations, e-learning platforms have enormous potential for enhancing student outcomes. The study stresses how important it is to understand and address these difficulties in order to maximize the benefits of online learning. Stakeholders such as lawmakers, educators, and platform developers are offered advice on how to create an environment that would promote the growth and effectiveness of online education in India.

This research contributes to the existing body of knowledge by providing light on the nuances of online learning in the Indian context and giving practical recommendations for addressing challenges and utilizing the potential of e-learning platforms to alter education in the twenty-first century.

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CHAPTER I: INTRODUCTION

1.1 Overview

The first COVID-19 cases were verified by the Ministry of Health (MOH) on January 25, 2020. As reported by Berita Harian (2020), three individuals of Chinese nationality arrived in Malaysia via Johor after departing from Singapore. The World Health Organization (WHO) declared COVID-19 a global public health emergency on January 30, 2020, five days after.

The WHO declared the illness to be a pandemic on March 11, 2020. Malaysia will enforce Phase 1 of the Conditional Movement Control Order (CMCO) from March 18 to March 31, 2020, in order to address the global spread of COVID-19. Six more CMCO stages have recently been added, starting on September 1, 2020, and ending on December 31, 2020. All childcare centers, private and state schools (including boarding schools, daily schools, and international schools), tahfizcenters, and other elementary, secondary, and post-university educational facilities were shut down on March 18, 2020. Every public and private higher education facility in the country as well as skill training facilities were impacted by these closures. Even though all of these establishments have reopened after the CMCO period ended, the COVID-19 outbreak in various states has forced the closure of educational facilities once again. Among them were Johor, Sabah, Sarawak, Kuala Lumpur, Putrajaya, Selangor, and Negeri Sembilan. The closures inevitably impact the day-to-day functioning of educators, students, and other individuals affiliated with educational institutions nationwide. Traditional in-person teaching, a long-standing tradition, had to be suspended during the CMCO era. Due of the uncertainty surrounding the end date of the epidemic, educational institutions worldwide have implemented online courses to ensure students may pursue their studies remotely. Multiple studies have examined the efficacy of online learning, including the challenges and constraints that students may face. Noteworthy examples of studies were undertaken by Muhammad and Kainat (2020), Awal et al. (2020), Irfan and Iman (2020), Hazwani et al. (2017), and Nurul Haidah et al. (2020).

Irfan and Iman (2020) argue that online learning is unproductive and needs proper implementation. The authors show this by mentioning various difficulties, such as poor internet access, teachers' failure to successfully utilize online training, and parents' limited engagement. Awal et al. (2020) discovered that online learning is effective but lacks efficiency. However, the high expense of getting sufficient internet packages limits the attainment of learning

objectives. In addition, Wildana et al. (2020) say that online learning delivers benefits by simplifying the usage of numerous software tools such as "WhatsApp," "Zoom," and "Google Classroom." However, Wildana et al. (2020) acknowledge that the availability of internet packages and access can impede the efficiency of online learning. According to research done by Muhammad and Kainat (2020), challenges linked to internet connection, a paucity of technical resources, and restricted contact between professors and students all impair the usefulness of online education. Research done by Hazwani et al. (2017) found that the infrastructure of an institution plays a key role in influencing the efficacy of its online programs. Inadequate infrastructure will restrict the internet accessibility of pupils. The success of online learning is also determined by the attitudes of the students. In the world of online learning, the existence of inattentive learners is a serious challenge that requires attention from all parties involved. Nurul Haidah et al. (2020) concur with the premise that students should take advantage of the chance to study, better their social skills, and improve their capacity to adapt to new technologies.

According to the research, there are particular conditions in which online learning is helpful. However, there are still impediments and problems in integrating online learning. Noted are the following factors: the expense of internet packages, challenges with technical infrastructure, the lack of internet connectivity in educational institutions, residential areas, and the attitudes of students. Enhancements to the current infrastructure are required in order to solve concerns and increase the effectiveness of students' online learning. Consequently, all persons affected, notably teachers and learners, must adjust to this new criteria. This flexibility is characterized by the ability to adjust one's existing conduct in reply to a new environment. Instructors and students should endeavour to develop their technical literacy in order to efficiently manage their academic obligations, regardless of their personal preferences. This is particularly vital while acquiring knowledge about novel methodologies for educational technology. This research analyses the usefulness of online education and discusses the obstacles it offers for students' learning in consideration of these concerns.

1.1.1 COVID-19 and its impact on online learning

The novel coronavirus (COVID-19) attacks the immune system and has the potential to result in death. The virus's fast dissemination might induce worry in individuals, resulting in

psychological consequences including breathlessness and light-headedness (Harrison, 2018). It has impact over the lives of people in general and affected the daily life also. In this chapter the impact because of Covid-19 on the education and e-learning importance has been understood and evolution of e-learning in India has been assessed.

1.1.2 Online Learning

E-learning refers to the use of digital technology to deliver educational training. These tactics employ numerous multimedia components such as visual graphics, text, animations, videos, and music. Furthermore, digital pedagogy may enable collaborative learning and the guidance of professors specialized in certain domains. According to this research, online learning is defined as the teaching process that happens between teachers and students on a variety of digital platforms, including "WhatsApp," "Zoom," and "Google Classroom." Moreover, online education encompasses more than just classroom instruction. Every task or exercise that a teacher assigns online is considered to be a part of online learning. According to Ratheeswari (2018), information and communications technology (ICT) usage in the digital era aids students in learning and applying the skills necessary for the twenty-first century.

Moreover, online learning is the optimal platform to guarantee the uninterrupted progression of students' education during the COVID-19 epidemic. Pusvyta Sari, (2015), online learning is a pedagogical option that is suitable for the current period of technology advancement and communication, and students must adjust to it. Mat Dawi et al., (2016), the promotion of technology-based and online learning has significantly increased throughout the era of globalization and the growth of information and communication technology (ICT). Efficient educational processes need creative management and continuous innovation to enhance teacher-student engagement. Through online interaction, teachers and educators maintain connectivity with their pupils, even while they are physically separated. Technology-based teaching and learning strategies should be used in schools and other institutions by both public and private businesses. The implementation of these strategies need to align with the guidelines for digital learning, and participants ought to engage in ongoing communication without requiring face-to-face interaction. It is important to use different educational technologies to foster student engagement and address any disparities in learning experiences between online and in-person settings.

When new technologies are integrated into the education industry, distance learning makes it possible for knowledge and information to be sent globally. She contends that since online learning makes self-directed learning more effective, it is essential. Students are free to choose the length, content, and direction of their education. Pupils are given the opportunity to go over challenging material once more until they are confident in their understanding. Additionally, studying online gives students the chance to do it in a safe environment where asking questions is not frowned upon.

As to Harrison (2018), young children have the ability to see images and videos, use the 'Youtube' platform, and engage in interactive games and age-appropriate online apps. It is clear that Gen Z and Y have the greatest experience and understanding of ICT resources, which makes it easier for them to utilize online learning.

According to Fauziana (2020), to improve their comprehension, students might choose to revisit the teacher-provided recordings of their classes, obtain information from books, or use the internet.

Both educators and students have the ability to engage in two-way communication by exchanging messages using various platforms such as chat columns, 'Whatsapp', video calls, or phone calls during a lecture. Through Education TV on DIdikTV channels, students may edit their lessons. Students who want to sit for the Form 5 Malaysia Certificate of Education (SPM), Form 3 Assessment Test (PT3), and Standard 6 Primary School Assessment Test (UPSR) can particularly benefit from this.

1.1.3 Theory of Planned Behaviour

Ajzen (2002) presents the Theory of Planned Behaviour, which elucidates the connection between beliefs and the desire to engage in certain behaviors. This theory has gained significant acceptance in elucidating the process of behavior formation across several domains, such as education. Among the most important factors influencing behavioral intentions are attitude, perceived behavioral control, and subjective norm. In general, attitude refers to interpersonal relationships or experiences that shape a person's propensity to pursue a certain behavioral goal.

According to Pasani, Amelia, and Hassan (2020), acceptability of technology use in education is greatly influenced by an individual's attitude toward it. Undoubtedly, the shift from traditional classroom instruction to virtual learning has given students direct exposure to using technology as a teaching tool in the face of the pandemic.

Consequently, their disposition may result in a propensity to use technology for educational purposes. Perceived behavioral control, on the other hand, pertains to an individual's subjective assessment and understanding of their capacity to engage in certain behaviors. Perceived ease of use and perceived usefulness are the two elements that drive the integration of technology to improve organizational performances, according to Davis (1989).

If students think that the technology is both user-friendly and beneficial for their learning, this will result in the enhancement of their perceived behavioral control.

Subjective norm pertains to an individual's perception of a certain behavior, influenced by the viewpoints of others. Hence, the subjective standard is influenced by the individual's immediate surroundings or social milieu. Students' perceived behavioral control will increase if they believe that the technology is both easy to use and helpful for their education.

Nevertheless, some studies dispute the correlation between one's environment and their inclination to use technology. When it comes to identifying behavioral intention about the usage of online learning, subjective norm plays a crucial role. Shiue (2007) and Eksail and Afari (2020) both agree that there is little to no environmental impact on a person's motivation to use technology.

Within the realm of online education, these aforementioned elements significantly influence students' inclination and willingness to use technology for their learning. When students possess a favorable disposition, a sense of control over their actions, and are in supportive environments, their purpose to fully use technology will enhance the effectiveness and significance of their learning.

1.1.4 Pupils' Perspective on Online Learning

An individual's conduct is greatly influenced by their attitudes. As opposed to negative attitudes, which always result in poor conduct, good attitudes always result in positive behavior (Hazwani et al., 2020). This realization is consistent with how students engage with online

learning, or e-learning. Scholars endeavor to understand the benefits and difficulties faced by various e-learning stakeholders.

Various research have emphasized the difficulties and advantages linked to e-learning throughout the epidemic. This realization is consistent with how students engage with online learning, or e-learning. Scholars endeavor to understand the benefits and difficulties faced by various e-learning stakeholders. As to Mailizar et al. (2020), the incorporation of the student's viewpoint is a crucial component to take into account in this specific scenario. Therefore, more research is necessary to determine the barriers that prevent students from achieving their goals. According to a research by Hazwani et al. (2017), students' attitudes have an effect on how effective e-learning is. As a result, motivated and upbeat students won't see e-learning as a barrier to their academic success. Students saw notable distinctions between conventional and online learning, according Adnan's (2020) study.

Moreover, students expressed the belief that in-person instruction is essential for optimal learning outcomes, and they found collaborative tasks challenging to do in an online setting. According to Hazwani et al. (2020), not all companies and students have a preference for e-learning. It is essential to comprehend the major factors influencing the usage of e-learning in order to optimize its utilization and effectiveness. Users that utilize e-learning must be more self-motivated in order to learn. The findings of earlier study are supported by Surjono et al. (2015), who claim that e-learning may provide a flexible and widely available learning system. Since they are not required to be present at a certain location at a defined time, students are free to select the location and the time of their study sessions. By having teachers, students, and course materials in different places, a technique known as "distributed learning" enables students to overcome temporal and locational learning obstacles.

1.1.5 Challenges Affecting Online Learning

Wildana et al. (2020) found that online learning methods used during the COVID-19 pandemic effectively imparted information to pupils, comparable to traditional face-to-face learning. Online learning offers a greater opportunity to get expertise in the significance of process learning, which involves a balance between the advancement of time and technology and the cultivation of self-regulatory qualities possessed by each student. Wildana et al. (2020) emphasize the paramount significance of the rules implemented by the head of an educational institution in the context of online learning delivery. The availability of the internet and the

cost-effectiveness of internet packages are prerequisites for the continuation of online education. However, this poll also showed that students had limited access to the internet because of their location or because they did not have enough money to pay for internet subscriptions. The reading proficiency of students and their ability to access online resources play a critical role in the effectiveness of online learning.

 In their study, Hazwani et al. (2020) determined that the internet connection had the greatest impact on the efficacy of e-learning. It is essential for management people to enhance dormitory facilities in order to provide universal internet access for all students. An internet connection of moderate or excellent quality is required. Furthermore, it is important for students to have exposure to contemporary technology in order to adjust to present situations. Abstaining from using this application does not exempt one from acknowledging the significance of technology. Students should acquaint themselves with several web apps to ensure their expertise remains current. The use of digital technology is very advantageous and confers rewards onto pupils who employ it in a constructive manner. In order to improve the achievement of educational goals, new pedagogical frameworks and digital learning platforms have been developed in response to the advent of COVID-19.

To address this, it is imperative that innovation in the realm of education persists to assure the continuity of this progress.

As to the findings of Nurul Haidah et al. (2020), students effectively adjust to the presence of new technology in order to stay up with societal advancements. This adaptability is essential, given that contemporary existence is deeply intertwined with technology. Once pupils have acquired these abilities, they may effectively adjust to any situation and effectively address new or familiar challenges. As a result, students will acquire a diverse range of technological competencies that they may use in the future. This program has promoted the use of Information and Communication Technology (ICT) and social media apps as a significant platform to facilitate the involvement of teens and students in remote learning. These efforts and proposals prioritize pupils who will be taking significant tests, such as the SPM, PT3, and UPSR, since these exams have a direct influence on the teachings implemented during the CMCO. Nevertheless, the presence of social media and contemporary communication technologies enables instructors to guide students' online learning experiences.

1.2 Online Learning: A Panacea in The Time of Covid-19 Crisis

The deadly and extremely infectious Corona Virus, also known as Covid-19, has had a significant effect on the global economy. This tragedy has also had a significant effect on the education sector, and it is anticipated that this anxiety will spread across the global school system.

Due to the Covid-19 epidemic, several educational institutions, including schools and universities, were had to temporarily cease operations. Multiple regions are being impacted on a global scale, and there is a concern about the potential loss of the current semester or perhaps more in the foreseeable future. Numerous educational establishments, including schools, colleges, and universities, have discontinued providing in-person training.

According to the experts' judgment, it is questionable whether regular teaching will resume in the near future. Given the current emphasis on social distance, it is expected that this would adversely impact learning possibilities. Educational institutions are facing difficulties in identifying alternatives to address this formidable predicament. These situations highlight the need for academic institutions to engage in scenario planning. This is a circumstance that requires compassion and solidarity. It is imperative to safeguard and preserve our students, educators, academic staff, communities, society, and the country.

Many debates are connected to e-learning. A number of variables, including affordability, adaptability, learning styles, ongoing education, and regulatory issues, are included in online pedagogy. Online education is very accessible and has the potential to reach remote and rural areas.

Distance education offers a more cost-effective alternative to traditional institution-based learning, since it reduces expenses related to transportation, housing, and total educational costs. Online learning has the advantage of flexibility, allowing learners to independently arrange and manage their time for completing accessible courses. The integration of in-person lectures with technology leads to the emergence of blended learning and flipped classrooms, which have the potential to enhance students' learning capabilities. Students have the ability to acquire knowledge and skills at any given time and location, therefore fostering continuous learning throughout their lives. The government recognizes that, in our ever-changing world, online education is becoming more important.

One other evidence in favour of online learning is the widespread breakout of the Corona Virus disease, which suggests that online learning may serve as a universal cure during emergencies.

1.2.1 Online Learning or E-Learning

Technological developments have made remote learning easier. Using a computer connected to a network is a common feature of most of the terms listed, including computer-mediated learning, blended learning, online learning, open learning, web-based learning, and m-learning. This makes it possible to learn using a variety of ways, from any place, at any time, and at one's own speed. The creative, flexible, and student-centered elements of the teaching-learning process are enhanced by online learning technologies. The term "online learning" describes the process of gaining information and skills via educational experiences that occur in synchronous or asynchronous environments, using a variety of devices, including computers and mobile phones, as long as there is an internet connection.

Within these settings, students have the freedom to study and engage with instructors and peers from any location, without being reliant on a specific physical space. Real-time interactions between teachers and students, live lectures, and the possibility of receiving instant feedback are characteristics of the synchronous learning environment. Asynchronous learning environments, on the other hand, are not as structured.

. In this particular educational setting, the learning material is not presented via live lectures or classrooms, but rather through various learning platforms and forums. Real-time feedback and prompt reaction are unattainable inside such a setting. Synchronous learning offers many opportunity for social engagement. In light of the rapid transmission of this lethal virus, there is a pressing need for online platforms that fulfill the following requirements: (a) the ability to hold video conferences with at least 40 to 50 students; (b) the capability to hold discussions with students in order to preserve the authenticity of classes; (c) dependable internet connections; (d) the availability of lectures on laptops and mobile devices; (e) the ability to view lectures that have already been recorded; and (f) the ability to get feedback from students immediately and assign assignments.

1.2.2 Online Teaching Is No More an Option, It Is a Necessity

Due to the massive outbreak of the global pandemic Covid-19, a large chunk of the planet is now under quarantine. As a result, a number of cities have become desolate, and the effects of this are especially evident in academic establishments like colleges, universities, and schools. One potential answer to the present predicament is to discuss online teaching and learning. Online pedagogy has replaced conventional offline teaching techniques in educational institutions because to the COVID-19 epidemic. This disaster will force institutions that were previously hesitant to adopt modern technology. This disaster will highlight the financial benefits of distance learning and education.

Through online teaching platforms, we can educate a substantial number of pupils, regardless of their location or the time. It is essential for all institutions to explore various alternatives for online pedagogical methods and strive to use technology more effectively. Numerous institutions worldwide have completely digitized their activities, recognizing the urgent need in light of the present circumstances. Amidst this pandemonium, online learning is emerging as the dominant and most successful method. Therefore, at this time, it is imperative to improve the quality of online teaching and learning. Since the Covid-19 pandemic, online learning has become much more common in Chinese institutions. Overnight, traditional classrooms have become virtual learning environments as instructors have entirely redesigned their curriculum to meet the demands of the changing market. In this difficult time, the emphasis is on how academic institutions can effectively adopt online learning on a big scale rather than whether online teaching-learning systems can provide high-quality education (Carey, 2020).

No educational institution in the world will benefit from resistance to change. Their ability to maintain the level of quality and adapt quickly to changes will be the basis for their evaluation. Institutions of higher learning are under scrutiny and their reputation is in danger.

Their ability to adapt is shown by their exemplary behavior and the consistent maintenance of the quality of education throughout this crisis. The transition from in-person lectures to virtual classrooms is the one viable resolution. Undoubtedly, academic institutions cannot instantaneously convert their whole college courses into an online resource. The primary obstacles in online teaching are distance, scalability, and individualized instruction. Only via the implementation of pioneering strategies by institutions can we effectively address this epidemic. In order to swiftly transition to online learning, Google offers several useful products that can be utilized. These include Open Board Software (which is not a Google product but helps with meeting recording as files), Gmail, Google Forms, Calendars, G-Drive, Google

Hangouts, Google Jam board and Drawings, and Google Classroom. These technological advancements could successfully replace in-person instruction.

1.2.3 Problems Associated with Online Teaching and Learning

There are several technologies available for online education, but, they may sometimes provide significant challenges. The challenges and concerns related to contemporary technology include a wide variety of issues, including download faults, installation issues, login difficulties, and problems with audio and video. Occasionally, students see online instruction as tedious and lacking in interest. The abundance of time and flexibility in online learning sometimes leads students to struggle to find the time to engage in it. The lack of individualized attention is a significant challenge in the realm of online education. Students want reciprocal communication, which may sometimes pose challenges in its execution. The learning process cannot achieve optimal results unless students actively engage in the application of their acquired knowledge. At times, internet information may be purely theoretical, hindering students' ability to successfully practice and learn. The course material is of mediocre quality, which is a significant problem. According to students, the main barriers to online learning include a lack of a sense of community, technical difficulties, and difficulties understanding the goals of the course. According to a study, students weren't adequately equipped to handle juggling their academic goals in an online learning environment with their professional, familial, and social responsibilities. It was shown that students lacked preparedness in a number of e-learning skills and academic-related competences. Additionally, the students' level of preparation for adopting learning management systems is restricted.

1.2.4 Possible Solutions for Problems

Online education is associated with several challenges, although we cannot disregard its advantages during times of crisis. There are always viable methods available to address these challenges. Technical challenges may be resolved by pre-recording video lectures, thoroughly testing the material, and consistently having a contingency plan in place to ensure uninterrupted teaching and learning. Online courses have to be rendered lively, captivating, and engaging. Teachers should establish specific time constraints and provide prompts to ensure pupils

remain vigilant and focused. It is imperative that deliberate efforts be made to maximize the human element of the learning process. Students should get personalized attention in order to help them transition to this learning environment without any problems.

Students may use social media platforms and diverse online group forums as means of communication. Effective communication is crucial when faced with challenges in connecting with students via text messages, messaging apps, video conferences, and other means. The material should be designed to facilitate student practice and skill development. Instructors should make a constant effort to improve the quality of their classes, and they should give it their all. Creative thinking, interaction, relevance, student-centeredness, and group collaboration should all be included into the design of online courses. Teachers have a great deal of work ahead of them in creating effective online training programs. Effective online lessons increase learner engagement by promoting inquiry, soliciting feedback, and deepening the learner's comprehension of the subject matter. Through online training, educational institutions should give priority to pedagogical issues and emphasize case-based, project-based, and collaborative learning.

1.3 Indian Government E-Learning Initiatives in Response to Covid-19 Crisis

E-learning is the process of learning via the use of electronic devices or media, such laptops.

In contemporary society, the concept of E-learning (online education) encompasses the use of many computer programs, including Artificial Intelligence, Quantum Computing, and Machine Learning, for the purpose of acquiring information. Furthermore, since it only offers electronic versions of learning materials rather than hard copies, it may be seen as virtual education and gives students the ability to take charge of their education.

The information society's educational and training practices have been greatly impacted by a major breakthrough in e-learning during the last 10 years.

Academic institutions are allocating significant financial resources to implement E-learning systems in order to adapt to recent advancements. The evolution of e-learning extends beyond academics. The advent of the internet and the proliferation of online learning techniques and rising technology have made E-learning more prevalent in work environments.

The advancement of ICT is rendering manual or conventional learning methods more outdated. The use of ICT is more prevalent in the contemporary education system, and a significant proportion of students do not find traditional print books or other study materials engaging to learn from. In addition, traditional methods of learning need a greater allocation of resources, including physical space, financial resources, and time, for the maintenance of learning materials compared to electronic methods. Physical materials are also susceptible to being lost, stolen, or destroyed with relative ease.

In the present day, information and communication technology, or ICT, is essential to the advancement of the educational system.

Traditional methods of learning are being phased out in academics as well as many sectors worldwide. Quinn's 2011 study revealed a significant increase in the proportion of organizations intending to provide E-learning assistance to their employees, with the rate rising from 38.5% in 2007 to 51% in 2011. Various scholars hold the view that conventional learning approaches should be used in conjunction with technology-driven learning techniques. In a 2014 study, Adzobu suggested that online learning platforms would develop in conjunction with conventional learning platforms in the future. Moreover, Iwayemi and Adebayo both said that automated solutions need to work in tandem with present manual procedures rather than taking their place.

Unquestionably, e-learning is important. Over the last ten years, there has been a rapid transformation, and many businesses, organizations, and governmental bodies are adopting these advances. As a project of the World Wide Web Consortium, this development rose to prominence in the mid-1990s and has since become a significant part of our daily lives. There are two main types of e-learning approaches: synchronous and asynchronous. Without depending on in-person communication, asynchronous learning provides a flexible approach that lets teachers and students complete assignments and study at their own pace. Online classes typically use this technique. The synchronous approach, on the other hand, offers a quick and genuine feeling of being in a real classroom. The encounter encourages social interaction and makes it easier for teachers and students to bond right away. Webinars and video conferences are typical examples. To make wise decisions about their online learning initiatives, corporations, government agencies, and educational institutions should have a thorough awareness of the benefits and drawbacks of both approaches.

The highly infectious COVID-19 virus, often known as the Corona Virus, was first identified in China in December 2019. Since then, it has sickened over 120,000,000 people worldwide and resulted in the deaths of over 2,000,000 people. The countries most affected include the United States of America (USA), India, Brazil, Russia, and the United Kingdom (UK).

The United States of America has reported more over 30 million confirmed cases to far, while the United Kingdom has the lowest number of confirmed cases among the five countries, with over 4 million illnesses and a death toll of 120,000.

Since face-to-face instruction had to end due to the development of COVID-19, virtual learning became the only option available to the government and educational institutions in order to slow the spread of the new coronavirus (Pal & Vannijja, 2020). Government organizations with effective e-learning protocols and infrastructure have an easier time adjusting to the online learning environment (Uju & Olofu, 2020), while those without strong e-learning systems or programs take longer to adjust to this sudden change.

1.3.1 Modern perspective of E-learning

In Indian higher education institutions, using modern information and communication technology (ICT) for teaching purposes has become crucial. It is impossible to overestimate the importance of information technology in the field of education. The modern perspective on e-learning is becoming increasingly diverse as a result of several factors. These elements were divided into six different dimensions by Sun et al. (2008) in their study: student, instructor, course, technology, system design, and environmental factors. When evaluating an E-learning system, students give priority to the quality of the course content even if user pleasure is a key factor in determining the system's success. A user's perception of an e-learning system is greatly impacted by a number of characteristics, including computer self-efficacy, system quality, simplicity of use, and usefulness. On the other hand, different points of view among faculty members have influenced how they see e-learning. Teachers' perceptions of e-learning are strongly impacted by performance expectations, effort expectations, social pressures, and behavioral restrictions, according to research by Abdekhoda et al. (2016). Compared to other faculty members, lecturers in the areas of computer science, engineering, education, and Indian studies, as well as those who are new or inexperienced, have more positive opinions. The

degree to which instructors voluntarily participate in online learning initiatives is a crucial factor that will influence their perception.

1.3.2 Benefits of Online Education

In order to maintain the continuation of educational activities in the face of the continuing COVID-19 epidemic, universities and other educational institutions throughout the globe have begun using online learning, or e-learning. This is a clear proof that e-learning is essential to the global education system. With the use of e-learning, students may acquire important information that will help them succeed in their academic endeavours.

The primary benefit of E-learning is the system's inherent flexibility. The system is accessible from any location at any time. In comparison to conventional learning methods, there is a significant reduction in both cost and time.

Additional advantages of e-learning, according to Kimiloglu et al. (2017), include cost-effectiveness, customization, simplicity of use, and enhanced employee motivation and engagement. The following are the five (5) advantages of e-learning: time and cost efficiency, better retention, scalability, customization, and consistency. The advantages of e-learning include easy access to course materials at any time and location, equitable educational opportunities, better group collaboration, direct access to more training resources, a more global perspective in educational services, and the capacity to monitor course progress when assessing the advantages and disadvantages of e-learning among Iranian agricultural students.

1.3.3 Disadvantages of E-learning

The popularity of e-learning platforms is steadily increasing. Nevertheless, these users encounter some obstacles that hinder them from fully capitalizing on the advantages of E-learning, ultimately leading some of them to abandon its use. An inherent drawback of E-learning is the instructors and cohorts' limited capacity to engage in regular discussions on course materials and topic matter. Credibility, technological issues, computer proficiency, time management, and self-motivation are major barriers to e-learning.

   a) Credibility

Every individual is entitled to get commensurate returns for the time and resources they have committed, however this principle is not always upheld on E-learning platforms. Due to the intangible nature of e-learning, such as not physically attending courses or seminars/workshops, individuals may have questions over its trustworthiness. Furthermore, there are distinct disparities between online degree programs acquired via E-learning and those gained in person at a real institution.

b) Technical issue

Difficulties arising from a platform's hardware or software resources are referred to as technical issues. It's possible that many users of e-learning platforms lack the basic technical requirements needed to enroll in the course (Alkharang & Ghinea, 2013).

The customers may have difficulty in fully using the platform due to platform portability issues, such as limited access from different devices, low internet connection, unreliable power supply, and hardware limitations like poor monitor display.

c) Computer Literacy

Most students in the twenty-first century possess basic computer skills. However, the majority of users possess insufficient understanding about computer use, including fundamental abilities to diagnose hardware malfunctions, manage files, and do word processing tasks. Users that lack the aforementioned abilities are prone to causing issues for themselves, despite the platform functioning well. Moreover, this might impede their ability to navigate the intended Learning Management System, resulting in a troublesome learning experience that may ultimately hinder their progress in comparison to their virtual peers.

d) Time Management

Online courses need the same amount of time as traditional in-person courses. Due to their regular daily obligations, students should carefully arrange their learning schedule even if e-learning gives them the freedom to study whenever they choose. Because e-learning is vague and virtual, ineffective time management might be the outcome.

e) Inspiration from Within

Many pupils lack the self-discipline required for e-learning. The presence of internet already causes distraction. Platforms such as YouTube, Facebook, Twitter, news websites, and advertisements have the capacity to divert the attention of pupils. Users should diligently monitor and regulate their internet use in order to prevent the squandering of valuable study hours. Online learning, in contrast to traditional classroom learning, lacks oversight and accountability. Insufficient self-control in a student may result in falling behind his peers in the virtual classroom, perhaps leading to a loss of motivation to continue the course.

Need of OER

The primary purpose of Open Educational Resources (OER) is to provide a robust platform with easily accessible educational materials for teachers, students, and open-source contributors. Openly licensed educational resources are seen to have the ability to improve instruction's effectiveness and quality for less money.

Historical perspective

It was at the 2002 United Nations Educational, Scientific, and Cultural Organization (UNESCO) summit that Open Education (OER) gained prominence. UNESCO convened a group of scholars, the most of whom were from developing countries, to talk about a new development: the Open Course Ware (OCW) programs of the Massachusetts Institute of Technology. "Open provision of educational resources, enabled by information and communication technologies, for consultation, use, and adaptation by a community of users for non-commercial purposes," is how The Mission first used the phrase "open educational resources."
Less than 20 years have passed since the OER movement began, thus it is still relatively young, but important steps have been done since then to assure its growth.

Modern perspective

Textbooks, assigned readings, and other educational resources are often included in open educational resources (OER). As a result of the internet's and online platforms' rapid development, open education has become more productive, efficient, and effective. One of the biggest barriers to early open educational resources (OER), especially in developing countries, is the end user's inability to obtain fast internet connections. With the increasing prevalence of high-speed internet connections, particularly with the introduction of 4G and 5G technology,

this issue is becoming worse with current OER. Additionally, open source contributors have made several changes to contemporary OER systems, making them more productive, affordable, accessible, efficient, and user-friendly.

Various tools, systems, and further open educational resources (OER)

The Massachusetts Institute of Technology launched the OpenCourseWare Project, the longest-running and biggest open educational resource, in 2002. At the moment, the program provides MIT students with course materials for more than 2500 courses. Another OER initiative launched in 2000 by Richard Baraniuk and associates at Rice University is called Connexions. In 1999, it was renamed OpenStax CNX. The idea behind the new OpenStax is that knowledge and learning materials should be freely shared, repurposed, integrated, linked, and updated. Note 5: Connexions' resources are still available under a CC BY Creative Commons license, which allows for usage, modification, and remixing of the content as long as proper attribution is given.

The CK-12 Foundation, a non-profit corporation located in California that was established in 2007, is another OER endeavor. Its goals were to lower costs and broaden access to K–12 (kindergarten–twelfth grade) education in the United States and throughout the globe. The CK-12 foundation resources are used by approximately 38,000 schools in the USA alone, in addition to a growing number of international schools.

There are hundreds of OER tools available now; they have developed so much that we almost lost track. Ariadne, WikiEducator, ATutor, Open of Course, The Open University, Olat, Canvas, Citizendium, Commonwealth of Learning, SchoolTool, Educause, Cloe, and Open Class are a few of them.

1.3.5 E-learning initiatives of the Indian government

This portion contains information about well-known and successful e-learning projects implemented by the Indian federal and state governments, both before and after COVID-19 epidemic.

Educational programs implemented by the central government before to the COVID-19 pandemic.

The Indian government has long been an advocate for using ICT in public education. With the goal of making computer literacy a required subject for students in grades XI and XII, the Indian government started the CLASS (Computer Literacy and Social on Schools) project in 1984. During the seventh and eighth five-year plans, computer literacy was implemented in 2598 and 2371 schools, respectively.

The Indian Space Research Organization (ISRO) successfully launched the EDUSAT, a communication satellite primarily focused on the education sector, on September 20, 2004. EDUSAT enables the provision of education to millions of individuals throughout India, allowing for the distribution of educational resources in regional languages and for specialized long-distance study.

The Indian government initiated SWAYAM, a prominent e-learning initiative, with the aim of establishing a unified platform and entry point for online courses inside the country's education system. SWAYAM was developed in collaboration with Microsoft by the Ministry of Human Resources Development (MHRD) and the All India Council for Technical Education (AICTE). It was intended to serve students from rural locations, working professionals, and college dropouts. SWAYAM's qualitative assessment method, acknowledgment of credits and equitable access, and cost are its main points of strength. Its history started in 2003. The IITs and IISc launched the National Programme on Technology Enhanced Learning (NPTEL). Established in 2009, the National Mission of Education via ICT (NME-ICT) first prioritized courses in engineering, science, and the humanities but later expanded to encompass all fields of study in higher education.

The School of Open Learning (SOL) E-learning Gateways, Sakshat, the Institute of Life Long Learning (ILLL), the Consortium for Educational Communication (CEC), the National Programme on Technology Enhanced Learning (NPTEL), and the Indira Gandhi National Open University (IGNOU) were among the e-learning initiatives that the Indian government had launched prior to the COVID-19 pandemic.

Response to the COVID-19 pandemic

The sudden and unexpected Corona Virus Outbreak caught the government and educational institutions off guard. The government continues to oversee education even during the nation's lockdown. The state and UT's creative approaches to educating every child are admirable and show that e-learning is still one way to maximize the impact of COVID-19 across the nation.

Central government initiatives for e-learning in the COVID-19 era

Because of COVID-19's strict requirements, the government was compelled to offer alternative teaching and learning strategies, especially during the lockdown. The first strategy makes use of current systems to meet the need. During the COVID-19 pandemic that began in September 2017, the government employed a variety of strategies, including DIKSHA (Digital Infrastructure for Knowledge Sharing). In April 2020, the VidyaDaan program was unveiled as a nationwide initiative to utilize the DIKSHA platform for content contribution.

PM eVidya, a comprehensive initiative, was introduced by the Indian government on May 17, 2020. This plan aims to synchronize all digital, online, and on-air educational activities. The objective was to provide equitable access to education across several modes.

More e-learning programs are being launched in the midst of the COVID-19 pandemic, such as open schools, pre-service education, Swayam Prabha TV Channels, On Air, e-textbooks, and the National Repository of Open Educational Resources (NROER).

Swayam Prabha TV channels

The MHRD dedicated thirty-two (32) channels to offering excellent educational programming. It provides different routes for postsecondary education and traditional classroom teaching. The project is now being developed and enhanced, and going forward, all users will be able to access the content asynchronously from anywhere at any time by organizing it both chronologically and thematically.

For pre-service education and open schools

Approximately ninety-two (92) course materials, specifically created for the National Institute of Open Schooling, are available on the SWAYAM website for grades 9 through 12. SWAYAM is a means of accessing the contents.

On air

Children in remote locations are using radio broadcasts that are focused on educational activities. In addition, a total of 289 community radio stations were employed to broadcast the National Institute of Open Schooling (NIOS) programs to students in grades 9 through 12. All courses from grades 1 through 12 are offered by the Central Board for Secondary Education

(CBSE) using only the Shiksha Vani Podcast, which is owned by CBSE. In total, there are 430 audio resources in this podcast.

Regarding the individuals with disabilities

A dedicated Direct-to-Home (DTH) channel is available for children who have hearing loss. For pupils who are blind or deaf, the Digitally Accessible Information System (DAISY) creates study materials in sign language. These resources may be found on the NIOS website and YouTube.

E-textbooks

The e-Pathshala application and web site provide electronic textbooks. It offers desktop Windows apps in addition to mobile Android and iOS applications.

National Repository of Open Education Resources (NROER)

Through NROER, users can access over 17,500 electronic publications from The National Council of Educational Research and Training (NCERT) and other cooperative partners. There are resources accessible for a range of academic areas.

The federal government is always battling to update the current e-learning resources and develop new projects. It is expected that other e-learning initiatives would be introduced shortly, even after the COVID-19 phase.

State governments' E-learning initiatives

To meet the demands of the current situation, the majority of State and Union Territories have developed several e-learning initiatives in addition to the efforts of the Central government. Delhi, Rajasthan, Odisha, Andhra Pradesh, Kerela, Jammu & Kashmir, Himachal Pradesh, Meghalaya, Punjab, Ladakh, Telangana, Tripura, and several other regions have been actively involved in their e-learning programs. These states and union territories have adopted DIKSHA systems. India is made up of eight Union Territories (UT) and twenty-eight states. Note 10: In light of several obstacles, we have thoroughly reviewed the inclusion and exclusion criteria. As a result, we have determined that it is not possible to cover and investigate the efforts of each state in the present study format:

1. Given the large number of states and the whole count of Online learning initiatives.

Given the present research aims, doing a detailed analysis is not feasible.

2. In comparison to other states, a certain state has a lower level of initiative. Consequently, we have eliminated the states based on the frequency of their proactive actions.

3. Specifically, the region of Jammu and Kashmir (J&K) was included. Considering its status as one of India's most fragile and volatile states.

4. Only Some states, such as Delhi, have successfully executed and implemented the most comprehensive measures well-known projects.

5. The level of education (or literacy rate) is also considered when selecting the states.

6. excluded the states that are using federal or other state government-led e-learning projects but have only implemented a small number of their own. The percentage of the state population living in poverty is also taken into consideration while selecting a state.

1.4 Coronavirus Pandemic: Online Learning and Teaching in Higher Education

The COVID-19 pandemic has changed how students and teachers communicate with one another as well as how teaching and learning are conducted in higher education. Universities were forced to shift all of their student relationships online due to the pandemic. Several nations took measures in this area to stop the virus from spreading and to guarantee that education would continue, and educational institutions everywhere welcomed online learning.

Online learning proved essential to keeping universities and colleges open during the coronavirus outbreak, despite the fact that it is frequently seen as an option or an alternative to traditional classroom training. This paradigm shift may cause students' impressions of this kind of training to change, and those perceptions may differ from those found in studies done before to the outbreak. Thus, we attempted to document the frequency of such changes in our study.

Prior research has demonstrated the significant advantages that e-learning offers students. It is more adaptable, integrates a student-centered methodology, and improves student-teacher contact via the provision of both synchronous and asynchronous tools including email, chat rooms, and forums. Distributing material to a big number of consumers concurrently is also made simpler by internet technology. One of the many advantages that e-learning platforms provide to students is the ability to customize the content and duration of their learning

sessions. This makes it possible to adjust the procedure to the learners' requirements and learning goals. More communication between students and professors could arise from this, and e-learning could enhance students' educational experiences despite certain obstacles caused by the current crisis.

However, there are also some aspects of using e-learning platforms that could be seen as barriers to students' learning, such as low student motivation, a lack of timely feedback or assistance from teachers when needed, or feelings of loneliness brought on by the absence of classmates in person. However, instructors who Adapting their teaching strategies to their students' needs might help them get beyond these obstacles. You need to have previous expertise teaching in an online context in order to accomplish this. Therefore, we think that these difficulties and drawbacks would be more obvious if the entire educational process were conducted online. This could occur due to the teachers' lack of e-learning experience as well as the little amount of time allotted to them to modify their pedagogical approaches for the new environment. Relevant to this point, research done by School Education Gateway during the early stages of the epidemic revealed that 66.9% of participants claimed they were using online platforms for teaching for the first time. It follows that neither instructors nor students were prepared for a totally online learning environment.

As a result, there were several difficulties for both students and faculty personnel. Universities have many challenges, according to the Organization for Economic Co-operation and Development. including maintaining a balance between non-digital activities and online courses that may have an adverse effect on students' health; assessing and prioritizing students' mental health and offering them support during the learning process; recognizing that not every student has internet access; regulating and keeping an eye on how students use their devices so they may effectively collaborate with one another. Colleges also face difficulties in attracting and enrolling students, efficiently communicating with the academic community, and maintaining consistent and timely course materials. However, students also faced difficulties. One study that examined students' perspectives on e-learning found that the primary difficulties faced by students were those related to accessibility, connectivity, a shortage of suitable devices, and social issues that were reflected in their inability to interact and communicate with peers and teachers.

Considering the previously mentioned factors, it is thought that switching to fully online instruction may have a significant impact on the educational process and students' perceptions of how the internet is used for teaching and learning. We base our research on these concepts. We felt it was important, relevant, and crucial to assess whether or not students are content with this new online experience and whether or not they are accustomed to e-learning.

In order to enhance and fortify the e-learning system, the study seeks to ascertain the student's viewpoint on their experience with e-learning during the coronavirus epidemic. Stated differently, our study examines how the current crisis affected the learning process and investigates students' attitudes toward e-learning platforms and the ways in which these technologies impacted their understanding and assimilation of information. In addition, we wanted to know what the primary challenges were that students had while studying online and what settings they preferred for institutions to utilize these platforms in the future.

1.4.1 Higher Education's Use of E-Learning

These days, the higher education landscape is always evolving, and universities must adapt to the needs, desires, and aspirations of their student bodies. Because e-learning platforms and information technology are seen as essential to conducting business, universities are spending more and more money on devices and online systems. But in the age of technology, one of the main issues confronting colleges is using state-of-the-art e-learning platforms to support and improve teaching and learning.

The term "e-learning" has been defined in a number of ways due to its complexity. E-learning, to put it simply, is the process of developing and creating learning experiences using computer and information technologies and systems. In contrast, Elmarie Engelbrecht defines e-learning as a technique for delivering instruction remotely through the use of electronic media, such as CDs, mobile devices, the internet, and even television. E-learning, to put it briefly, is the process of imparting knowledge and teaching through a variety of electronic devices. The idea makes more sense when considered in light of the ways that technology supports human learning and growth.

The first recorded cases of distance learning are from 1840, when Isaac Pitman partnered and taught students via shorthand and mail. It is believed that the word "e-learning" first appeared in the sphere of education in the middle of the 1990s. Considering the aforementioned features, one could regard this type of virtual learning as a logical development of the idea of remote

learning. E-learning is a specific type of teaching and learning that uses media and electronic resources to promote improvement and raise the bar for instruction and training, according to a more comprehensive and detailed description. E-learning can alternatively be thought of as an official educational system or as a network that disseminates information to a large audience using electronic resources. Computers and the internet are prerequisites that guarantee the operation of these systems.

E-learning provides aspects that support and nurture the teaching-learning process, such as a multitude of possibilities for information sharing and the capacity to upload documents in multiple formats. Users do not need to install any extra programs since it is a web-based system, and once material is posted, it is always accessible to them. In this sense, the wide range of technology instruments at our disposal today made it possible to create a multitude of e-learning formats. A few of these were recognized by Horton and include self-paced courses that individuals complete without the assistance of a class; virtual courses that are set up like traditional, on-campus courses; learning games, in which information is learned through role-playing; blended learning, which combines online and traditional learning methods; mobile learning; and knowledge management, which is the online exchange of knowledge intended to teach large populations, communities, and organizations in addition to individuals. Because of this, e-learning is a complex process with many moving parts, such as participants and users, e-learning platforms, content, and technological tools and design. Sunil et al. (2020) claim that since e-learning emphasizes instruction and individualized learning equally, it differs from traditional or other kinds of learning. Put another way, the introduction of e-learning may have caused a shift in education away from the traditional model, which is mostly teacher-centred and toward a student-centred approach.

It is also possible to distinguish between the assessment, educational quality, and primary information sources of online instruction and traditional classroom instruction. Online learning allows for the use of tools and systems to conduct assessments, provides students with access to a variety of documents uploaded on the platform, and influences the quality of education through teachers' technological proficiency and instructional style. Teachers are the only ones who assess pupils in a regular classroom; they are also the main source of knowledge for the students. Cheung and Cable (2014) list and explain the following eight guiding principles of successful online instruction: high standards (in order to inspire and motivate students, teachers should communicate their expectations), varied learning, technology application, collaborative

learning, prompt feedback, active learning, task time—which encourages students to allot more time for tasks—and technology application.

Because the development and expansion of educational opportunities were made possible by the evolution and application of systems and technologies, many academics were interested in the use of e-learning in higher education as well as students' opinions of the value of this kind of learning.

The Technology Acceptance Model (TAM), which has been useful in assessing and understanding how students intend to utilize e-learning, may be used to research on the use of e-learning. Davis, Fred, the creator of the paradigm, thought that an important component of information systems' success may be people's acceptance of technological integration. The model provides information and elucidates the connections between system attributes, user behavior, and potential attitudes about the system—attitudes impacted by perceived utility and ease of use.

In a study focusing on students' perceptions of the implementation and integration of e-learning platforms, with the TAM model serving as a theoretical framework, every student reported understanding the material and finding the e-learning module they took to be user-friendly. Additionally, they said that browsing and obtaining papers was not difficult for them. Similar research conducted at the University of Jordan found that students' attitudes about embracing e-learning were directly impacted by perceived utility and simplicity of use, with conclusions based on the TAM model. The attitudes of teachers about e-learning were also investigated using TAM. In addition to their prior experiences with it, instructors' views on e-learning impacted how they behaved and used it in practice, per a study by Sunil et al. (2020).

Studies on the application of e-learning in postsecondary education typically show that it is beneficial, efficient, and enhances student performance. The majority of respondents to a study on the effects of online learning on teachers and students stated that, in addition to offering flexibility and improving the educational process, online learning can also foster student knowledge and cooperation. These respondents were instructors. In general, students' views about online learning are positive, according to Dookhan's research, and these sentiments improve when they think that online learning materials are readily available. According to a different study, e-learning increased students' engagement with lectures and enhanced their learning results when utilized as an adjunct to conventional classroom instruction. Studies that

compared online and traditional learning revealed that a significant portion of respondents felt they had learned more in in-person classes than they had online, but they also expressed satisfaction with their overall online experience, despite some challenges with platforms for online learning.

While most studies indicate that students have good views regarding online learning, others indicate that students would rather embrace blended learning and think that courses delivered in a classroom have more value than those given online—a mix of in-person and online instruction—rather than solely online instruction.

1.4.2 Platforms for E-Learning in Higher Education

Many online platforms help to facilitate the e-learning process in higher education. Online learning has gone by many different names over the years, including e-learning, computer-mediated learning, web-based training, and learning management systems. Whatever name they go by, all of these systems have in common the use of the Internet and a few features that facilitate communication between students, professors, and instructors, registration, and the assessment of students' and instructors' activities. Some of the most crucial components of online learning systems include chat, which enables users to send and receive messages in real-time; web conferences, which provide text, audio, and video communication; and forums, which enable asynchronous student-teacher engagement and cooperation.

A software program called a learning management system (LMS) facilitates the management of lectures and classes by teachers. It was made to grade assignments, record attendance for classes, evaluate student performance, and carry out any other administrative duties that schools and universities would need. These systems can be categorized into two groups: commercial or proprietary, which includes platforms like Blackboard, and open source, which includes Moodle platforms.

Moodle is thought to be a flexible online learning platform that promotes user interaction. It was created as a tool to assist teachers, administrators, and students in creating more individualized and productive learning environments. These networks allow professors to post materials and information that students would not have had access to in-person classrooms, and they also make it easy for students to voice difficulties, share information, and get feedback. Moodle includes several features as a consequence, such as forums, chat rooms, and

private messaging. Universities may use it to perform all of their courses online or as a complement to traditional teaching techniques.

Because of this, Moodle systems are renowned for being easy to use and for enhancing student learning. Over the course of the academic year, students who used Moodle outperformed their peers in terms of performance and grades, as shown by Oswal, Nidhi & Narayanappa (2018) research.

1.4.3 E-learning's effectiveness, advantages, and disadvantages

E-learning offers several intricate aspects that might enhance the learning experience. Nonetheless, teachers and students need to understand how to effectively incorporate collaboration into the teaching and learning process in order to increase cooperation and performance. Three factors affect how effective e-learning is: Students who don't have physical colleagues may feel alone; in this situation, teachers should be able to build rapport and engage with them. Institution: this describes how well teachers use resources to enhance learning, engage with students and create a friendly, supportive learning environment, and use creativity to pique students' attention and keep it.

Studies comparing face-to-face and virtual learning have produced evidence supporting the effectiveness of online learning in the field of education. Studies shows that pupils who studied online could recall material almost as well as, if not better than, those who studied in a regular classroom. Online learning was particularly successful with sluggish, reluctant, and shy students—who typically lack the bravery to speak out and express themselves in class.

As opposed to in-person training, e-learning is growing in popularity due to its adaptability in terms of both material delivery and resource availability. E-learning is thus crucial to the process since it may enhance its quality and provide the opportunity to customize and modify courses to meet the demands of the students. Due to its flexibility, e-learning removes barriers related to time and place, provides users with access to a wealth of knowledge, fosters collaboration, allows students to learn at their own speed, and motivates them to interact with one another by sharing thoughts and viewpoints. Other research lists advantages the speed at which learning occurs online, the cost and time savings from not having to travel, as well as the convenience and consistency with which the supplied data may be updated. Additionally, it has been found that participants viewed accessibility as the most significant benefit of online learning out of all of the benefits, outweighing benefits like flexibility, student attention,

accessibility, and teamwork. This was discovered when researching how instructors and students perceived e-learning.

E-learning undoubtedly offers a lot of advantages, but there are drawbacks as well. Due to its reliance on technology, including computers and the internet, to which some pupils may not have access—online learners run the risk of being easily side-tracked, losing attention, or missing deadlines. Additionally, disruptions or other system issues may arise during classes. Students may experience a decline in motivation depending on their ability to manage their study schedules and time commitment, and they may feel more alone if they don't communicate with classmates in person or face social isolation. There are negative effects of online learning on one's physical well-being furthermore. Due to spending so much time sitting in front of a computer, online learners and teachers may have eye or back problems, and their outside exercise may decrease.

1.4.4 Online Learning in COVID-19 Pandemic

Because of the unique situation the coronavirus epidemic generated, scholars were very interested in how it affected education, universities, teachers, and students. According to Allo's (2019) research, students' opinions on online learning during the coronavirus were positive, and they believed it would be helpful during the pandemic-induced crisis. The pandemic impacted conferences, research, international movement, and the provision of education, per a survey conducted by 424 institutions throughout the globe. Most of these colleges said that they were compelled to implement online learning and that they encountered several difficulties, the most important of which being the inability of instructors to provide online courses and their lack of access to technology.

A few of universities had used e-learning as an adjunctive strategy prior to the coronavirus epidemic, but most were unprepared for an all-online environment. For education to continue being provided correctly, the e-learning process must be improved. Clear language that incorporates vocabulary from the students' subject of study should be utilized when communicating between students and teachers. The interaction between the teachers and pupils should be taken into account throughout this optimization.

According to Sun et al. (2020) study on students' experiences in online courses, students also think that instructors should assign a sufficient number of projects and assignments and should

know how to modify their lectures for the online environment rather than just transferring content that is typically taught in a traditional manner.

Additionally, Huang and associates discovered seven basic components that serve as the basis for online learning and are essential for improving learning in special circumstances like the ones caused by the coronavirus pandemic. These include setting up and maintaining internet infrastructure to prevent disruptions, particularly during video conferences; offering dependable, engaging, and varied electronic resources; utilizing social media to create online communities for students to lessen feelings of isolation; employing a variety of successful strategies, such as debates or hands-on learning; and offering services to assist educators and learners in learning about the most recent policies that the government and higher education institutions have put in place.

1.5 Assessment And Learning Online Module

The COVID-19 epidemic has fundamentally altered the landscape of medical education, necessitating the move to online instruction. Now, it seems so far away from the close personal touch that was the core of clinical teaching. We now need to investigate unconventional approaches to teaching, learning, and evaluation because of the ongoing coronavirus epidemic. Medical schools must now be ready to teach the next generation of digital natives in online learning environments.

This doesn't mean that traditional classroom instruction will become obsolete; rather, it offers an opportunity to successfully blend the two methods in a hybrid manner to raise the efficacy and efficiency of the educational process.

While distance education has been popular for a while, its use in medical education is relatively recent, particularly in India. Although some professors have taken part as "students" or facilitators in previous faculty development programs, the utilization of online learning in undergraduate education is a relatively new trend. When comparing online learning to in-person training, the "theory" is the same, while there are some minor variations and parallels. Both formats have similarities about the cycle of education, processes of learning, demands for interaction, integration, assessment, and feedback. Three notable distinctions are the utilization of technology, the instructor and students' physical separation, and learner isolation. Diverse viewpoints, concepts, and interpretations exist about online learning. There are many

terms used to describe non-face-to-face (f2f) learning, such as e-learning, remote learning, web-based learning, web-facilitated learning, virtual learning, internet learning, distributed learning, computer-based learning, and technology-based learning. These terms are sometimes used interchangeably and very loosely, depending on the context, technology, institution, and goal. 4–7 In the purpose of this module, we will refer to learning online as "learning that occurs entirely (purely online learning) or partially (blended learning) through the internet," as defined by Means et al. (2008). Figure 1.1 displays the most well recognized type of online learning.

The facilitator skilfully blends online and in-person training as part of the blended learning teaching-learning methodology. For the purposes of this program, blended learning is described as "seamless integration of traditional face-to-face learning with online activities to enhance the learning experience".

1.5.1 Online Learning : What works, what doesn't

Virtual education's effectiveness is impacted by multiple factors. Among these include technological competence, academic competence, learner motivation, administrative issues, social interaction, time management, technological hurdles, cost, and internet access. 10 The quality of online training may be impacted by subpar course design and a lack of multimedia resources. Online education has been shown to be equally effective as traditional classroom instruction, according to research. It might also play a big part in promoting learning that is done on one's own initiative. Because they may review the material at their own speed, learners can exert more control over their education. Instructors may analyse students' abilities via online tests and provide them comments for personal development. Due to the unique needs of online learning, the issue of poor teaching is exacerbated when higher education faculty members lack sufficient training in instructional techniques. A learner-centered approach is necessary for online instruction, and instructors must be skilled in the use of pedagogical concepts, transformational and constructive learning, assessment, and feedback.

1.5.2 Online learning formats

These days, a lot of options are available on online learning platforms that are utilized globally, such online tutorials, videos, webcasts, video conferences, and virtual simulations. Both synchronous and asynchronous methods may be used to accomplish online teaching and

learning. Online discussion forums, online chat rooms, and online meeting apps are just a few of the options for real-time communication. Nowadays, live-streamed online lectures have taken the position of lectures in classrooms as technology makes it possible to record and share the lectures online. Interactive webinars utilizing online platforms have taken the role of lessons and small group discussions. Nearly all of these educational tools are also readily available to use on cell phones. Websites and blogs are examples of online venues where information or educational materials may be shared. Videos that highlight crucial clinical, procedural, or communication skills may be shared. It is possible to participate in problem-based learning, synchronous and asynchronous online lectures, simulated laboratory work, virtual patient visits, and conversations. When used skilfully, each of these may increase student connection and engagement. Learners may experiment with learning at their own speed and take advantage of flexible learning experiences that online learning provides. But it can't take the place of in-person instruction. Thirteen Setting it up cost's money at first, and you need to know how to use technology.

1.5.3 What lies ahead for Indian online education

Although the Covid-19 pandemic has played a role in the recent surge in the use of online learning, it is anticipated that in the future, it will be a standard component of both teaching and learning. Furthermore, as information technology evolves quickly, novel methods of delivering healthcare are changing as well. A significant role for online learning is anticipated in this context. The recently introduced competency-based curriculum in India already encourages students to use e-learning as a tool to study independently. The Medical Council of India's (2018) CBME paper suggests e-learning at the following points in time:

- As a lifelong learner, the Indian Medical Graduate is expected to *"demonstrate ability to search (including through electronic means), and critically evaluate the medical literature and apply the information in the care of the patient"*
- One of the objectives of Foundation Course is to *"to enable the learner to acquire enhanced skills in use of information technology"*
- The new curriculum has reserved time for self-directed learning during every phase of the MBBS course
- The document recommends mandatory provision of skills laboratory in every medical college
- It also recommends mandatory provision of virtual lecture theatres

Figure 1: Prioritizing virtual education in the newly implemented competency-based curriculum

To effectively benefit from online training, medical students also need to acquire a set of abilities known as 21st century competencies. They must be proficient in digital literacy. While most students feel at ease using computers and other digital platforms, conscious efforts should be taken to impart literacy in information technology, including information access, critical analysis, and application to particular issues. As readers may remember, many of these problems were attempted to be addressed by the Foundation Course, which was established for 2019 admissions.

The Pedagogy of Online Learning

It's possible that pedagogical strategies that are used in in-person instruction won't be effective in virtual learning environments. It's time to reconsider pedagogical strategies for online instruction.

Building student engagement online

a. Let students do the majority of the work: It's critical to offer them enough opportunity to participate and connect with the material. It is important to instill in students the responsibility for their own education. Students' participation in group projects and discussion facilitation must be included to this.

b. The key to successful learning is interaction: students need to have the chance to engage with the material, the instructor, their peers, the surroundings, and the context; and

c. Aim for Presence: During their online classes, educators need to make an effort to guarantee the following three kinds of presence.

Good Online Teaching Practices

The literature has enumerated the fundamentals of effective offline20–21 and online1 instruction. These guidelines are based on the fundamental tenets of aligning goals, instruction, learning, and assessment techniques; encouraging interactivity; utilizing feedback and assessment; encouraging group projects; encouraging self-directed learning; and fostering higher order thinking abilities through the use of online pedagogical approaches.

1.5.4 Teachers' and students' opinions of online learning during COVID-19

In March 2020, COVID-19 was deemed a worldwide health emergency (WHO, 2020). It had an impact on many areas of life, including learning. Universities and other organizations were forced to close as a result. The educational institution had to deal with the drastic change from traditional to online learning, which resulted in this closure. The epidemic sparked advancements in virtual learning. Restrictions imposed by most countries, where education is now delivered either synchronously or asynchronously. More than 190 nations worldwide have seen the largest upheaval of educational systems in history. Closing academic institutions has affected up to 99% of students globally who come from lower-middle-class households (The Economic Times, 2020). Due to the COVID-19 outbreak, people must stay at home during a partial or complete lockdown. Since more and more universities are closing, courses must be offered online. For example, in an attempt to halt the pandemic's spread, Jordan, an Indian nation, has switched from in-person instruction to online learning environments. The national shutdown by the government forced colleges and universities to close.

Most foreign colleges decide to employ both synchronous and asynchronous virtual learning methods. While asynchronous learning involves professors presenting the content to students without engaging with them, synchronous learning involves teachers and students getting together at a predetermined time for interactive sessions. There's no communication going on between the teachers and pupils. Students may access online content anytime they want via asynchronous online learning modalities (Easy LMS, 2021). Teachers play a crucial role in helping students pass, developing a love of learning, and shaping the attitudes and personalities of their students. Globally, COVID-19 spreads the culture of online education (Beteille et al., 2020). The change to online learning was compelled by COVID-19, but several institutions in developing nations lack the necessary resources to provide effective online instruction. Furthermore, there are worldwide differences in the training of faculty members in high-, middle-, and low-income nations. An further significant barrier is the availability of the Internet to less fortunate pupils. Face-to-face training is de facto more efficient than online instruction, and with the whole COVID-19 curriculum being delivered online, it is imperative to look into how professors and students see online learning in order to determine its benefits, drawbacks, and difficulties.

Even though there has been a lot of turmoil in the globe lately, it has been tough for everyone, and the effects of online learning have been particularly noticeable for teachers and students. Online learning and teaching have many benefits, but there are drawbacks as well. The

flexibility in scheduling sessions allows students to study at their own pace. However, students' participation in in-person class activities is hindered by online learning. Additionally, kids do not benefit from peer learning. These difficulties also affect the personality of the students and keep them from delegating. The faculty's other responsibilities include teaching, monitoring, and providing academic and personal counseling to pupils. The COVID-19 pandemic has brought attention to how common technology and the Internet are in many facets of life, including schooling. Understanding the attitudes of educators and learners regarding online learning is crucial, as the pandemic has demonstrated the usefulness of this mode of instruction in responding to unforeseen emergencies.

1.5.4.1 Online Learning

A significant shift in education has occurred, with student-centered education replacing teacher-centered education as the primary style of teaching. In an educator-centered learning environment, the instructor serves as the knowledge provider and students are the ones who absorb and apply what they learn. The focus of student-centered education, on the other hand, is on how students contribute to the creation of knowledge in the classroom. In a student-centered curriculum, teachers now take on the role of "assistant to students who establish and enforce their own rules". Instructors answer questions from students and invite them to provide more or different answers. By using the internet and other state-of-the-art technical instruments for information transmission, communication, and expansion, student-centre education has recently profited from numerous new technologies (Hancock, 2002). Since online learning uses internet platforms, it has become a fixture of the twenty-first century. E-learning, according to Ehrers and Pawlowski (2006), is the process of enhancing learning and giving user's access to online resources through the use of online platform technology and the Internet.

Customers may now obtain the abilities they will need in the future by using the internet in conjunction with schooling (Haider and Al-Salman, 2020). Three primary techniques to online teaching have been recognized by Stec et al. (2020): online approach, blended learning, and improved learning. To deliver creative and engaging education, enhanced learning makes extensive use of technology. Online and in-person instruction are combined in blended learning. It is implied by the online approach that the course materials will be made available online. Because they may access course materials whenever they choose, students find online education convenient (Stern, 2020). With online learning, the classroom becomes a student-

centered setting where students actively participate in their education and professors act as supervisors and mentors (Al-Salman et al., 2021).

Several technologies are available on online platforms to make running interactive online lessons easier and lessen student attrition. As stated by Martín-Blas and Serrano-Fernández (2009), the goal of online learning environments is to plan assignments and foster the sharing of knowledge. WeChat Work (video sharing and calls customized for the Chinese market), WhatsApp (calls, chat, and content sharing), Zoom (calls, chat, and collaboration features), Teams (chat, interactive meetings, video and audio calls), DingTalk (an interactive online platform created by Alibaba Group), and Hangouts Meet (video calls tool) are a few of the most well-known and respected interactive online tools. (UNESCO, 2020).

1.5.4.2 Prior to COVID-19, Online Education in the India Area

During COVID-19, online instruction may replace traditional classroom instruction. It turns into the effective 21st-century online learning tool. Everywhere in the world, online learning is not the same. Some nations do have the resources required to advance education, even while many others lack the resources available in wealthy and middle-class nations. Some countries in the India region are more developed than others, including Bahrain, Kuwait, Saudi Arabia, Qatar, Emirates, Jordan, and Kuwait. The majority of Indian colleges switched to synchronous and asynchronous online learning techniques during COVID-19. In Jordan, an Indian nation, the Ministries of Planning, Education, and Information Technology launched online courses in 2002 (Dirani and Yoon, 2009). By switching from a traditional to a virtual form of training, they attempted to introduce the online experience. As a result, Talal Abu-Ghazaleh University introduced the first online enrollment and recruitment tool in addition to offering virtual courses.

Additionally, Jordan's institution employed synchronous blended learning, which combines virtual instruction with on-campus instruction to provide students with real-world experience. One of the nations that created an online platform, Darsak, to support online learning for schools in response to the crisis was Jordan (Audah et al., 2020). But prior to this crisis, internet education was not seen as an educational option in Jordan.

1.5.4.3 Online Education throughout COVID-19

On March 11, 2020, the World Health Organization (WHO) declared COVID-19 to be a pandemic disease. On March 19, the COVID-19 virus was declared to be under emergency control. The ensuing curfew was in effect for two months. Due to college closures, instruction is now conducted online. The need of having a strong infrastructure and being prepared to provide online courses is highlighted by the closing of institutions. Jordan has one of the most developed Middle Eastern regions and is regarded as one of the world's leaders in Internet infrastructure (Jordan Times, 2017). Online education turns as a tool for social distancing and disease control. Online learning provides constant access to learning environments around-the-clock as well as useful study tools. It also provides flexibility in terms of location and timing. Moreover, it offers feedback on the material of the prescribed courses as well as open-ended questions and answers for students (Rosell, 2020).

1.6 INTERNET-BASED EDUCATION AMID THE COVID-19 PANDEMIC LOCKDOWN PERIOD

Subsequently its beginning in Wuhan, China, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the source of the highly contagious disease known as COVID-19, which has since spread to every continent (Remuzzi & Remuzzi, 2020). It is mostly transmitted via intimate touch and has killed millions of people. Because of its intensity and severity, COVID-19 is known as a pandemic. It is the worst global health disaster to strike human civilization in millennia. Everything was destroyed by the new coronavirus, including societal customs and global economy (Schulten, 2020). Because of this, the International Labour Organization (ILO) projected that employment losses might total 195 million (UNDP, 2020). Adopting COVID-19 containment measures in their individual regions is one of the most favoured strategies to lessen the impact of this catastrophe (De Brouwer, Raimondi & Moreau, 2020). Lockdown is a popular keyword these days, having been discussed by many during the COVID-19 epidemic. Lockdown is a condition of emergency that people are prevented from leaving their houses by the proper authorities (in this case, the federal and state governments).This has led to widespread stay-at-home orders and quarantines since March 2020. India's first phase of a statewide lockdown began on March 25, 2020, and lasted for 21 days due to the coronavirus. The lockdown was then prolonged for a further 19 days on April 15, 2020, 14 days on May 4, 2020, 14 days on May 18, 2020, and 1 day on June 1, 2020, solely for confinement zones. Controlling the COVID-19 pandemic may be achieved, in part, via people's unrelenting commitment to strict precautions such social distance, according to

medical advice during quarantine, and practicing good hygiene and sanitation. (Khachfe et al., 2020).

1.6.1 Government of India policies and programs regarding online instruction at higher education institutions

The Indian government started to take this problem seriously and gave ICT and online learning a lot of attention as essential elements of university teaching and learning. Additionally, it is mirrored in the 2019 education policy draft, which is seen to be a proactive and very technologically efficient action during this epidemic. The Indian government launched the Examine the Massive Open Online Courses (MOOC) Webs of Active-Learning for Young Aspiring Minds (SWAYAM) program portal that offers online courses across many quadrants. A collection of 32 DTH channels called SWAYAM PRABHA is devoted to providing top-notch educational programming on television every day of the week. The MHRD used the SWAYAM platform to launch the On November 13, 2018, the online professional development program Annual Refresher Programme in Teaching (ARPIT) was launched. The University Grants Commission (UGC) oversaw the MHRD initiative e-PG Pathshala, which provided interactive, curriculum-based e-content in 70 subjects covering all academic fields. The National Council of Educational Research and Training (NCERT) and the Ministry of Human Resource Development (MHRD) jointly launched e-Pathshala, an online learning platform with instructional resources for teachers, teacher educators, research researchers, students, and parents, on November 7, 2015.

Therefore, it can be said that we were aware of the challenges and possibilities related to online learning.

The UGC, the highest governing body in India for postsecondary education, has taken the present status of education seriously and has moved aggressively to end the standoff over completing coursework and tests for the current semesters. The UGC has also issued a circular on the academic calendar in response to suggestions made by one of the committees it established. Furthermore, all Indian institutions are now mandated by law to complete 25% of their curriculum online and 75% in person (UGC, 2020). It would be challenging to manage teaching-learning situations in the post-COVID-19 educational environment without the stringent usage of online teaching platforms. It is anticipated that pupils will soon face a range of educational challenges, including excellent teaching, real-world experience, lab work,

library trips, peer tutoring, remedial instruction, research, and creativity, after their horrifying coronavirus experience. Because of this, maintaining a mix between online and offline learning settings is the best strategy for managing the post-COVID-19 educational crisis. (mode of hybridization).

1.6.2 Implementation of Online Teaching-Learning in HEIs

The COVID-19 situation has resulted in a number of challenges for the education system's implementation of change; these challenges are attributed to the innovative nature of online learning and its associated technical complexity. Prior to the current epidemic, online learning was mostly associated with Indian open institutions. During the COVID 19, online teaching and learning has become quite challenging, and stakeholders may struggle to adapt to the immediate change in the education system as they lack the technical skills needed for the current situation. Therefore, consideration of the consequences of change is necessary for the effective implementation of educational change (in this case, switching from traditional to online methods of instruction).

Fig. 1 described the selection procedure for adopting online teaching and learning. Beginning with the joint vision of UGC and MHRD (sub-system), University and Colleges (system), and different academic departments (sub-system), the road toward integrating online teaching and learning into the educational system is laid out. The unified vision of the education system in light of COVID-19 acknowledged that teachers and students must adjust to online teaching and learning platforms throughout the curriculum in order to satisfy the needs of education in the present. Both teachers and students were adept and friendly in using social media platforms such as Facebook, Instagram, Twitter, and WhatsApp. This shows how easily information can be shared through online learning platforms like Zoom, Cisco, WebEx, Google Meet, and others making them user friendly. Furthermore, various beneficial educational applications are accessible, such as Office 365, Google Classroom, and an incredibly intuitive videoconferencing app (FutureLearn, 2020). As a result, it seems unnecessary to be overly concerned about acquiring new technology abruptly, since some of these applications are already incorporated into our Higher Education Institutions. Fewer stakeholders had personal computers, which are needed for online teaching and learning, while most stakeholders had smart phones. The ICT centre and learning management system (LMS) at Mizoram University ensured the smooth management of the online teaching and learning setups.

The federal and state governments came to a unified decision to adopt online education nationwide, taking the urgent necessity into consideration. The notion of online teaching and learning modalities was only hesitantly and halfheartedly supported by different national, state, and university level teacher and student unions due to a lack of preparedness, orientation, and incentives for embracing online learning. This was a result of their curiosity to experiment with cutting-edge tools and fresh approaches to instruction and learning within the classroom. The action plan was created with consideration for the fact that we are equipped to teach online, that this epidemic is driving change, and that resources are available to support the implementation of online instruction. Teachers individually taught and prepared to get used to the technology needed for online teaching modes in order to follow the action plan. System administrators and ICT specialists oversaw the transition process at the university level and provided support to stakeholders in whatever they needed. However, many studies have examined how effective online teaching is, but none of these studies were conducted during the COVID 19 lockdown.

1.7 Research Questions

1. What are the main problems that students deal with e-learning in India, and how these problems affect success of online learning?

2. What are the various areas of online educational courses available in India, and how do they cater to the diverse educational needs of learners?

1.8 Chapters Scheme

Chapter 1: Introduction

In the contemporary era, education has witnessed a significant transformation with the advent of online learning platforms, offering a novel approach to teaching and learning. The chapter talks about what the study aims to do, what questions it wants to answer, and why it is important to look into how and why E learning platforms are used in India. Furthermore, it provides an outline of the subsequent chapters, offering a roadmap for the reader to navigate through the research journey.

Chapter 2: Literature Review

Chapter 2 explores the existing knowledge base regarding online learning, E learning platforms, and their impact on education particularly in the Indian context. It conducts a comprehensive review of relevant literature, synthesizing key findings, concepts, and theories related to online learning.

Chapter 3: Methodology

Chapter 3 describes the research methodology used to investigate the research design. It covers the selection of the research approach, methods of data collection, sampling techniques, and data analysis procedures. The chapter discusses the rationale behind selecting specific methodologies, ensuring the validity, reliability, and ethical considerations of the study.

Chapter 4: Results and Discussions

In Chapter 4, you will find the discoveries of the study based on the collected and analysed data. It offers a thorough examination of the results, structured based on the research goals and hypotheses.

Chapter 5: Conclusion

Chapter 5 summarises the key findings, conclusions, and implications that are derived from the study and culminating it in a comprehensive conclusion.

CHAPTER II: LITERATURE REVIEW

2.1. Literature review

This research study is comprised of a number of important components, one of which is the literature review. It provides a complete synthesis of the available knowledge and academic discourse on online learning and e-learning platforms, with a particular focus on the Indian context. This introduction gives a summary of the most important issues, aims, and structure that are included in the chapter that is devoted to the literature review. Over the course of the last several years, the widespread availability of digital technology has brought about a revolution in the area of education, resulting in the development of novel methods to both teaching and learning. Online learning, which is made possible by e-learning platforms, has emerged as a transformational force, providing learners all over the globe with educational possibilities that are adaptable, easily available, and customized. Within the context of India's distinct sociocultural and economic environment, online education has a tremendous amount of potential to meet the varied educational requirements of the country's enormous population, to democratize access to high-quality education, and to propel socioeconomic growth.

The chapter on the review of the literature offers a complete synthesis of the current research, ideas, and concepts that are associated with online learning and online learning environments, with a focus on the Indian setting. This section's objective is to provide a theoretical groundwork and provide participants with an awareness of the setting of the research project.

2.2 Evolution of Online Learning

The first attempts at computer-based training in the middle of the 20th century are where online learning got its start (Hammad et al. 2018). However, online learning did not become widely accepted until the development of the internet and digital technology. The literature discusses key milestones in the evolution of online learning, such as the development of learning management systems (LMS), the emergence of Massive Open Online Courses (MOOCs), and the integration of multimedia and interactive elements into online courses. Within the Indian context, the evolution of online learning has been shaped by factors such as increasing internet penetration, the proliferation of smartphones, and government initiatives promoting digital literacy and education.

2.3 Benefits of Online Learning

Online learning offers a plethora of benefits that have contributed to its popularity and adoption worldwide. The literature review synthesizes empirical evidence and theoretical perspectives to elucidate the advantages offered by online education. These benefits include flexibility in learning schedules, accessibility to educational resources regardless of geographical location, individualized instruction based on each student's requirements and preferences, opportunities for skill development through interactive and multimedia-rich content, and cost-effectiveness compared to traditional classroom-based education. In the Indian context, these benefits hold particular relevance in addressing the diverse educational needs of a large and geographically dispersed population.

2.4 Challenges in Online Learning

Despite its potential benefits, online learning also presents various challenges that impede its effectiveness and accessibility. The literature review identifies and discusses key challenges encountered in online learning, particularly within the Indian context. These challenges include technological barriers such as inadequate internet infrastructure, limited access to digital devices, and disparities in digital literacy levels among learners. Additionally, infrastructural limitations, including power outages and bandwidth constraints, hinder the seamless delivery of online courses. Moreover, socio-cultural factors, language diversity, and pedagogical challenges pose further obstacles to effective online learning in India.

2.5 Effectiveness of E-Learning Platforms

The literature review evaluates the effectiveness of e-learning platforms in delivering educational content, engaging learners, and enhancing learning outcomes. Drawing on empirical studies, evaluation reports, and theoretical frameworks, this section examines the impact of e-learning platforms on educational practices and student achievement. Studies indicate that well-designed e-learning platforms can facilitate active learning, foster collaboration and interaction among learners, provide immediate feedback, and accommodate diverse learning styles. However, the effectiveness of e-learning platforms is contingent upon various factors, including the quality of instructional design, learner engagement strategies, usability, and learner support mechanisms.

2.6 Competitive Landscape of E-Learning Platforms in India

The competitive landscape of e-learning platforms in India is characterized by a diverse array of providers offering a wide range of educational content and services. The literature review analyzes market trends, key players, and strategic initiatives shaping the competitive dynamics of the e-learning industry in India. Key players include both domestic and international platforms, offering courses across various subjects and levels, catering to diverse learner needs. Factors contributing to the competitiveness of e-learning platforms include content quality, user experience, pricing models, marketing strategies, and partnerships with educational institutions and industry stakeholders.

2.7 Regulatory Framework and Policy Initiatives

The literature review explores the regulatory framework governing online learning in India, including government policies, guidelines, and initiatives aimed at promoting digital education and ensuring quality assurance. Authorities that oversee online education and accredit e-learning platforms include the University Grants Commission (UGC) and the All-India Council for Technical Education (AICTE). Additionally, government initiatives such as Digital India, National Education Policy (NEP) 2020, and initiatives promoting digital literacy and open educational resources (OER) contribute to the growth and development of online learning in India.

2.8 Review of Literature

Devi, Manita & Kalra, (2023) provided that the education system of the country largely depends upon the quality of education provided by the teachers. Teachers are the future builders of the nation, they are the one who imparts knowledge, skills and continuously design the growing power of mind. To uplift the education system of the nation it is essential to revitalize and intensify the teacher education system. Therefore, it is a need of an hour to improvise the quality education among the teacher educators. Innovation is the key to the quality of teacher education. It is the ability to think out of the box which is totally unique and does not exist till date. The teachers of the 21st century have revamped their wings due to the upcoming of the covid pandemic. Prior to this, a lot of modification has been done in the teacher education program but still the teachers are having a hard time in coping up with the latest technologies. Covid-19 has initiated the use of the latest technology and has provided hands-on experience

to the teachers to impart the knowledge through technologies in the education system. This paper is focuses on the emerging trends in teacher education such as, Artificial Intelligence, Online learning, LMS Based Learning, and Blended Learning.

Saha et al. (2023) said that the Covid-19 outbreak surprised everyone by being both sudden and very infectious. People are being compelled to remain inside and are learning how to work from home. Given its impact on future prospects, education has likely been impacted the most of all the industries. Teachers and students alike are struggling with technology, attention spans, traditions, and other issues as they attempt to adjust to the online learning environment. This research attempts to identify the main challenges that students have while adjusting to e-learning, based on a survey that was given to engineering students in India. The answers have been categorized and examined according to the topic of the inquiry. The results, some insignificant, some delicate, and some enlightening, would undoubtedly support government and corporate sector policy-making efforts that fund e-learning.

Ghosh et al. (2023) found that, science and technology have undergone unprecedented development in the 21st century and have been applied in various fields of society. These have begun to be applied in the realm of education, particularly in the area of distance learning. Information and communication technology use has made the education process more interesting; efficient and students' learning outcomes have increased even more. At present, the whole India and the whole world has witnessed a terrible Pandemic. The Pandemic has forced countries to close their educational institutions, and our India was not left out of this. In a word, the traditional way in which the educational institutions were conducting their education process seems to have come to a halt due to this Pandemic. But even though education is not imparted in the traditional way, the educational institutions have continued their process to educate students through online mode of education. A variety of tools and software application are required to join and manage this online education and also need some electronic gadgets with internet facility.

According to Singh, Bharat & Gupta, Varun Kumar (2023), the emergence of digital technologies has transformed the field of education, changing the conventional approach to teaching and learning. This study offers a thorough examination of the effects of digital technology on education and highlights how it has transformed various aspects of education, including pedagogy, curriculum development, assessment, and communication. Digital technologies have revolutionized pedagogy by offering innovative teaching methods that cater

to different learning styles. Videos, images, and animations are examples of multimedia technologies that have improved education and made it more dynamic and interesting for students. Digital technologies have also revolutionized curriculum development, making it possible for educators to design and develop courses that are flexible and adaptable to different learning environments. Digital learning Students may access a vast array of instructional materials and tools from platforms at any time and from any location. Because it is now more available to students who may not have access to conventional educational resources, this flexibility has completely changed the face of education. In conclusion, digital technologies have transformed the education sector, offering innovative teaching methods, personalized learning experiences, flexible curriculum development, efficient assessment practices, and enhanced communication and collaboration.

Mokhets'engoane et al. (2023) stated that the modern classroom is more dynamic than it was in the past. Notably, the 21st-century teaching techniques of educators have undergone a significant transformation due to the advent of technology in the classroom. In order to fully comprehend instructors' deep perceptions on the issue under inquiry, the study used a qualitative case study approach. A semi-structured interview conducted over the phone was used to gather the data. Furthermore, since Covid-19 limited mobility and in-person interactions, a convenience sample of five instructors from five departments at the chosen university was chosen. The study's overall conclusions imply that instructors in the twenty-first century face a variety of difficulties that have a negative impact on the teaching-learning process. The difficulties may be categorized into three main categories: technology, adaptability, and resource-related. The participants suggested that sufficient research be conducted, CPD courses be offered, and appropriate technical assistance be provided about the integration of technology into teaching and learning processes in order to solve these issues.

Roy and Smritikana (2023) concluded that, blended learning connotes an amalgamation of traditional in-campus learning and online learning in a suitable way to make both teacher and students benefited in the teaching learning process. It helps in the improvement of learning practices and this mixed learning approach makes students able to complete their given activities in more independent and flexible way. The experience of inside and outside the classroom should be planned very carefully as well as systematically. The importance of a teacher cannot be altered anyway by the usage of Technology. It can only enhance the process of learning as it maximizes the learning opportunities in order to meet students' needs. Students

also learn joyfully in the blended learning environment with the proper support and guidance of efficient teachers. From different point of view in the twenty-first-century educational system, blended learning is seen as an important learning strategy. The current work aims to shed light on the overall concept of blended learning approach in this globalized era.

The study by Alsharah et. al. (2023) studied and analysed the results of COVID-19 pandemic, online business education courses were offered. Design, procedure, and strategy: The research conducts an analysis of the current literature on the consequences of online learning in business education during the COVID-19 crisis, taking into account the limitations of the journal. Results: There is evidence in this study that the pandemic has worked as a catalyst of the business schools to reassess and plan new teaching strategies. Additionally, it has replaced the outdated model of instruction with cutting-edge, technologically-assisted online learning methods. Originality and worth: Despite the limited sample size of the research, the results will deepen our knowledge of the importance of online learning in education and provide fresh perspectives for new investigations.

Rosak-Szyrocka, et. al. (2023) found that the book "Advances in distance learning in times of pandemic" is focused to the problems and difficulties that colleges encounter in the modern world of remote learning. It addresses both the theoretical and real-world aspects of remote learning. It goes into detail on topics including the difficulties of remote learning, student evaluations and expectations, how to utilize technologies to make distance learning better, and how e-learning works in the context of industry 4.0 and society 5.0. The problems associated with the implementation and use of Web 3.0 for e-learning, quality assurance, and knowledge management are also given a lot of attention in this book. Along with defining the impact and future scenario of future of e-learning from the learner's point of view, this book aims to paint a comprehensive picture of the current and continuous online teaching activities, in sharp contrast between the time before and after lockdown. It does this by taking into account the behaviour and demands as well as aspects of industry 4.0 and society 5.0. The book explains how remote learning has evolved, particularly during the pandemic that transformed the field of education. Highlights: During a pandemic, e-learning may help to promote digital citizenship and has previously transformed the role of online education. The feature of distant learning in the industry 4.0 and society 5.0 eras 4.0 views distant education as a desirable kind of instruction. The book is beneficial for university students since it addresses both scientific

and instructional topics. Courses in Undergraduate, Graduate, and Research Grade are available for anybody who wants to learn more about the many facets of remote learning.

Theoneste, et. al. (2023) asserted that in addition to providing a detailed description of the prospects and problems confronting e-learning in secondary education, the purpose of this research was to provide a perspective study of e-learning in Rwandan secondary schools. Following the Covid-19 epidemic, Rwanda has expedited its secondary school e-learning program to better serve the nation's students. E-learning is still essential for improving educational quality and accessibility. Rwanda has made greater investments in ICT to improve learning environments. It has also taken the initiative to expand internet coverage and provide laptops and other ICT equipment to instructors and students to facilitate online learning. Aside from that, difficulties persisted and must be overcome for a more successful e-learning trip. In this essay, we discussed and examined the primary e-learning obstacles as well as the potential that exist in Rwanda's secondary school.

Siripipatthanakul and Supaprawat (2023) claimed that Information and communication technology (ICT) teaching combined with in-person instruction is called blended learning (BL). Technologies based on the Internet of Things (IoT) are seen as devices by any network. An IoT-based BL model could be the best New Normal option for all educational stakeholders during the COVID-19 epidemic. Conventional in-person interactions must change because of social distance. To establish and enhance an intelligent learning environment, a variety of Internet of Things (IoT)-based "things" might be included into classrooms, and learning goals could be connected to portable devices. Four aspects of the PBL—face-to-face, self-paced, tele-distance, and ubiquitous—could be separated into three types of typical learning environments: digital, embedded, and side-by-side. These categories help prevent the spread of COVID-19. A better way to address students' academic demands during natural catastrophes, pandemics, and conflicts would be via online or blended learning. The whole teaching style has changed to one that is learner-centered thanks to the usage of ICT-based tools; as a result, proficiency with technology should be seen as one of the prerequisites for both instructors and students. In teaching and learning transactions, it is important to understand how educators and learners perceive online or hybrid learning environments. It may be difficult to provide online or blended learning in the classroom, especially during and after the COVID-19 epidemic.

Mondal et al. (2023) found that India's Union Cabinet passed the New Education Policy (NEP) on 29th July 2020, making it one of the most important policies of the 21st century. This policy prioritizes various aspects of education, including online and digital learning, and is revolutionary for the 21st century. For online and digital learning, this study discusses curricular and pedagogical innovations. NEP, as part of the 2020 policy objectives, creates a stage for courses of open online supported by several portals. Due to the current escalation of epidemics and pandemics, Higher Education Institutions must be prepared with excellent alternative education methods whenever and wherever traditional and in-person education methods are impractical. The policy of NEP, 2020 is aware of the importance of digital and online education in this regard.

According to Dubey et. al. (2023), since the COVID-19 and more accessibility to the Internet have made it more common for students to utilize e-learning technology for improving the student performance, increasing student engagement with learning via developing a virtual environment has its own problems an limitations for educational institutions throughout the world. Examining the consequence of empowerment, utility, hedonic motivation (HM) applicability, perception and attitude on student engagement among open and distant learners (ODLs) in central India is the goal of the current research. We used basic random sampling to get information from Chhattisgarh's ODLs. ODLs who have been using e-learning systems for a minimum of a year were selected as research participants. Through both online and offline methods of collection, the authors were able to gather 1,137 replies. The test findings showed that although perception and empowerment variables had no effect on students' involvement in e-learning, usefulness, HM, and attitude factors were shown to have a strong association with student engagement. The current research takes a fresh method. It makes clear the essential elements of student engagement that, if skilfully handled by educational institutions or relevant administration, might raise students' use of e-learning technology.

Siripipatthanakul and Supaprawat (2023) suggested a revolution in education has been made possible by the advancement of technology. A broader set of procedures and guidelines that prepare and support the development of a highly trained workforce in 21st-century learning is starting to include technology-enabled learning as a fundamental component. Gamification has been used in e-learning, or digital education and training, for a number of years. A similar situation is presented by gamification in digital education and training systems. A cutting-edge approach to teaching called "game-based learning" uses instructive computer games. Software

for instructional augmentation, student evaluation, and learning aids in the form of educational games is also included. In order to assist a well-organized and methodologically sound gamification design for digital education and training, gamification may aid in the development of a systematic approach. Many types of computer games are widely used in the educational sector. Making suitable games may help learners grasp the teaching content more readily. A growing number of scholars are focusing on gamification and game-based learning. Gamification has been around for a while, having its roots in marketing campaigns like point cards and incentive memberships, as well as in educational institutions, the highest level of science, degrees, and workplace efficiency.

The research by Thomas, et. al (2023) aims to explore academics' viewpoints on the state of digital learning as it is implemented in different South Indian higher education institutions. Additionally, it looks for the difficulties people run across while switching from offline, conventional techniques to online or hybrid learning. Faculty members were given a survey, and the data was analysed using statistical methods including factor analysis and percentages. One important conclusion from the survey is that getting kids' attention in digital classrooms is a major difficulty, as agreed upon by 44.2% of respondents, and strongly agreed by 36% of respondents. Therefore, compared to full digitalization, 49.4% of respondents think that a mixed learning strategy is more appropriate. Just 0.9% of respondents said they had never had any problems implementing technology in the classroom, while 36.3% of academics strongly agreed and 48.3% agreed that more FDPs and refresher courses related to the advancement of technical skills are urgently needed to address this educational transformation. The present research also suggests a 4-factor adaptation model for higher education institutions to use in order to improve the quality of the learning experience, based on the issues that have been noticed. Novelty: The research highlights how important it is to determine academics' requirements in order to help them adjust to the current changes in education. Literature on instructors' opinions on how easily online learning may be adapted in higher education after the epidemic is lacking.

Torun et. al. (2023) said that in the 21st century, technology plays an important role in our daily lives Changes in technology have had a significant impact on several fields. Professionals, educators, and students recognize the necessity of using technology to rebuild or reengineer the education and teaching system. Specifically, the ease of technology and the proliferation of the Internet have precipitated this situation. In response to these changes, not only individuals

but also the various components of the states have begun to adapt. In particular, as with the COVID-19 pandemic, there have been changes in the definition of the workplace, as well as changes in education. Approximately 1.2 billion students have continued their education online. This has aroused a curiosity about questioning the effectiveness of online education and how it can be structured and moved into the future. Studies conducted during the pandemic period suggested that online learning could be more effective for those who have access to the right technology. Some studies have shown that students hold on average 25 to 60 percent more material while learning online.

Shohel, et al. (2022) stated that the world of teaching and learning at all educational levels is changing as a result of e-learning and digital education strategies. E-learning and digital education are becoming more innovative in order to satisfy the demands of the twenty-first century. The digital revolution in daily life has led to a more self-paced and accessible learning and education process from any location at any time. As a result of their interactions with the digital world, the younger generations of digital natives are developing a certain set of abilities. In this regard, the book comprises a number of chapters that explore the opportunities and challenges of creative approaches through the prism of contemporary theories, policies, and practices in order to support ongoing improvements, such as flexibility and accessibility, in e-learning and digital education.

Akash (2022) said that although digital education has been around for a while in various forms, it is mostly a recent concept. The educational system is about to undergo significant changes as a result of the digitization of certain system components. These adjustments will aid in preventing pandemics like COVID-19 in 2020, both naturally occurring and man-made. The internet and other electronic media make it all feasible. Numerous platforms, including YouTube, Telegram, MOOCs and others, provide online learning. The most well-liked kind of online education is MOOCs, which provide degrees in the same manner as conventional universities. This essay will examine digital education in India, including its objectives, viewpoints, challenges associated with shifting paradigms, and issues that may arise as a result of its inclusion in the NEP-2020.

Kanyal, et.al. (2021) proclaimed and suggested that the COVID-19 has forced every educational institution towards closure of their daily commute of learners. In order to ensure that instruction would not be disrupted, many institutions expedited the development of online learning environments by shutting. The coronavirus pandemic put the centers' capacity to

handle an issue requiring remote and online assistance to the test. Since the majority lack education, it is important to look at the reasons for offering kids online programs that continue beyond the days of incarceration. Prior to the epidemic, most kids had never engaged in distant learning. Given the global lockdown, these institutions relied heavily on the virtual classrooms. Schools, following the lockdown procedures like every other organizations, have already shifted their emphasis to interactive networks in order to provide online courses. It's standard practice to combine learning management systems such as blackboard, Infrastructure Canvas and Google Classroom together with video conferencing platforms like Zoom and WebEx. Furthermore, there are programs like Proctorio, a Google Chrome plugin that monitors students as they take online exams. As part of the nationwide lockdown, the government of India has also stopped all educational institutions, which has an effect on students ranging from elementary schoolchildren to postgraduates.

Ouadoud et. al. (2021) said that as part of an experimental strategy, numerous Moroccan institutions have been conducting distance learning initiatives since 2010. Therefore, it seems to us that a plan has to be implemented to offer this option for education a proper position in training and the resources it needs to accomplish these goals. The article's goal was to provide an overview of the many types of e-learning systems, platforms, and standards in the e-learning industry. Conversely, provide a summary of both private and free e-learning platforms, their functional designs, and the kinds of e-learning gadgets that may be made using these online learning environments.

Singh, et. al. (2021) concluded that due to the COVID-19 pandemic, e-learning is now required for medical and nursing students. It is unknown how prepared emerging nations like India— which have a vast socioeconomic and cultural diversity—are for this issue. Our goal at this crucial moment is to assess whether online instruction for medical and nursing students is as practical, acceptable, and successful as in-person instruction. The poll was completed by 684 nursing students and 1541 medical students from 156 cities overall. Students from wealthy households and those who attended urban schools had higher levels of computer competency, laptop availability ($p<0.0001$), Wi-Fi availability ($p<0.0001$), and dedicated room availability ($p<0.0001$). Headache, eyestrain, anxiety, neck/back discomfort, and disturbed sleep were predicted by class duration >4 hours/day ($p<0.0001$), each class length >40 minutes ($p<0.009$), and pre-existing health conditions ($p<0.0001$). Eighty percent of teachers used PowerPoint presentations as their primary teaching tool. Just 30% of students had enough time to

communicate with professors. Merely 20.4% of respondents believed that online learning could take the place of traditional classroom instruction. Preferred by students: 3-6 courses each day, lasting no more than 40 minutes each, with 10-to 20-minute breaks in between interactive lessons.

Singh & Tiwari (2021) in light of the epidemic, nations worldwide are concentrating on providing ongoing online education. Since education cannot be stopped, all parties involved in it must play a significant part in this. From kindergarten to the research level, all tiers of the educational system are using digital efforts to keep up the teaching-learning process. All academic institutions throughout the globe provide different forms of online education. The emergence of new technologies, widespread Web use, and the need to prepare a workforce that would mostly rely on technology for work provide the foundation for the creation of a new educational framework. MHRD has already implemented a number of efforts to improve education for academic fraternity using a variety of digital channels. Digital learning will become an essential component of our educational system in the next years. This essay seeks to outline the soon-to-be anticipated new normal, which calls for adequate infrastructure, unemotional instructors and kids, standardized government regulations, and quick, ubiquitous network access.

Yadav & Gorai (2021) in a book called eLearning in 21st-Century Problems and Repaired includes a number of essays, perspectives, and case studies. eLearning is growing in popularity daily. The world has changed from physical to virtual learning during the COVID-19 pandemic. Our time is being saved, and technology is keeping us safe from serious harm. Virtual platforms are being utilized extensively, such as Webex meetings, GoToMeeting, Zoom apps, Microsoft Teams, Blue Jeans, GoToMeeting, GoTowebinar, etc. Although virtual platforms have saved us time, customers find them bothersome due to a number of significant and little issues, such as poor connection, voice and signal loss, unclear sound, login errors, etc. Educators and learners alike must enhance their technological proficiency to effectively navigate these platforms. Pupils at the university level are well-educated and can thus respond rapidly to such emergencies, while pupils at the school level have far greater challenges. Newspapers have reported that many students who take online courses find them dull and that many of them suffer from mental health issues. Teachers are becoming frustrated because of student misbehaviour as well.

Meier (2021) said that a guidance for teachers and students using networked technology was provided in the article. It also acts as a manual for network builders that want to provide more equal access to resources that encourage youth "to pursue their interests and take ownership of their learning" and are worried about the caliber of online education (Nacu et al. 2018, p. 1029). Network platforms took on a significant part in the educational process during the Covid-19 epidemic. The post serves as a useful reminder of how crucial it is to plan and execute platforms that will meet the educational objectives of the twenty-first century. The study of Nacu et al. is reviewed from a "theory of change" standpoint in this response to their publication. In the original study, the authors provide a heuristic that broadens the range of online roles that educators may now play to help youth develop their knowledge. In order to fully use the heuristic, a more comprehensive strategy that reframes online learning as a knowledge-building setting is needed. The essential elements required to assist educators and designers in making the shift to a more thorough comprehension of online learning might be determined by using a theory of change. Sadly, network designers and educators are not prepared to do this task just by heuristics. The heuristic may be included into a more comprehensive, long-term study to better equip educators and designers to implement student-centered online learning environments.

Nafrees (2021) said that COVID-19 epidemic has stopped people from moving across the world, yet technological advancements have made it possible for people to carry out their everyday chores even under lockdown situations. This research focused on the experiences and aspirations of Malaysian undergraduates about e-learning during COVID-19 in order to do a comparative study between undergraduates at Malaysian and Sri Lankan institutions. Both quantitative and qualitative data were used. Additionally, data were gathered via the use of a random sample methodology, and SPSS was utilized for data analysis. Despite agreement on the monthly cost for internet connectivity was high significantly and that the services provided by the university and the E-Learning activities fell short of their expectations, students were still happy to participate in online learning despite having less experience with it overall. It was also found that Malaysian undergraduates agreed that E-Learning provides course resources as expected satisfactorily. Additionally, it is highly advised that an AI-based e-learning platform be created that can instantly respond to student inquiries, and that students be given free internet data access by the government. Maintaining the hybrid learning approach is preferable than using a totally online platform. Few prior research studies were found to be relevant for the

literature review. Undergraduates from Malaysia and Sri Lanka will compare their experiences with e-learning during the epidemic.

Niaz et al. (2021) stated that the historical overview of e-learning is presented in this article. It describes the evolution of e-learning throughout the years after reviewing many research into its beginnings. It has arranged, summed up, and clarified the development of e-learning historically. Additionally, a thorough survey of the literature about the origins and evolution of e-learning from antiquity to the present is included in this research.

As per Jindal et al. (2020), changes in the education industry are unavoidable given the speed at which technology is developing. A great deal of study is being done to determine the benefits and drawbacks of online learning vs traditional classroom instruction. There are several obstacles and chances for online learning in India. In this study, we have highlighted critical aspects that would propel online education in India by a thorough assessment of the literature. They have determined that internet penetration, the affordability of online learning, the convenience of the courses, government effort, employer recognition, and gap-bridging are the main drivers of the industry's expansion. A few things that are impeding the expansion include the language used in online education, trust issues, and a lack of adequate digital infrastructure. The study also examines the prospects in the education industry that arise from India's growing internet user base.

Similarly, Barman, et al. (2020) concluded that COVID-19 pandemic is still spreading around the globe and damaging every economic sector, resulting in a precipitous decline in global economic growth. Global education has been completely upended by the COVID-19 pandemic, resulting in the closure of several educational organizations around the world, resulting in closure of prominent institutions like Harvard and IITs (India Today, April 7, 2020). Schools are closed during this epidemic hour, leaving children left at home with very little social interaction and nearly little physical exercise. Additionally, almost all recognized boards have cancelled or postponed exams. Because passing their school or college leaving examinations is a prerequisite for moving forward with their next stages in education or jobs, the student body is thus faced with grave anxiety about their future. In order to address the larger issue of education disruption caused by the COVID-19 pandemic, the only practical solution is to move to a digital learning environment, where parents can act as both an administrator and a facilitator while also assisting teachers. This will minimize any disruptions to the educational process. With 34 crore students, more than the population of the United States, and the majority

of higher education institutions in India depending on the old-fashioned gurushishyaparampara of physical classroom instruction, the COVID-19 pandemic has caused significant disruptions to the country's educational system.

Thakker & Parab (2020) from their research identified that, educational institutions started addressing the issues raised by COVID-19, e-learning emerged as the most viable option. The goal of this research is to identify the underlying constraints by studying how engineering students perceive the various e-learning systems. Additionally, it aims to provide effective and applicable strategies that can enhance e-learning over the long term as well as during pandemics. Starting from comparing the various e-learning platforms that are out there, 364 engineering students were selected from different institutions and branches to participate in an online survey that collects primary data for analysis. The gathered information was examined to identify any online learning bottlenecks, and recommendations were made for resolving a few issues. The accessible e-learning systems received scores between 2.81 and 3.46 on a five-point Likert scale. The platform that was most favoured was Google Meet. The most satisfied platform, however, was Microsoft Teams, with a net promoter score (NPS) of 30.36. Errors in technology along with biological and psychological variables were shown to be negatively impacting e-learning. This novel study may include biases related to educational stream and geography since it is based mostly on the opinions of engineering students who are predominantly from Indian cities. The study may be expanded to include e-learning trends worldwide including rural locations. From the perspective of engineering students, the study provides a comprehensive examination of e-learning platforms. Additionally, the research reveals to be comprehensive and strong enough to uncover important problems tarnishing the e-learning experience since it does not limit itself to technical details.

Liu, et. al. (2020) addressed that online learning is becoming increasingly crucial for the current and future educational landscape. The current implementation and integration may be not adequately represented in educational institutions, however. held discussions with university professors, in which they will emphasize the advantages of remote learning programs from the perspective of the instructor; and test takers, who make use of the online learning platform to study, to elucidate its influence on academic achievement. Benefits includes increased access freedom, reduced educational costs, the ability to break up the content of an online course into manageable modules, flexibility for students and educators, being updated with new technologies to prepare students for the future and the capacity to establish standards for

knowledge evaluation. Test findings show that students (300 in all) with varying levels of academic achievement have improved their performance after using the Moodle platform. Students who rated low show the most significant increase in their performance.

The purpose of this research article was to examine the E-learning process among students who are used to using online technologies. Finding ways to assist kids become more proficient at studying on their own is also beneficial. This study's sample size is 175 people worldwide, and it uses the stratified sampling approach. The study's conclusions highlight the effects of online learning, students' enthusiasm in using online resources, and their academic achievement. In summary, this survey demonstrates that e-learning has gained a lot of traction among students worldwide, especially during the COVID-19 lockdown period.

According to Sunil, et. al. (2020), due to the lack of qualified teachers and the rise of medical students in India, online materials are more accessible than ever. Online learning, computer-assisted education and dispersed learning are other terms that different forms of e-learning. With the use of e-learning tools, students have the flexibility to customize their experiences that fit their unique learning abilities and goals by having control over the material, learning order, learning speed, time, and frequently media. Medical schools in resource-constrained nations turn to e-learning to provide access to medical education in the face of a severe faculty shortage. The adoption of adult learning theory in medical education may be accelerated by the incorporation of e-learning, since educators will take on new roles as facilitators of learning and competence evaluators rather than just material providers. The present essay addresses the development of e-learning in medical education, as well as its elements and resources, with an emphasis on the benefits and drawbacks of e-learning.

Danilescu (2020) concluded that through the use of Internet technology, role-based e-learning has produced a student-centered approach to learning. Unquestionably, social networks and Web 2.0 technologies have the ability to enhance e-learning's role-based learning. But as technology advances, it will also affect how role-based e-learning is developed in the future. These changes will encompass issues including shifting teacher perspectives and shifting student roles. Three key elements underpin the ongoing development of role-based e-learning: learners, educators, and technology. E-service-learning is an educational strategy that meets social demands while offering a practical, progressive learning experience by fusing learning goals with community involvement. The modern information technologies facilitate the learning process by attending to its requirements and facilitating the concept-level interaction

between the learner and the technology. Technology should serve as thought-provoking instruments that let pupils create more insightful, unique worldviews and representations. Students may get real-world experiences from an eService-Learning course that they cannot get from a textbook, conventional lectures, or made-up lab projects. A great benefit for future employment is the skill sets and on-the-job training that an eService-Learning model cultivates.

Our inclusion criteria led to the identification of forty-three important studies that focused on four different forms of integrated digital learning: digital, ubiquitous, mobile, and electronic learning. The research also investigates the fact that lectures, tutorials, and laboratory work are the main technology-related delivery modalities. Using technology in the teaching-learning process may be a useful strategy for preparing teachers and students for improved teaching and learning results. It is clear from our analysis of these research that methods may significantly enhance students' learning. We investigate these claims to provide educators and decision-makers with an alternative perspective on the efficacy of education.

Kumar, et. al. (2019) stated that one of the most significant advancements in higher education in the twenty-first century is distance learning, which is made possible by a variety of online learning environments. E-learning platforms are starting to replace conventional learning systems, which are falling behind in terms of new technology and tools. These platforms provide the freedom to study at any time and without being restricted by geography. The advantages of adopting e-learning platforms for distance learning include time and cost savings, efficient administration, curriculum mapping, information accessibility, current course content, sophisticated reporting, and multimedia learning with access to a vast array of global learning resources. With adaptable ICT technologies, an e-learning platform may make learning simple and efficient. Additionally, it offers interactive online services with pedagogical materials to help students learn and become more motivated to study. The e-learning systems that facilitate the transformation of higher education via distant learning are described in this research. The authors discovered that there are several e-learning platforms available, but they only chose the most cutting-edge, futuristic, and technologically advanced ones to facilitate higher education.

Son (2019) found that online degree programs have been expanding quickly both domestically and internationally since the early 2000s. Learning management systems have been used by even conventional colleges to provide online, flexible, and hybrid courses. Publishers of textbooks have also been enhancing e-Learning environments and accessories at the same time.

Tailored education should include high-performing, flexible multimedia tools to meet the demands of the pupils. We see the expanding influence of online collaboration tools and live e-learning on constructivist and connectivism pedagogies. As a result, curriculum for the digital era of the twenty-first century should encourage active learning, multimedia learning, experiential learning, and collaborative learning. These four interconnected learning components make up the learner-centered integrated e-Learning paradigm that this chapter proposes. We also thoroughly analyse cutting-edge e-Learning practices that are essential to fostering highly engaging and applicable learning in the twenty-first century, using the example of a worldwide online MBA course. In conclusion, we examine the consequences of an integrated e-Learning paradigm in management education, deliberating on the optimal applications of pedagogical strategies.

Ratheeswari (2018) said that in modern times, ICT is affecting all aspects of human life. They are making significant contributions to business, education, entertainment, and the workplace. Furthermore, it has been acknowledged by many people that ICTs are change agents which are now defining how people handle and exchange information, how we teach as well as learn, how science is conducted, and how we access information communication technologies. Integration of ICT has therefore become crucial in the classroom to train students for future. ICT enhances instruction and learning, and it is crucial for educators to carry out their responsibility as designers of educational settings. ICT enables educators to provide their material in an engaging way to students at every educational program level. Teaching training programs are becoming more helpful and appealing in India via the use of ICT. The internet and interactive multimedia, as examples of ICTs, are undoubtedly major areas of attention for education in the future. Formal teaching and learning must be properly integrated with ICTs, particularly in teacher education institutions.

Ayu (2018) suggested that students must have more access to information in order to support and enhance their learning process in the "Information Age," when there is a greater demand for knowledge. Universities are now just experimenting with e-learning, but they are rapidly warming up to the potential of this approach. All of the ways that instructors teach and learn might be altered by e-learning. It may raise expectations and encourage involvement in the classroom. While technology can't take the place of lecturers and instructors, it may supplement current techniques to increase output and cut down on administrative time. This essay examines e-learning from the viewpoints of instructors and students and attempts to provide an overview

of how prevalent e-learning is in higher education. Additionally, it provides a quick overview of the state of interactive technology-enhanced e-learning today.

Palvia, et. al. (2018) found that the increasing need for workers who are regularly educated for the constantly changing digital economy, along with the convergence of new technologies and widespread Internet penetration, have led to a steady growth in online education around the globe. By 2025, online learning is expected to become commonplace. Factors at the national level that affect the amount and quality of online education are covered in this article. Industry (company); national, state, and municipal governments; national legislation; ICT capability; Internet/mobile technology dissemination; and income and digital divide are some examples of these elements. They provide recommendations on online education for national and international organizations.

Cheriyan (2018) through the lens of the student, this research sought to identify the crucial elements contributing to the effectiveness of e-learning in the higher education. It seeks to add to the little body of information on e-learning effectiveness in India. Based on the earlier studies, a questionnaire is created. The data is gathered from the undergraduate, graduate, and doctorate students at a Bangalore based institution- Christ, Bangalore, India, using a convenience sampling approach. Survey respondents were asked to provide their opinions about the significance of several elements contributing to various aspects of e-learning success. Principal Component Analysis is used in an exploratory component analysis to see how each variable loads onto several factors. The study finds that the five factors as e-learning resources, technological support, e-learning support and training, student and instructor characteristics— are essential to the success of e-learning. These factors are ranked according to their relative importance, with technological support being the most important.

Kundu, et. al. (2018) acknowledged that nearly every student in the present period has heard of e-learning, and e-learning is being actively explored and implemented in many forms by every aspect of the education and training system. The term "e-learning" is wide. It covers a broad spectrum of approaches and procedures. It is often used as a general phrase to refer to the domains of technology-delivered education, web-based learning, and online learning. The area of education has attempted to take advantage of the web's remarkable growth as a communication medium to link remote learners with their educational materials. E-learning raises knowledge about contemporary education and provides more flexibility in the Teaching-Learning Process (TLP). Since everyone is concerned about growth and educational

development in the present day, e-learning activities are crucial for the development of any nation on our globalized planet. This study paper examines the latest advancements in e-learning in India with the aim of understanding the concept's growing popularity and its potential to become the main driver of the country's education sector's growth soon.

Oswal & Narayanappa (2018) found that learning alters human behavior in a way that is essentially permanent. This conduct is the outcome of internal processes including attitudes, emotions, and thought processes, as well as educational initiatives. Technology advancements are changing the conventional instructor-centered learning approaches to learner-centered ones. These widely used technologies provide an enormous amount of educational materials to fulfill the various demands of every student. These low-cost new pedagogies have marginalized the role of the teacher. The outcome of pedagogical and technical advancements coming together is e-learning. The modern generation's existence and sense of self are fundamentally shaped by technology. With the change in information technology, learning is now taking place at home and in workplaces instead of in classrooms. Because e-learning offers a customized and flexible learning experience, it has expanded the knowledge base of learners. It is now an essential instrument in the 21st-century learning process. This essay will concentrate on e-learning and its innovative methods of instruction. It will discuss the need for, significance of, uses for, and blending of online and in-person learning.

Güneş, et al. (2018) stated that education's future is being molded right now. The 21st-century student has several ways to get information. Information is now more easily accessible than it was in the past. People in the modern day may easily get important information even via wearable technology, such as smart watches or glasses. In this technological era, redefining education is unavoidable, and in comparison, to in-person instruction, open and distant learning now leads the way. 21st-century learners can use modern technology via open and remote learning. This chapter seeks to provide an overview of 21st-century learners, their natural abilities, the learning environment they inhabit, and the ways in which open and remote learning may be advantageous to them.

Chitra & Raj (2018) suggested that students studying via e-learning are immersed in a whole new world, necessitating the development of new skills in order to succeed. While the performance of online learners is often comparable to that of in-person learners, withdrawal rates and incomplete grades are greater. E-learning is a term that refers to both computer-assisted and student-centered collaborative learning methods. The relevance of study, critical

thinking, and assessment abilities is increasing because students are shifting towards the use of ever-increasing amounts, coming from a wide range of sources. Additionally, compared to a typical classroom, students are much more autonomous, especially in fully online courses. They must thus have a strong sense of motivation and a strong commitment to teaching, with little social contact with students or teachers. Early advances in e-learning were centered on computer-assisted learning, in which all or most of the course material is provided digitally.

According to Basak, et. al. (2018) the information and communication technology boom of the twenty-first century has led to a growth in the usage of digital devices for a variety of reasons in both official and informal education as well as the workplace. This research examines the literature that already exists, focusing on definitions, terminology, distinctions, core viewpoints, advantages, drawbacks, and, ultimately, the parallels and divergences between e-learning, m-learning, and d-learning (digital learning). It demonstrates that m- and e-learning are divisions of d-learning. However, certain educational resources may be classified as both m-learning and e-learning.

As per the study by Hammad, et. al. (2018) an overview of the idea of e-learning, its history, its future, virtual classes, adaptive e-learning, and case studies are provided in this presentation. These technologies are seeing a very fast growth in cyberlearning. By contrasting it with other e-learning platforms, the characteristics of adaptive learning are highlighted. The research makes it very evident that adaptive learning has many facets and will usher in a new age in education. The learning group and the learning environment determine which e-learning technology is ideal. By directly mapping the learning objects to the learning domain and tailoring them to the specific requirements of the students, adaptive learning improves the capacity for learning.

Al-Saadi (2017) study examined 47 published studies on online teaching and learning since 2008, that primarily focused on how theories, practices, and assessments relate to the online learning environment. Because e-learning is now essential, this research has been conducted. This document aims to provide useful recommendations to those who want to create online courses, enabling them to make well-informed choices throughout the implementation phase. The results led the authors to conclude that three factors are necessary for effective online instruction:

1. the development of an online learning community

2. the rapid advancement of technology
3. well-designed course content, motivated interaction between the instructor and learners, and well-prepared and fully-supported instructors.

It is intended that by doing this, the conversation on practical tactics that might help academic institutions and faculty members successfully make the switch to online instruction will continue. This work might contribute to improving higher education, student enrollment, and retention in light of the ongoing discussions about the expense and quality of higher education.

Garrison (2016) found a logical, thorough, and scientifically supported paradigm for comprehending e-learning in higher education is offered by the third edition of E-Learning in the 21st Century. Garrison explores the technical, educational, and organizational implications of the subject matter by drawing on his decades of expertise and substantial study in the topic. The third edition, which emphasizes the disruptive and revolutionary effects that e-learning has recently had on education, has been completely updated throughout and contains new content on learning technologies.

Bezovski, et. al. (2016) stated that although computer-assisted learning, or electronic learning, has been present since the 1960s, its acceptance and popularity mostly began with the rise in popularity of the internet and the web. Since its inception to the present, e-learning has quickly advanced in terms of both technology and the tools and techniques used. E-learning has found its place in business, education, the military, and other fields where it is required, owing to its many advantages for both students and teachers. This study aims to provide an overview, analysis, and discussion of the development, status, and emerging trends in e-learning. The study demonstrated the wealth of e-learning resources and technology available to support and encourage learning. It is clear that e-learning is extensively used in both business and education, and this trend is only predicted to continue. However, there is not enough evidence to support the unique efficacy of the many educational approaches used in e-learning. The current status of e-learning and emerging trends serve as the cornerstones for the field's future growth and orientation in terms of training and education. Blended learning, microlearning, gasification, individualized learning, Massive Open Online Courses, and more are some examples of these developments.

El Hiani (2015) found that teachers, particularly those at the university level, now have additional obligations and problems as a result of the rise of distant learning. Therefore, it may

be necessary to address two key questions: What are educators' new responsibilities in relation to remote learning? What difficulties do instructors have while teaching remotely? In order for distant learning instructors to make a significant contribution to the learning process, this article discusses the new duties and responsibilities that they must keep in mind. Basically, new media and abilities are desperately needed by schools. This presentation also addresses the primary issues that educators face when it comes to remote learning. The latter's rise is not without limitations, such as problems in organizing, instructing, and assessing. Creating a clear understanding of these obligations and difficulties is essential to elevating the standing of remote learning. This article has valuable implications for educators, curriculum designers, and stakeholders by offering a solid foundation for reevaluating important concerns surrounding distant learning education.

Bilal's (2015) research aims to investigate how e-learning is revolutionizing the field of education. Throughout the ages, education has evolved with civilization, modifying its methods to meet the demands of both instructors and pupils. Preparing people, including the social and cultural views, for involvement in a knowledge-based economy is one of the fundamental needs of education in the twenty-first century. A key component of creating inclusive knowledge society is e-learning. The use of electronic educational technology for teaching and learning is known as e-learning. The current research investigated how e-learning is revolutionizing the educational landscape. E-learning is the process of accessing educational materials outside of conventional classroom settings by using electronic devices.

Ku, et. al. (2015) said that in the early 21st century world is evolving quickly, and education is no exception. Learning environments that are more student-centered benefit from the usage of ICT in education. The goal of this study is to investigate novel educational techniques to improve teachers' ICT skills in the 21st-century learning environment, given the evolving landscape of teacher education. The research suggests that a succinct description of education in the twenty-first century should include the following roles: (i) student; (ii) teacher; (iii) curriculum; (iv) classroom; and (v) information and communication technology (ICT). The Personalized Learning Environment (PLE) is a novel educational strategy that has just been implemented. With PLE, students may plan their education, choose the information they want to study at their own pace, and collaborate and communicate with others with ease. In order to guarantee that as many students as possible have access to higher education, the report ends with proposals for further advancements in 21st-century education.

Erazo and Nicolay (2015) found the possibility for using games, videogames, 3D settings, and virtual reality for teaching has been examined in several papers over the last few years. There have also been a lot of newly developed technical innovations that will be crucial to the advancement of teaching and learning methods. In light of these advancements, learning takes precedence over teaching as the primary organizing principle for the educational process. Now that this process has transcended the analog realm and in-person instruction, it has entered the digital sphere, where new learning environments with ever-increasing levels of realism are being created. Because they allow analogous environments and processes to be recreated with a high degree of realism and where "physical" and communicative interactions closely approximate the effects of interactions that occur in our real world, virtual worlds, metaverses, and 3D virtual environments are now demonstrating huge potential for educational purposes. Teachers (primarily) are required to redefine their professional role while also becoming learners, avatars bearing the identities of the users in these worlds take on important roles for the development of training strategies. In environments where simulation is essential, it is recommended that all agents of education must always assume the roles assigned to them.

As per Khalid (2014), in addition to reviewing the current status of online learning, the authors remind readers of the "paradigm grid for online learning" that Coomey and Stephenson suggested in the first book. They compare the categorization to Kember's model of teaching ideas and consider how the grid affects the essential elements of discourse, engagement, support, and control. The authors then go on to talk about how the advent of Web 2.0 may have changed how we make material available while having no effect on the development of underlying pedagogy due to the possibility for cocreation. The potential of Web 3.0 is examined in the chapter's conclusion, along with some important questions about the future paths that pedagogy and educational practice will take.

Kong, al. (2014) said that creating 21st century abilities in students via everyday learning activities is one of the curricular aims of e-learning in schools. The purpose of this study is to address the research questions and policy implications that are essential to accomplishing this curricular objective. According to a study of relevant research, K–12 institutions should make the most of e-learning to provide students the best chance possible at developing 21st century abilities. We identify six research issues that are crucial for e-learning in the classroom: achieving the goal of helping students develop 21st century skills; closing the knowledge gap between the curriculum in the classroom and real-world situations; optimizing learning

opportunities during the learning process; gathering evidence of improvement and raising awareness of progress; assessing 21st century skills; and offering teacher development to help students develop 21st century skills. We advise the relevant parties in various nations and areas to think about policies regarding curriculum goals that address the development of 21st century skills and close the gap between education and society; the accessibility of digital technology for educational purposes in schools; the privacy and legal implications of learning data in e-learning processes; and the preparation of pre-service and in-service teachers.

Finger (2014) said that the prospects of eLearning are being investigated by educational institutions in a globalized information economy made possible by an increasingly digitally connected and digitally omnipresent world. These days, education may be planned to support learning at any time and from any place. This presents both obstacles and intriguing opportunities. Thus, the purpose of this special issue was to provide conceptual and research articles on eLearning and digital futures in the twenty-first century, with the goal of offering evidence-based counsel.

O'Leary, et. al. (2013) found the use of social learning as a teaching tool is known as e-learning 2.0 (EL2). The collaborative learning model underpins EL2's educational approach, in which users create the learning materials that may then be shared via user collaborations. Because many e-learning systems have technology limitations, marginalized cultures have an unfair advantage. EL2 has helped to reduce this gap. Even in these more marginalized civilizations, the enormous rise in the usage of mobile media has been quite beneficial to this. Even while EL2 has come a long way, there are still a number of significant security and privacy concerns that need attention. In addition to outlining the technological challenges that the E-learning generation will soon encounter, this chapter will explain the pedagogical value of EL2 to the students of today.

According to Lihitkar (2013) the goal of the current research was to investigate the idea of e-learning as well as the national and international e-learning programs offered by institutions and universities. This work seeks to address these problems. For this study, a survey research methodology has been used. For the purposes of this research, 89 LIS courses taught entirely online at 23 institutions have been looked at. It has been noted that LISc e-learning programs are offered by 23 institutions at the master's, certificate, and bachelor's degree levels. Using Moodle software, the majority of colleges provide short-term online courses for LIS education. Web 2.0 technologies are being used by all 23 colleges to communicate and disseminate

information. The results of this research will assist the teachers and students of library and information science in creating an e-learning model for their individual departments. In light of the facilities, technology, and material offered by universities, students will discover what kind of e-learning courses are offered by different establishments. After reading this article, institutions without any e-learning programs will be able to comprehend LIS education's e-learning courses. Such investigations have never been done before.

Goyal (2013) said that the nature of electronic learning, or "E-learning," and the case for its importance in the transition from teaching to learning as well as diversity in education. The purpose of this essay is to examine how e-learning fits into the modern educational environment of the digital era, which emphasizes student-centered learning and innovative, adaptable teaching techniques. Without incorporating modern information and communication technologies into the educational system, it is impossible to attain excellent learning and educational outcomes in the twenty-first century. Today's information and human abilities have a shorter lifespan than in the past, which increases the need to continue learning and growing throughout one's career. A need in today's world of globalization and technological advancement, lifelong learning is growing in importance. Computer technology is used as the primary medium of teaching in electronic learning, also known as e-learning or e-learning. This form of technology is also known as online education. Traditional forms of education become more engaging and useful when they are delivered online.

Watson, et. al. (2011) suggested that while many educators are finding it difficult to provide students with a 21st century education, a small but rising number of institutions are embracing the Internet to provide top-notch, teacher-led online courses to students all across the country. Not all students, especially those in rural and inner-city regions, have access to these possibilities, thus these online courses and institutions provide educational chances and results. The courses vary from totally online, where the instructor and students are located apart, to blended learning, which combines online and in-person instruction. Even while just 1% to 2% of students now enroll in online or hybrid courses, this figure is rising quickly, and online learning has the potential to completely change the way that education is provided in the US.

Garrison (2011) said a logical, thorough, and scientifically supported paradigm for comprehending e-learning in higher education is offered by the second edition of E-Learning in the 21st Century. Garrison examines the organizational, educational, and technical effects of e-learning by drawing on his three decades of experience and substantial study in the topic.

Most significantly, he offers useful concepts that teachers may use to maximize the benefits of online learning. This book is different in that it concentrates more on the quest for an educational understanding of these technologies than it does on the extensive list of constantly changing technologies.

Shraim, et. al. (2010) found the potential for a new paradigm in teaching and learning is made possible by the Internet's and ICT's fast expansion. International consensus has determined that the e-learning strategy is required to help students in the twenty-first century adjust to changing global conditions. This essay investigates how e-learning techniques could improve education and provide Palestinian secondary students access to ongoing education in the face of war and mobility constraints. The Alaws Educational Network (AEN) is an interactive web-based application prototype that offers a range of tools for a student-centered learning process, such as online discussion forums, virtual classrooms, and e-training courses. In order to gauge their aptitude and preparation for e-learning, instructors and students were asked to rate several elements of the AEN according to their self-efficacy, willingness, and obstacles. The findings indicate that while instructors and students agree that e-learning techniques are beneficial, they may not be prepared to apply them just yet. This study addresses the potential provided by e-learning technologies in a conflict setting and further emphasizes a number of obstacles to e-learning implementation in public schools in developing nations.

The study by Arbaugh (2010) aims to find potential for significant future research and improve the practice of online education in business schools by examining the current level of research on online and blended learning in business disciplines. Research in business fields such accounting, finance, economics, information systems (IS), management, marketing, and operations/supply chain management is assessed in this book. The author discusses subjects that academics in the corresponding fields are interested in, the approaches often used to investigate those subjects, and the most notable findings from that study to date.

Paragina, et. al. (2010) said that the information and expertise are exchanged extremely quickly thanks to these communications technologies. Occasionally, owing to concurrent concept presentations by participants, online references may change at any moment. The foundation of eLearning is information and communication technology, or ICT. ICT is being used in education to create new learning environments with technological enhancements in a variety of contexts, including training facilities, colleges, and schools. "Electronic learning (or e-Learning or eLearning) is a type of technology supported education/learning (TSL) where the

medium of instruction is through computer technology, particularly involving digital technologies," according to the Wikipedia definition of eLearning, which we used in our study. The term "pedagogy empowered by digital technology" refers to e-learning. There are times when there is no face-to-face communication. There are several different scenarios when eLearning is used interchangeably. It may also refer to staff training programs that are delivered over the business network.

Annetta & Folta (2010) suggested that in addition to offering a wealth of real-world examples of distant learning in its present form, the study made well-informed forecasts on the potential evolution of future settings. Situated at the forefront of its field, this much-needed book coincides with a convergence of research in educational gaming and distant learning. It also offers the distance-learning community (administrators, faculty, and students) an alternative, yet effective, method of delivering content over the Internet through 3D virtual learning environments that have the potential to revolutionize higher education, as academics start using environments like Second Life to reach a wider student audience. This book demonstrates how such virtual learning is the future in higher education, with equal support from the authors' years of study and development of useful applications. The book, which covers a wide range of frameworks from online learning to commercial multiplayer video games, demonstrates the educational potential of these environments and comes to the conclusion that data-driven practice will guarantee nearly universal adoption, even among those who are now hesitant to use V-learning.

Kasraie & Kasraie (2010) said that the Internet and information technology developments have created previously unheard-of chances for every person to prosper in the twenty-first century. Web-based education is one way that higher education has been using new technologies. These days, a lot of colleges use eLearning to provide online courses and even online degrees. However, how can the efficacy and cost-effectiveness of e-learning be quantified? This article's goals are to examine a methodology for calculating the efficacy and cost-effectiveness of e-learning, examine the three main e-learning business sectors, and talk about how the economy is affecting the expansion of this relatively young industry.

Roberts & Swinney (2010) concluded that effectiveness of using a Virtual Learning Environment (VLE) as a platform to interact with adult literacy practitioners operating in various communities throughout Scotland was examined in this paper, along with the difficulties that arise when relationships are acknowledged as being crucial to the learning

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process. Research techniques included a qualitative/quantitative assessment of field practice and an examination of interactions on Web 2.0-based learning forums. According to preliminary research, virtual learning environments may provide a discursive social space called "Agora" where students can participate in the production and sharing of information rather than just being passive recipients of it. The data that has been acquired so far also indicates that in order to boost student use of the VLE, a "blended" approach to TQAL program delivery is required. Overcoming technological obstacles and promoting innovation in the creation of novel learning systems are still difficult tasks, nevertheless.

Seok (2008) found new pedagogical approach for education in the twenty-first century is e-learning. E-Teachers are subject matter experts, interaction facilitators, and instructional designers for online learning. Enhancing learners' cognitive engagement and interaction is the responsibility of e-teachers. This is accomplished by using the increased accessibility and flexibility that come with computer-mediated communication. The sociocultural theory, transactional distance, and computer-mediated communication were reviewed in this study in order to bolster the distinctive pedagogical features of e-learning. Digital libraries, assessment techniques, and instructional materials are examined as special components of e-learning. It is imperative that all parties involved in e-learning endeavour to enhance language immediacy and reduce transactional distance.

Trentin et. al. (2008) found several programs aimed at providing in-service teacher training, but only a small number of them have had their true impact on classroom instruction examined. Since there have seldom been thorough assessments of the knowledge instructors have gained by attending any kind of training or education program, it is likely necessary to identify the underlying cause. This chapter will demonstrate how learning assessment is an essential prerequisite for a trustworthy follow-up analysis in education. It is a laborious assessment procedure that is often handled by a dedicated monitoring team—a team that is seldom ever given dedicated funding for educational initiatives. Therefore, the issue posed in this chapter is whether a follow-up analysis can be completed in the same way with the help of survey instruments that can "replace" the work of a dedicated monitoring team. In order to help the follow-up analysis, a methodological approach specifically designed for the design, development, and assessment of a questionnaire will be shown. Even though this method was created for a particular educational program, discussion will reveal helpful aspects that demonstrate its applicability in situations other than those for which it was intended.

Appanna (2008) said that when students and teachers are not able to meet each other physically, students opt for distance education programs where they can remotely get all the necessary educational services as per their convenience. But there are also certain limitations associated with it such as finance for primary integration; (b) preparing the organization according to new systems and acceptance by student. This paper will examine the advantages and drawbacks of virtual education from three angles: the learner, the teacher and the tenured faculty.

Gilbert, et. al. (2007) the study develops a picture of the students' viewpoint on the experience by using detailed qualitative remarks from their assessment of an e-learning module on an MSc in Information Technologies and Management. Surveys were conducted that produced a wealth of qualitative information in addition to some basic quantitative data. Students cite particular topic topics, discussion boards and other student engagement, learning assistance, and the alignment of theory and practice as reasons for their level of satisfaction. The following issues are linked to discontent: the platform's durability and usefulness; students' work schedules; access to resources (books and articles); and the currency of study materials. Each student learns differently; students use the integrated learning environment as a menu when they print; discussion threads and interaction are valued but students are hesitant to contribute; and students have ill-defined expectations regarding the tutor's role in e-learning. These are some of the aspects of the student learning experience that should guide the development of e-learning.

2.9. Research Gaps

1. Limited empirical research on the specific challenges faced by students in utilizing e-learning platforms in the Indian context, particularly regarding technological barriers, access issues, and pedagogical concerns.

2. Scarcity of studies exploring the diverse areas of online educational courses available in India, including their alignment with learner needs, curriculum coverage, and instructional design.

3. Lack of comprehensive analysis on the competitiveness of online learning platforms in India, including factors influencing user adoption, market penetration, and differentiation strategies among platforms.

4. Insufficient investigation into the perceived benefits of online learning in India's rapidly changing educational landscape, with limited understanding of how these benefits contribute to the overall success of online learning initiatives.

5. Inadequate research on suitable measures to address the challenges faced by online learning platforms in India, such as technological limitations, infrastructural gaps, and cultural barriers, and enhance their effectiveness in delivering education.

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CHAPTER III: RESEARCH METHODOLOGY

3.1 Introduction

3.1 Overview

This Chapter serves as a thorough manual on the research methodology employed in the study. It offers a thorough examination of the techniques, materials, and approaches applied in the gathering, handling, and interpretation of the data. The chapter describes the specific research design, why it was selected, and how it fits in with the study's goals. It also offers details on the sample strategies, data-gathering methods, and data analysis processes that were employed to guarantee the validity and reliability of the study. The chapter also explores the nature of the data, addressing its qualitative and quantitative aspects and providing support for the selected methodology. All things considered, this chapter offers a thorough explanation of the research methodology, including the steps used to conduct the study and the methods applied to gather and evaluate the data.

3.2 Objectives

The study's objective are as follows:

1) To analyse the difficulties observed by the students while using e-learning platforms for education.

2) To explore the domains of online educational courses.

3) To evaluate the competitiveness of the online learning platforms.

4) To explain the advantages of online education.

5) To propose effective strategies for addressing the challenges encountered by online learning platforms for delivering education.

3.3 Hypothesis of Study

The present study proposes the following hypothesis:

Hypothesis 1

H01: The advantages of online education in the dynamic world of today do not significantly increase its success.

Ha1: Benefits of online learning in today's changing world significantly positively influence the success of online learning.

Hypothesis 2

 H01: The difficulties in implementing e-learning platforms in India do not significantly improve the efficacy of e-learning.

Ha1: Challenges in applying the e-learning platforms in India significantly positively affect the success of online learning.

Hypothesis 3

H01: The success of online learning is not considerably influenced favorably by the effectiveness of e-learning platforms in India.

Ha1: The effectiveness of e-learning platforms in India significantly contributes to e-learning's success.

Hypothesis 4

H01: There is no discernible beneficial influence of e-learning platforms on the quality of education in India on the success of online learning.

Ha1: The success of online learning is significantly influenced by the impact of e-learning platforms on the quality of education in India.

3.4 Variables and Conceptual Model

Dependent Variables:

- Success of online learning

Independent Variables:

- The difficulties India had in putting e-learning platforms into practice.

- The effectiveness of Indian e-learning systems.

- The effectiveness of Indian e-learning systems.

- The advantages of online education in the dynamic world of today;

- The effect of e-learning platforms on Indian education standards.

- The effectiveness of Indian e-learning systems.

3.5 The Philosophy of Research

The research philosophy used for this study is pragmatism, a paradigm that emphasizes the useful application of knowledge to successfully address problems in the actual world. Pragmatism, as the guiding framework, provides a flexible and dynamic approach that aligns seamlessly with the complex landscape of online learning platforms within the Indian education system. Pragmatism, essentially, is grounded in the belief that the value of knowledge lies in the practical applications and its capacity to efficiently address concrete obstacles.

This study's pragmatic approach is apparent in its focus on evaluating the usefulness and efficacy of online learning environments within the Indian educational framework.

By adopting a pragmatic perspective, the research aims to go beyond theoretical considerations, focusing on tangible outcomes and the real-world implications of implementing digital education tools. This philosophy allows for a comprehensive examination of how online learning platforms function in practice, acknowledging the diverse and dynamic nature of the educational landscape in India.

The ability of pragmatism to see the real-world applications of research discoveries is one of its main advantages. Regarding online learning platforms, this entails assessing their theoretical foundations as well as comprehending how these platforms might be successfully incorporated into India's current educational practices.

The study's objective is to provide valuable insights that are both academically rigorous and practically significant for educators, policy makers, and stakeholders in the Indian education system which is in line with the philosophical perspective of pragmatism.

Moreover, pragmatism permits a comprehensive investigation of the possible enhancements in teaching methodologies that may arise from the study's findings. The research philosophy promotes the identification of feasible proposals and solutions by stressing the practical application of knowledge. With this practical approach, the study is guaranteed to be part of the continuing conversation about the development of online learning experiences in the unique socio-cultural and economic context of India, rather than being in a vacuum.

In summary, the choice of pragmatism as the research philosophy underscores the commitment to a practical and applicable investigation into online learning platforms in the Indian education system. By prioritizing the real-world implications of research findings, this philosophical framework ensures that the study is not only academically rigorous but also relevant and beneficial to the improvement of educational practices in India.

3.6 Research Concept

The This study aims to carry out a comprehensive analysis of the intricate dynamics present in online learning environments, particularly in the complex Indian educational system.

A specific emphasis is placed on dissecting the challenges, benefits, and competitiveness that characterize these platforms. The study attempted to illuminate the transformational potential

of online learning and its implications for educators and students, taking into account the particular issues presented by the COVID-19 epidemic.

At its core, the research endeavors to unravel the intricate layers of the educational landscape in India, dissecting how online learning platforms have evolved to meet the unique demands and disruptions brought about by the global health crisis. The study seeks to go beyond a mere analysis of technological advancements, delving into the nuanced ways in which these platforms have adapted to the shifting paradigms of education delivery.

The research puts great emphasis on the recognising and comprehending the obstacles that come with implementing and using online learning platforms in the Indian setting. These challenges may encompass issues of accessibility, infrastructure, digital literacy, and socio-economic disparities. By dissecting these issues, the study hopes to provide information that can guide strategies for enhancing the efficiency and accessibility of online learning in India.

Concurrently, the study aims to elucidate the specific benefits that arise from the integration of online learning platforms.

This involves a meticulous exploration of the positive aspects that contribute to enhanced learning experiences, flexibility, and adaptability in the face of evolving educational needs. The research aims to highlight the potentially transformational role that online learning may play in influencing the future of education in India by shedding light on these advantages.

Further, the study set to access online learning platforms' competitiveness in light of the Indian evolving educational landscape. This involves an analysis of the strengths, weaknesses, opportunities, and threats faced by these platforms. The goal of the study is to offer insightful information about how learning should be strategically positioned within the larger educational environment, offering a nuanced understanding of its place and potential for growth.

With the focus on how online learning platforms affect both students and teachers, the goal of the study is to significantly advance the ongoing conversation on the effectiveness of online learning. By offering evidence-based insights that might inform institutional strategy, policy decisions, and instructional techniques employed in the Indian educational system, it aims to close the knowledge gap between theory and practice. Essentially, the goal of this research is to serve as a catalyst for improvement, encouraging a better educated and flexible approach to education in the digital era.

3.7 Methodology of Research

This study's research strategy makes use of quantitative approaches, which entail the methodical gathering and examination of numerical data. Through the use of instruments including questionnaires, standardized tests, and organized observations, the study seeks to collect quantifiable data about the effectiveness, degrees of involvement, and results related to the usage of online learning platforms within the framework of the Indian educational system. By using statistical methods, the research aims to find and analyze trends, correlations, and patterns in the data that has been gathered. This enables a thorough and impartial analysis of all the different facets associated with the efficiency and competitiveness of these online learning tools.

The adoption of quantitative methodologies signifies the emphasis on generating empirical evidence and statistical insights that contribute to a more systematic and data-driven understanding of the impact and implications of online learning platforms on the educational landscape in India. By focusing on numerical data and measurable indicators, the research design enables researchers to draw concrete and generalizable conclusions, providing a robust foundation for informed decision-making and policy recommendations aimed at enhancing the quality and accessibility of online education.

Sampling Strategy:

The study uses stratified random sampling, which guarantees a representative sample from different educational institutions in different parts of India. Participants from a variety of backgrounds and demographics, such as students and instructors from universities, colleges, and schools, can be included with this method. The study attempts to provide a thorough knowledge of the benefits, disadvantages, and competitiveness of E-learning platforms within the Indian education system by stratifying the sample according to important demographic criteria.

3.8 Research Methodology

The research method chosen for this study is a combination of field research and data collection using a Google Form-administered questionnaire. The field study involves direct engagement with students, educators, and administrators within the education system to gather first-hand insights and experiences. This approach makes real time data collection and observation of the benefits and drawbacks of E learning platforms within Indian education system possible.

Field Study:

The field study involves direct interaction with the participants, enabling the research team to gather quantitative data through questionnaire. This method facilitates a comprehensive understanding of the experiences, perceptions, and challenges faced by students and educators using online learning platforms, thereby contributing to the overall richness and depth of the research findings.

Data Gathering:

The usage of a questionnaire made with Google Forms sampling approach facilitates the data collection process for this study. The questionnaire is designed to gather specific information related to the challenges, benefits, and competitiveness of online learning platforms, as well as the experiences of the participants within the Indian education system. By utilizing Google Forms, the study can efficiently collect structured data from a diverse group of participants, ensuring the capture of a comprehensive range of perspectives and experiences.

Data Analysis:

PLS and SPSS will be used to analyse the data gathered from the questionnaire. SPSS is a powerful software tool commonly used for statistical analysis, data management, and data visualization. By employing SPSS, the research team can conduct various statistical tests, such as descriptive statistics, inferential statistics, and correlation analyses, to derive meaningful insights and patterns from the collected data. PLS is used for structural equation modelling. This data analysis approach enables the identification of significant trends, relationships, and

associations within the dataset, ultimately contributing to a comprehensive and evidence-based interpretation of the research findings.

3.9 Nature of Data

This study used quantitative data, which is defined as numerical information gathered using systematic methods including surveys, standardized tests, and statistical records. This type of data allows for the quantification and statistical analysis of various aspects related to online learning platforms in the Indian education system. Quantitative data can include metrics such as performance scores, engagement levels, demographic information, and other measurable indicators.

By employing quantitative data, the study focuses to identify and measure the impact, effectiveness, and competitiveness of online learning platforms, providing empirical evidence to support the research findings. Through statistical analysis using tools like SPSS, the study can generate objective insights, draw correlations, and establish trends within the dataset, contributing to a more systematic and rigorous evaluation of the educational landscape in India.

3.10 Techniques for Data Gathering

The primary method of data collecting for this study will be a questionnaire created with Google Forms. The purpose of the questionnaire is to gather data regarding the benefits, drawbacks, and competitiveness of online learning platforms in the Indian educational system, as well as the experiences of teachers and students.

3.11 Population of Study

The population of this research includes students and educators from various educational institutions in India, such as universities, colleges, and schools. The people who have some experience with or have been exposed to e-learning platforms during the study period are the main emphasis.

3.12 Sampling Design

The study will adopt a stratified sampling design to ensure representation from different types of educational institutions, including both public and private entities. Stratification process will consider academic discipline, location, and also the type of institution.

3.12.1 Sampling Technique

The technique of sampling will involve random selection of participants from each stratum, ensuring a diverse and representative sample that accurately reflects the characteristics of the broader population under study.

3.12.2 Size of Sample

The concept of attaining sufficient representation from each stratum will guide the determination of the sample size, which will also consider the real-world limitations associated with the data collection and analysis. This will be determined by employing appropriate statistical computations to ensure the results' validity and reliability.

3.13 Sampling Method

The sampling method will involve reaching out to potential participants through various educational institutions and organizations, using both online and offline communication channels. The goal is to ensure the inclusion of a diverse and representative sample of students and educators from different backgrounds and regions across India.

3.14 Data Collection Parameters for Selecting Valid Questions

The questions' potential to elicit meaningful and insightful replies from the participants as well as their relevance to the study's objectives will determine the criteria of data collection for choosing valid questions. Validity checks will be conducted during the questionnaire design

phase to ensure that the questions effectively capture the intended information related to the challenges, benefits, and competitiveness of online learning platforms.

3.15 Method of Data Analysis

Quantitative data analysis will involve the use of statistical techniques in SPSS to identify patterns, correlations, and trends within the numerical data. The quantitative data analysis using SPSS will enable the exploration of patterns, correlations, and trends within the numerical data collected from the questionnaire. The study can use a variety of statistical techniques by utilising SPSS, such as inferential statistics to look at relationships between variables and test hypotheses and descriptive statistics to highlight the salient feature of the data. By utilizing SPSS, research team can identify significant associations and draw empirical conclusions, supported by statistical evidence. Moreover, SPSS's visualization capabilities will aid in presenting the data findings through informative charts and graphs, enhancing the communication of the study's results and implications.

3.15.1 Reliability Analysis of Data

When discussing research, the concept of reliability relates to the degree to which the data acquired using a certain research technique or instrument, such as a questionnaire, remain stable and consistent over time. In order to draw conclusions from the study's findings that are trustworthy,, accurate and consistent, it is vital to guarantee that the data obtained are reliable and consistent.

A statistical metric known as Chronbach's Alpha is widely employed to evaluate the internal consistency or dependability of a collection of items that comprise a questionnaire. It does so by quantifying the degree to which the elements are connected to one another and by providing a measure of the degree to which they collectively measure the same underlying construct or notion.

Cronbach's alpha equation

Let's say we have a measurement that is the total of K components, often known as K-items or testlets. X = Y1 + Y2 + Y3 + ∺······+Yk. What is meant by Cronbach's α?

$$\alpha = \frac{K}{K-1}\left(1 - \frac{\sum_{i=1}^{K}\sigma_{Y_i}^2}{\sigma_X^2}\right)$$

Where σ_X^2 represents the variation of the observed total test scores., $\sigma_{Y_i}^2$ and the component i variance for the individuals in the current sample.

Table 1: Internal Consistency (Questionnaire Reliability) Suggestion

Cronbach's Alpha	Internal Consistency
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

Source: Author's work (2024)

3.15.2 Descriptive Analysis of Data

In order to summarize and display data in a way that is both relevant and concise, descriptive statistics are used. They provide to a better understanding of the fundamental properties of a dataset and offer very helpful insights on the distribution of variables and the interrelationships among them.

The following are some of the goals of descriptive statistics:

A. Descriptive statistics give essential information about variables in a dataset, such as the central tendency, variability, and the range of values. This information may be useful in analyzing and interpreting the data.

B. In addition to showing potential correlations between variables, descriptive statistics help researchers spot patterns and trends in the data.

The three most typical descriptive statistics are as follows:

A. A data set's mean can be found by first adding up all of the values in the set and then dividing that total by the number of observations in the set. This results in the mean, which is the dataset's average value.

B. The data point or category that occurs the most often overall is the mode, and it is represented by the word "mode." It is the value that can be found inside the dataset the majority of the time.

C. "Standard deviation: describes the extent to which the values of individual data points vary from the value deemed to be "normal". It provides a numerical representation of the degree to which individual data points depart from the average value.

3.15.3 Frequency Analysis of Data

The number of occurrences (frequency) of each value or category within a data set is the subject of frequency analysis, a fundamental component of descriptive statistics. Frequency analysis is also known as "count analysis." It offers helpful insights into the distribution of a variable, enabling researchers to comprehend the pattern of frequencies and determine which values are more frequent and which are less common.

The total number of times a certain value occurs throughout the entire dataset is indicated by its frequency in the data. The symbol for frequency is "f." For instance, if we had a dataset of replies to a survey and one of the variables is "Gender," then the frequency of "Male" and "Female" would represent the proportion of respondents who identified as either male or female, respectively.

The pattern of occurrences of a variable's potential values or categories within a dataset is referred to as its frequency distribution. The term "frequency distribution" was used to describe

this pattern. Researchers are able to better view and comprehend the distribution of data as well as their relative occurrences thanks to this tool. It is common practice to represent frequency distributions using bar charts, pie charts, or frequency tables, all of which make it simpler to understand the distribution pattern.

3.15.4 PLS-SEM

One flexible statistical technique used to examine complex interactions in a structural equation modeling framework is partial least squares structural equation modeling (PLS-SEM). This approach becomes particularly valuable in scenarios with smaller sample sizes, non-normal data distributions, and models featuring complex structures. At its core, PLS-SEM allows researchers to explore relationships among both observed and latent variables, making it adaptable to a diverse range of research contexts.

One important difference between PLS-SEM and other methods is how latent variables—which can be endogenous or exogenous—are handled. While endogenous variables are affected by other variables in the model, observed variables—which serve as concrete indicators or manifest variables that facilitate a thorough understanding of the underlying concepts—have an influence on endogenous variables but are not influenced by other variables in the model.

The two main parts of the PLS-SEM modeling method are the measurement model and the structural model. The structural model illustrates the connections between latent variables by showing the direct or indirect effects of one variable on another. In the meantime, the measurement model assesses how effectively these indicators capture the latent constructs and elucidates the link between latent variables and observable indicators.

Several key steps define the PLS-SEM process, commencing with model specification, where researchers outline latent and observed variables and their interconnections. Data collection follows, with subsequent preprocessing involving checks for missing data, outliers, and adherence to normality assumptions. The PLS algorithm is then employed for model estimation, iterating to minimize the variance between observed and predicted data.

Assessment of model fit in PLS-SEM differs from covariance-based SEM, relying on measures such as R-squared values and cross-validated redundancy. Bootstrapping is often employed to gauge the reliability and significance of estimated path coefficients. Additionally, model validation techniques, like holdout samples or cross-validation, ensure the model's generalizability.

PLS-SEM exhibits distinct advantages, such as its adaptability to smaller sample sizes, flexibility in handling non-normal data, and suitability for complex models. However, it is sensitive to outliers, lacks traditional fit indices, and may be prone to overfitting, necessitating careful consideration of these factors during analysis.

In summary, PLS-SEM serves as a powerful analytical tool, providing researchers with a flexible and effective means to explore intricate relationships among variables, particularly in contexts where sample sizes may be limited, and data distributions deviate from normality. Its application spans various disciplines, offering a robust approach to structural equation modeling in diverse research scenarios.

3.16 Chapter Synopsis

This chapter provides a thorough analysis of the research methodology, covering all the many approaches, tools, and techniques employed to answer the objectives and study questions. The research methodologies and their significance to the study were summarized in the opening of the chapter. The subsequent parts encompassed a detailed explanation of the methodology's particulars, including the sample plan, research design, data gathering procedures, and data analysis tools.

The research design was explained in order to show how quantitative methodologies can be used to thoroughly examine the experiences and perceptions of educators in students utilising online learning platforms. The population under investigation and the reasoning behind the sample size selection were highlighted in the discussion of the sampling strategy and technique. Moreover, the data collection method using a questionnaire in the form of a Google Form was detailed, along with the plan for data analysis using SPSS software.

Furthermore, the nature of the data was clarified, emphasizing its quantitative nature, which necessitates the use of statistical techniques for analysis. The chapter concluded with a summary that highlighted the key elements of the research methodology and their significance in addressing the research objectives. The synopsis provides a comprehensive understanding of the employed technique and sets up the structure for the study's subsequent chapters.

CHAPTER IV: RESULTS AND DISCUSSION

4.1 General Introduction

Chapter 4 Results and Discussion presents a comprehensive analysis and interpretation of the findings obtained from the empirical study conducted. This chapter serves as a crucial section in the research, shedding light on the outcomes of the investigation and providing insights into the implications of these results. The primary focus is on presenting the data, statistical analyses, and discussing the significance of the findings in relation to the research questions or hypotheses posed at the outset.

The chapter is structured to guide the reader through the key aspects of the study, starting with an overview of the research design and methodology. It then proceeds to present and analyse the collected data, utilizing appropriate statistical tools and techniques. The goal is to uncover patterns, trends, and relationships within the data, offering a deeper understanding of the phenomenon under investigation.

The discussion component of Chapter 4 goes beyond mere presentation, delving into the interpretation of results in the context of existing literature. Researchers critically examine the implications of their findings, considering how they align or deviate from previous studies. This section often explores unexpected or significant results, providing a nuanced perspective on the research outcomes.

Additionally, the chapter may address any limitations inherent in the study, acknowledging potential constraints that could impact the generalizability or validity of the findings. This transparency contributes to the overall credibility of the research.

Chapter 4 Results and Discussion acts as a bridge between the empirical work undertaken and the broader theoretical framework. It aims to contribute to the academic discourse by offering new insights, confirming or challenging existing theories, and providing a foundation for future research. The comprehensive nature of this chapter ensures that readers gain a thorough understanding of the research outcomes and their implications for the field of study. The study explores various dimensions of online learning in the Indian educational landscape through the examination of five key variables (Table 4.1). Firstly, challenges encountered in the application

of e-learning platforms in India (CH) are investigated to provide insights into the impediments that may hinder the seamless integration of online education tools. Secondly, the effectiveness of e-learning platforms in India (ET) is assessed to gauge the extent to which these platforms contribute to educational goals and outcomes. The study also delves into the benefits of online learning in today's rapidly changing world (BT), shedding light on the advantages and opportunities that digital education can offer in the contemporary educational paradigm. Moreover, the impact of e-learning platforms on the quality of education in India (IoW) is examined, emphasizing the potential enhancements or drawbacks these platforms may introduce to the overall educational experience. Finally, the success of online learning (SC) is evaluated, encompassing aspects of student achievement, engagement, and satisfaction within the context of digital education. These variables collectively form the framework for a comprehensive analysis of the evolving landscape of online learning in India.

Table 2: Variables of the Study

Variable	Acronym
Challenges in applying the e-learning platforms in India	CH
Effectiveness of e-learning platforms in India	ET
Benefits of online learning in today's changing world	BT
Impact of e-learning platforms on the quality of education in India	IoW
Success of online learning	SC

Source: Author's work (2024)

4.2 Descriptive Analysis of Data

Descriptive statistics presented in Table 4.2 is described as follows;

Challenges in applying e-learning platforms in India (CH):

The challenges associated with applying e-learning platforms in India were assessed across multiple dimensions. The mean values for different challenges, ranging from the expense of technology to issues like inadequate training and lack of interaction in class, are between 3.312 and 3.538. A mean value around 4.00 for the mode indicates that respondents frequently perceived these challenges as significant. The relatively low standard deviations (ranging from 1.157 to 1.272) suggest a moderate level of agreement among respondents regarding the challenges posed by e-learning platforms.

Effectiveness of e-learning platforms in India (ET):

The effectiveness of e-learning platforms in India was evaluated based on various factors such as exam preparation, knowledge enhancement, and academic performance. The mean values for these aspects range from 3.366 to 3.604, with mode values around 4.00, indicating a consistent perception of positive outcomes. Standard deviations between 1.146 and 1.225 suggest a moderate level of arrangement among respondents about the effectiveness of e-learning platforms in different educational aspects.

Impact of e-learning platforms on the quality of education in India (IoW):

The impact of e-learning platforms on the quality of education in India was examined through dimensions such as improvement in education quality, excellency, understanding of subjects, and knowledge transfer. Mean values ranging from 3.260 to 3.610, with modes around 4.00, indicate a positive perception of the impact of e-learning platforms. The standard deviations (ranging from 1.101 to 1.204) suggest moderate agreement among respondents regarding the positive impact on the quality of education in India.

Benefits of online learning in today's changing world (BT):

Various benefits of online learning, including a safer learning environment, increased student engagement, and improved comprehension, were assessed. Mean values for these benefits range from 3.164 to 3.404, with mode values around 4.00, indicating a generally positive perception. Standard deviations between 1.144 and 1.245 suggest a moderate level of agreement among respondents regarding the perceived benefits of e-learning platforms in different aspects of education.

Success of online learning (SC):

The success of online learning was gauged based on achievements, awards, and the overall rating of success. Mean values for these aspects range from 3.346 to 3.374, with mode values around 4.00, suggesting a positive overall perception of the success of e-learning platforms. The standard deviations (ranging from 1.171 to 1.173) indicate a moderate level of agreement among respondents regarding the success of online learning.

The stats provide a comprehensive outline of the perceptions and evaluations related to challenges, effectiveness, impact, benefits, and success associated with e-learning platforms in the Indian educational context.

Table 3: Descriptive Statistics

Acronym		N		Mean	Mode	Std. Deviation
		Valid	Missing			
CH1	Expense of technology is a major challenge to apply e-learning platforms in India	500	0	3.4240	4.00	1.24391

CH2	Inadequate training is a major challenge to apply e-learning platforms in India	500	0	3.5160	4.00	1.18514
CH3	Technological issues are major challenges to apply e-learning platforms in India	500	0	3.5000	4.00	1.17506
CH4	The decreased motivation for e-learning is a major challenge to apply e-learning platforms in India	500	0	3.4900	4.00	1.20699
CH5	Lack of interaction in class is a major challenge to apply e-learning platforms in India	500	0	3.4220	4.00	1.27246
CH6	Online distractions is a major challenge to apply e-learning platforms in India	500	0	3.3120	4.00	1.16850
CH7	Disabilities and special needs is a major challenge to apply e-learning platforms in India	500	0	3.5380	4.00	1.15725
CH8	Poor digital literacy is a major challenge to apply e-learning platforms in India	500	0	3.3640	4.00	1.24845
ET1	Implementation of e-learning platforms helped them in preparation for the exam	500	0	3.4480	4.00	1.22568

ET2	Implementation of e-learning platforms helped them in increasing the knowledge of subjects	500	0	3.3940	4.00	1.20402
ET3	Implementation of e-learning platforms helped them in increasing the academic performance	500	0	3.3660	4.00	1.15008
ET4	Implementation of e-learning platforms helped them in increasing the confidence in subjects	500	0	3.6040	4.00	1.14622
ET5	Implementation of e-learning platforms helped them in achievement (better grade) in subjects	500	0	3.5820	4.00	1.17560
IOQ1	Implementation of e-learning platforms improve the quality of education in India	500	0	3.6100	4.00	1.10106
IOQ2	Implementation of e-learning platforms improve the excellency of education among students	500	0	3.4980	4.00	1.15614

IOQ3	Implementation of e-learning platforms improve the understanding of subjects among students	500	0	3.2600	3.00	1.19970
IOQ4	Implementation of e-learning platforms increase the transfer of knowledge between teachers and students	500	0	3.4000	3.00	1.20453
BT1	E-learning platforms provide a safer learning environment	500	0	3.2360	3.00	1.18284
BT2	E-learning platforms increase student engagement in studies	500	0	3.3000	4.00	1.20869
BT3	E-learning platforms improve comprehension in studies	500	0	3.4040	3.00	1.16941
BT4	E-learning platforms have more autonomy over their learning	500	0	3.3780	4.00	1.14444
BT5	E-learning platforms use of instructor time efficiently in teaching	500	0	3.1640	3.00	1.19161
BT6	E-learning platforms gather learner data for better insights in studies	500	0	3.3540	4.00	1.18638
BT7	E-learning platforms access and enroll more students in studies	500	0	3.2740	4.00	1.17716

BT8	E-learning platforms improve outcomes of studies	500	0	3.2160	4.00	1.24597
BT9	E-learning platforms have deepened students' interest in the subject being taught.	500	0	3.3920	4.00	1.14934
BT10	E-learning platforms have improved the interaction among students.	500	0	3.1900	3.00	1.23813
SC1	Do students achieve various awards, certificates, and prizes because of E-learning platforms?	500	0	3.3740	4.00	1.17170
SC2	Rate the overall success of E-learning platforms	500	0	3.3460	4.00	1.17347

Source: Author's work (2024)

4.3 Frequency Analysis of Data

Frequency tables are presented as follows;

Table 4: Frequency Analysis of Data

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	161	32.2	32.2	32.2
	Female	339	67.8	67.8	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table illustrates the gender distribution among the 500 respondents in the study. Among these, 161 respondents identify as male, representing 32.2% of the total sample, while 339 respondents, constituting 67.8%, identify as female. The cumulative percent column provides a cumulative view of the distribution as we progress through the table. The data reveal a notable gender imbalance in the sample, with a higher percentage of female respondents compared to their male counterparts. Understanding this demographic composition is crucial for contextualizing and interpreting the study's findings, particularly in the context of e-learning platforms in India. It prompts consideration of potential gender-related biases that may impact the interpretation of results and underscores the importance of addressing such disparities for the study's overall validity and applicability.
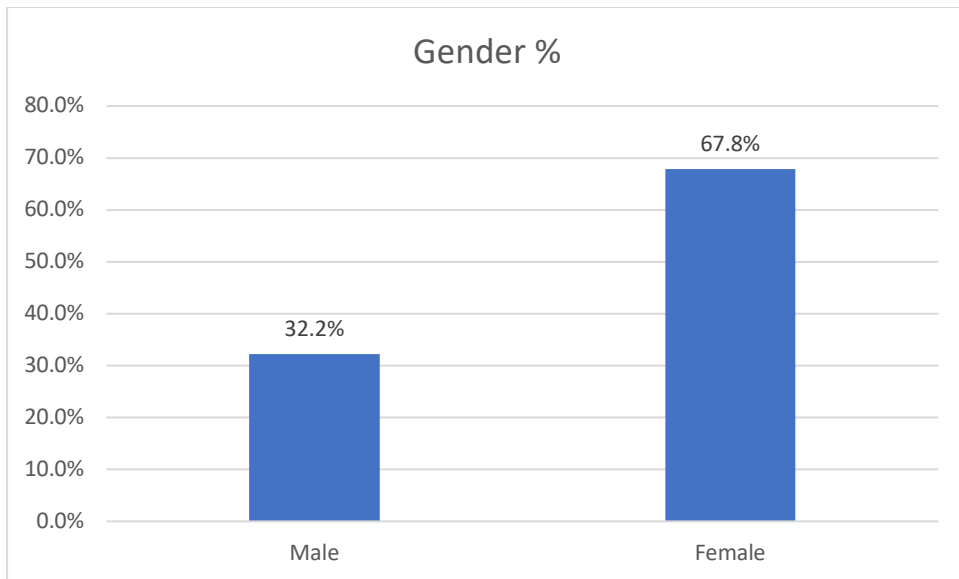
Figure 2: Gender %

Source: Author's work (2024)

Table 5: Age of respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-30 Years	119	23.8	23.8	23.8
	31-40 Years	114	22.8	22.8	46.6
	41-50 Years	127	25.4	25.4	72.0
	51-60 Years	140	28.0	28.0	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table outlines the age distribution among the 500 respondents in the study. Among the respondents, 23.8% fall in the 18-30 years age group, comprising 119 individuals. The 31-40 years age category accounts for 22.8% of the total sample, with 114 respondents. Those aged 41-50 years constitute 25.4% of the sample, amounting to 127 individuals. In the 51-60 years age group, there are 140 respondents, making up 28.0% of the total sample. The cumulative percent column provides a holistic view of the distribution, indicating the cumulative proportion of respondents within or below each age category. Understanding this diverse age representation is crucial for interpreting findings, as it enables the consideration of varied perspectives on e-learning platforms in India based on different life stages. This demographic insight aids in tailoring interpretations and recommendations to accommodate the unique needs and preferences of respondents across distinct age cohorts.
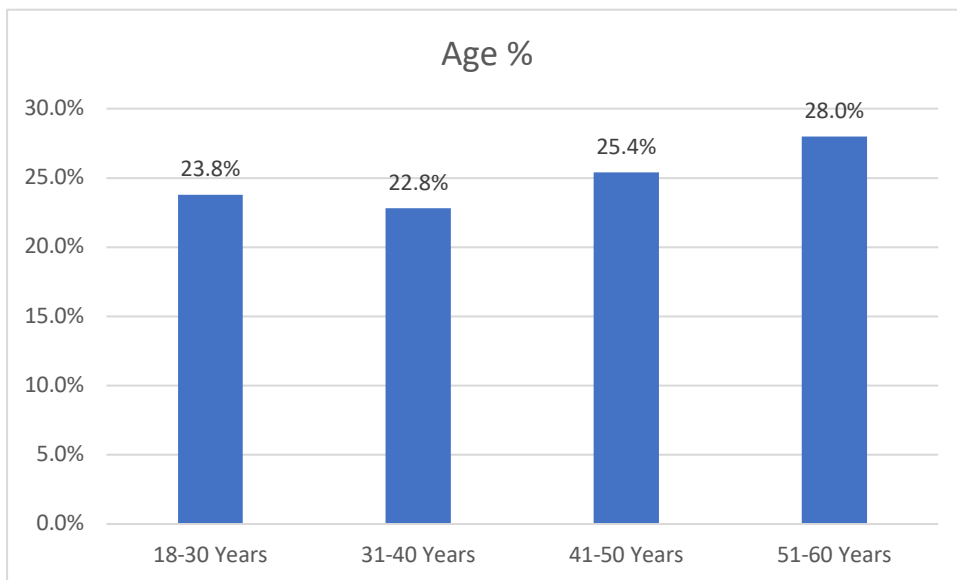
Figure 3: Age %

Source: Author's work (2024)

Table 6: Type of School

	Frequency	Percent	Valid Percent	Cumulative Percent

110

Valid	Public	255	51.0	51.0	51.0
	Private	245	49.0	49.0	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table illustrates the distribution of respondents based on the type of school they attend. Among the 500 respondents, 51.0% attend public schools, comprising 255 individuals, while 49.0% attend private schools, totaling 245 respondents. The cumulative percent column offers an overview of the cumulative proportion of respondents within or below each school type as we progress through the table.

Understanding the type of school attended by respondents is essential for discerning potential variations in experiences and perspectives related to e-learning platforms. Public and private schools may differ in infrastructure, resources, and educational approaches, potentially influencing respondents' opinions on the challenges, effectiveness, and benefits of e-learning platforms in the Indian context. Recognizing these distinctions is crucial for nuanced interpretations and the formulation of tailored recommendations that account for the specific characteristics associated with each school type.
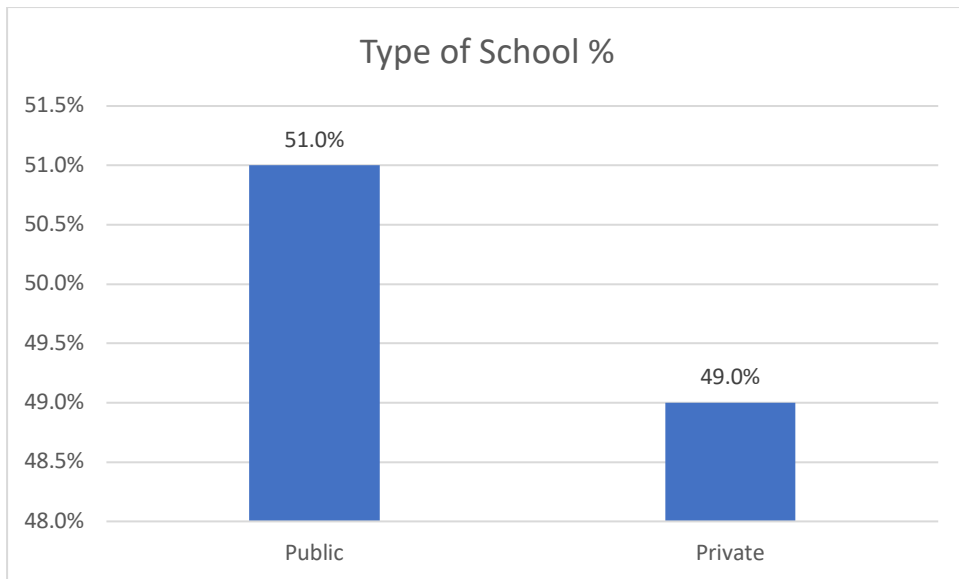
Figure 4: Type of school %

Source: Author's work (2024)

Table 7: Total teaching experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5 Years	131	26.2	26.2	26.2
	6-10 Years	111	22.2	22.2	48.4
	10-15 Years	135	27.0	27.0	75.4
	More than 15 Years	123	24.6	24.6	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table delineates the distribution of respondents based on their total teaching experience, encompassing four distinct categories. A notable 26.2% of respondents possess 0-5 years of teaching experience, with 131 individuals falling within this category. The 6-10 years' experience bracket comprises 111 respondents, representing 22.2% of the total sample. For those with 10-15 years of teaching experience, 135 respondents account for 27.0% of the sample. Respondents with more than 15 years of teaching experience constitute 24.6% of the total, totalling 123 individuals. This breakdown provides insights into the diverse professional backgrounds of educators, offering a foundation for understanding how varied teaching experiences may influence perceptions of e-learning platforms in the Indian educational context.
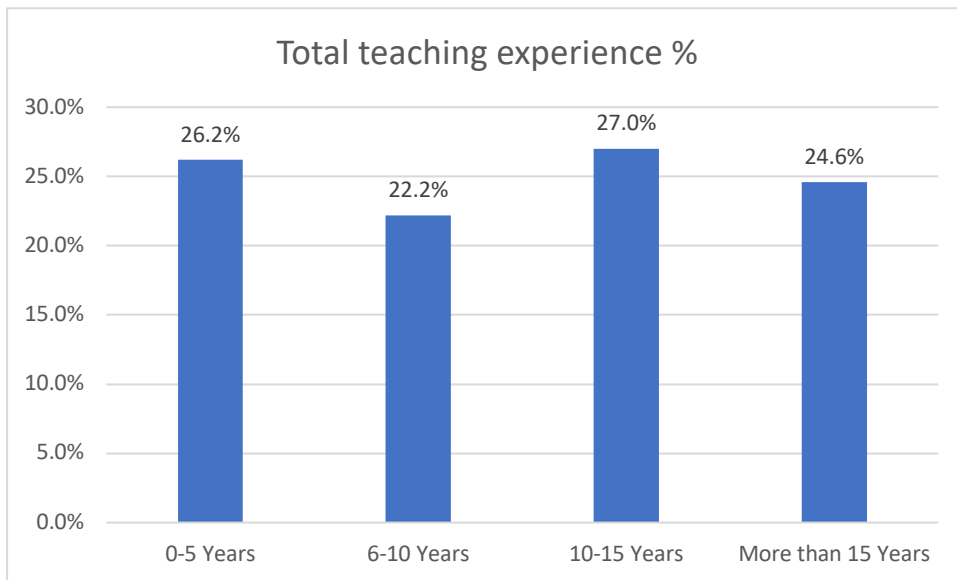
Figure 5: Total teaching experience %

Source: Author's work (2024)

Table 8: Salary per month

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20000/- to 30000/-	123	24.6	24.6	24.6

31000/- to 40000/-	118	23.6	23.6	48.2
41000/- to 50000/-	135	27.0	27.0	75.2
More than 50000/-	124	24.8	24.8	100.0
Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table provides an overview of respondents' monthly salary distribution, categorized into four ranges. Within the sample of 500 respondents, 24.6% reported a monthly salary ranging from 20000/- to 30000/-, constituting 123 individuals. The 31000/- to 40000/- salary range is represented by 118 respondents, accounting for 23.6% of the total sample. For those earning between 41000/- to 50000/- per month, 135 respondents make up 27.0% of the sample. Respondents with a monthly salary exceeding 50000/- represent 24.8% of the total, totaling 124 individuals. This salary breakdown offers insights into the financial diversity within the respondent pool, providing a foundation for understanding potential correlations between income levels and perceptions of e-learning platforms in the Indian educational landscape.
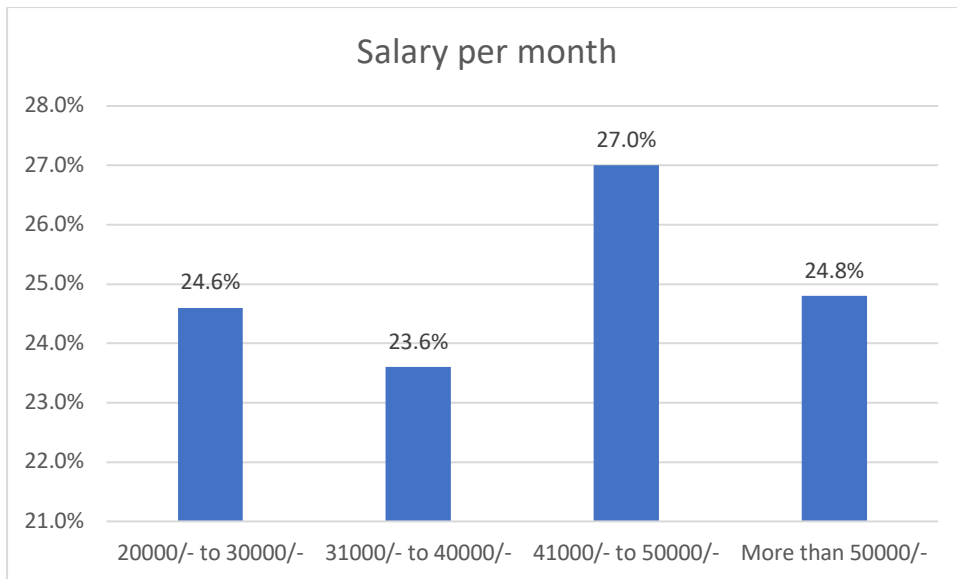
Figure 6: Salary per month

Source: Author's work (2024)

Table 9: Expense of technology is a major challenge to apply e-learning platforms in India

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	56	11.2	11.2	11.2
	Disagree	49	9.8	9.8	21.0
	Moderately Agree	130	26.0	26.0	47.0
	Agree	157	31.4	31.4	78.4
	Strongly Agree	108	21.6	21.6	100.0
	Total	500	100.0	100.0	

The frequency distribution table presents responses to the statement "Expense of technology is a major challenge to apply e-learning platforms in India." A diverse range of opinions is evident among the 500 respondents. A notable 11.2% "Strongly Disagree" with the statement, amounting to 56 individuals, while 9.8% "Disagree," with 49 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 26.0% of respondents, totaling 130 individuals, whereas 31.4% "Agree," with 157 respondents endorsing this perspective. Lastly, 21.6% "Strongly Agree" with the statement, constituting 108 individuals. The cumulative percent column illustrates the gradual accumulation of responses as we progress through the table, reaching 100% at the end. This nuanced breakdown provides valuable insights into the varying perceptions regarding the financial challenges associated with implementing e-learning platforms in the Indian educational context.
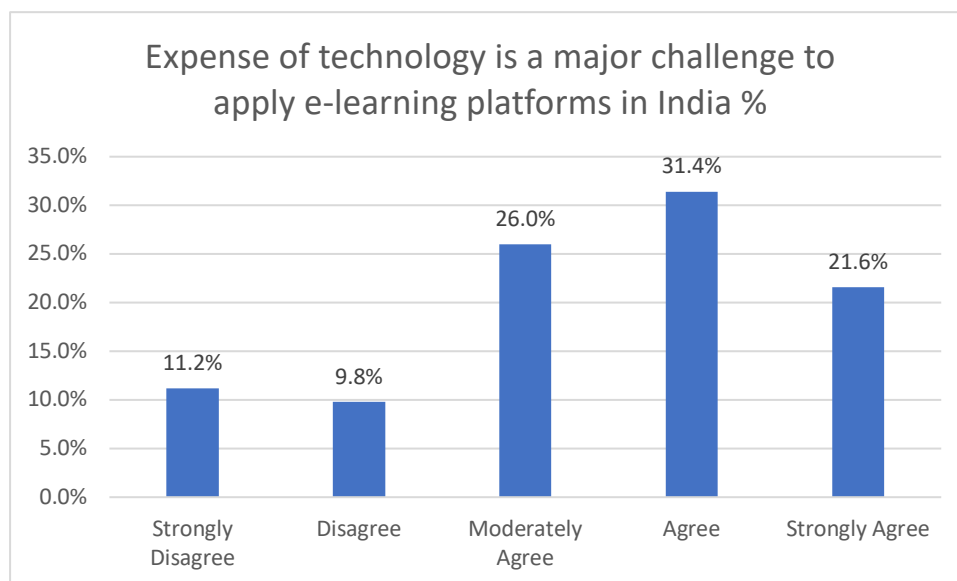
Figure 7: Expense of technology to apply e-learning platforms in India

Source: Author's work (2024)

Table 10: Inadequate training is a major challenge to apply e-learning platforms in India

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	42	8.4	8.4	8.4
	Disagree	49	9.8	9.8	18.2
	Moderately Agree	131	26.2	26.2	44.4
	Agree	165	33.0	33.0	77.4
	Strongly Agree	113	22.6	22.6	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table delineates responses to the statement "Inadequate training is a major challenge to apply e-learning platforms in India." Among the 500 respondents, 8.4% "Strongly Disagree" with the statement, with 42 individuals holding this perspective, while 9.8% "Disagree," constituting 49 respondents. The category of "Moderately Agree" encompasses 26.2% of respondents, totaling 131 individuals, and 33.0% "Agree," with 165 respondents supporting this viewpoint. Finally, 22.6% "Strongly Agree" with the statement, comprising 113 individuals. The cumulative percent column highlights the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown provides valuable insights into the diverse perspectives regarding the perceived challenges associated with inadequate training for the implementation of e-learning platforms in the Indian educational context.
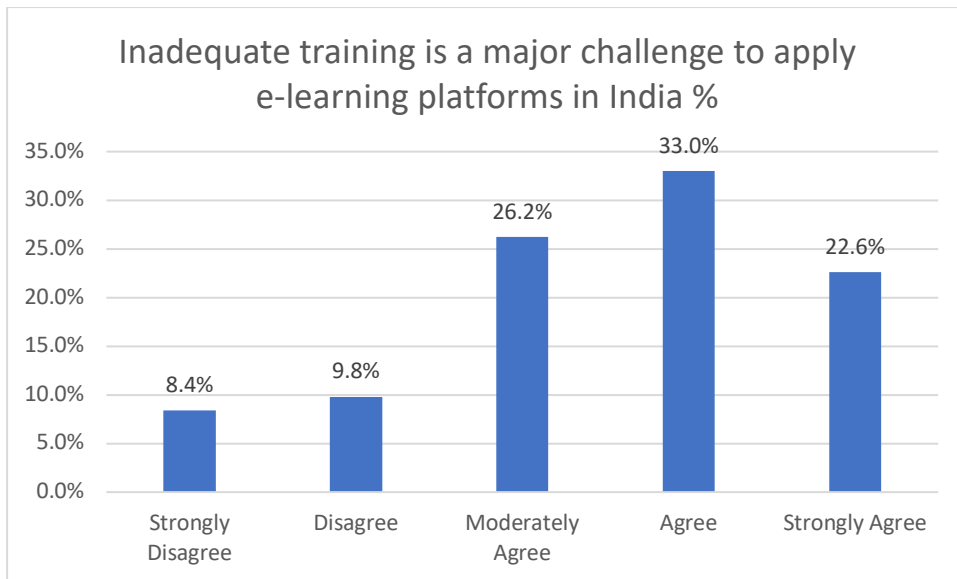
Figure 8: Inadequate training challenge to apply e-learning platforms in India

Source: Author's work (2024)

Table 11: Technological issues are major challenges to apply e-learning platforms in India

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	42	8.4	8.4	8.4
	Disagree	51	10.2	10.2	18.6
	Moderately Agree	127	25.4	25.4	44.0
	Agree	175	35.0	35.0	79.0
	Strongly Agree	105	21.0	21.0	100.0
	Total	500	100.0	100.0	

The frequency distribution table provides insights into respondents' perspectives on the statement "Technological issues are major challenges to apply e-learning platforms in India." Among the 500 respondents, 8.4% "Strongly Disagree" with the statement, comprising 42 individuals, while 10.2% "Disagree," with 51 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 25.4% of respondents, totaling 127 individuals, and 35.0% "Agree," with 175 respondents supporting this perspective. Lastly, 21.0% "Strongly Agree" with the statement, constituting 105 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the end of the table. This nuanced breakdown offers valuable insights into the varying perspectives regarding the perceived challenges related to technological issues in the application of e-learning platforms in the Indian educational landscape.
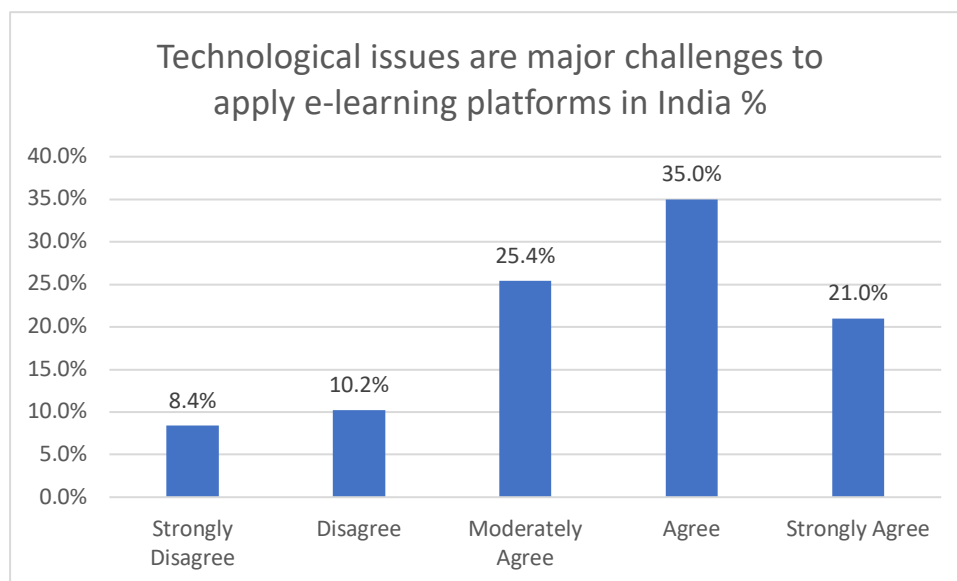
Figure 9: Technological issues to e-learning platforms in India

Source: Author's work (2024)

Table 12: The decreased motivation for e-learning is a major challenge to apply e-learning platforms in India

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	51	10.2	10.2	10.2
	Disagree	46	9.2	9.2	19.4
	Moderately Agree	112	22.4	22.4	41.8
	Agree	189	37.8	37.8	79.6
	Strongly Agree	102	20.4	20.4	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table provides an overview of respondents' perspectives on the statement "The decreased motivation for e-learning is a major challenge to apply e-learning platforms in India." Among the 500 respondents, 10.2% "Strongly Disagree" with the statement, constituting 51 individuals, while 9.2% "Disagree," with 46 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 22.4% of respondents, totaling 112 individuals, and 37.8% "Agree," with 189 respondents supporting this perspective. Lastly, 20.4% "Strongly Agree" with the statement, comprising 102 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the varying perspectives regarding the perceived challenges associated with decreased motivation for e-learning in the application of e-learning platforms in the Indian educational context.
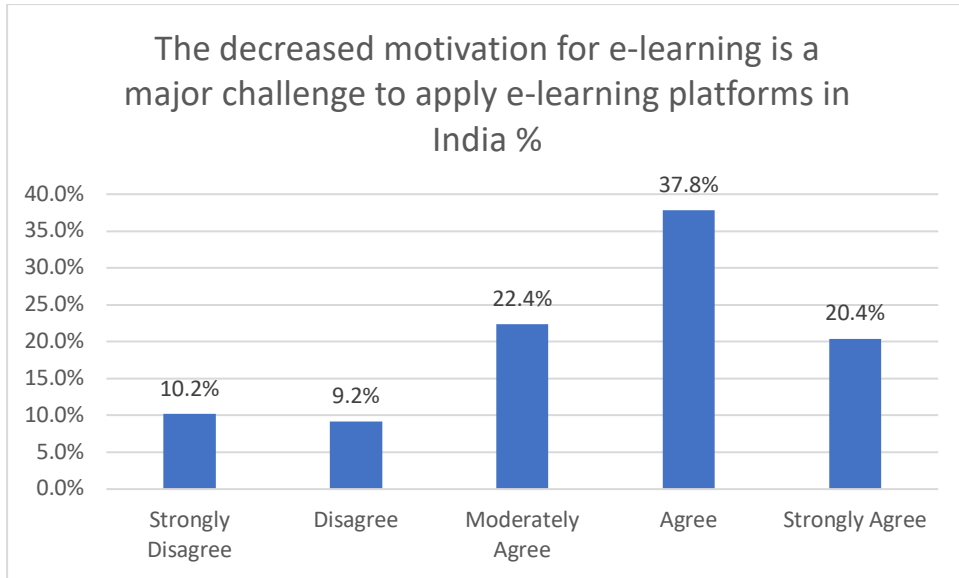
Figure 10: The decreased motivation for e-learning

Source: Author's work (2024)

Table 13: Lack of interaction in class is a major challenge to apply e-learning platforms in India

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	57	11.4	11.4	11.4
	Disagree	54	10.8	10.8	22.2
	Moderately Agree	128	25.6	25.6	47.8
	Agree	143	28.6	28.6	76.4
	Strongly Agree	118	23.6	23.6	100.0
	Total	500	100.0	100.0	

The frequency distribution table sheds light on respondents' perspectives regarding the statement "Lack of interaction in class is a major challenge to apply e-learning platforms in India." Among the 500 respondents, 11.4% "Strongly Disagree" with the statement, constituting 57 individuals, while 10.8% "Disagree," with 54 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 25.6% of respondents, totaling 128 individuals, and 28.6% "Agree," with 143 respondents supporting this perspective. Lastly, 23.6% "Strongly Agree" with the statement, comprising 118 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived challenges associated with the lack of interaction in class when applying e-learning platforms in the Indian educational landscape.
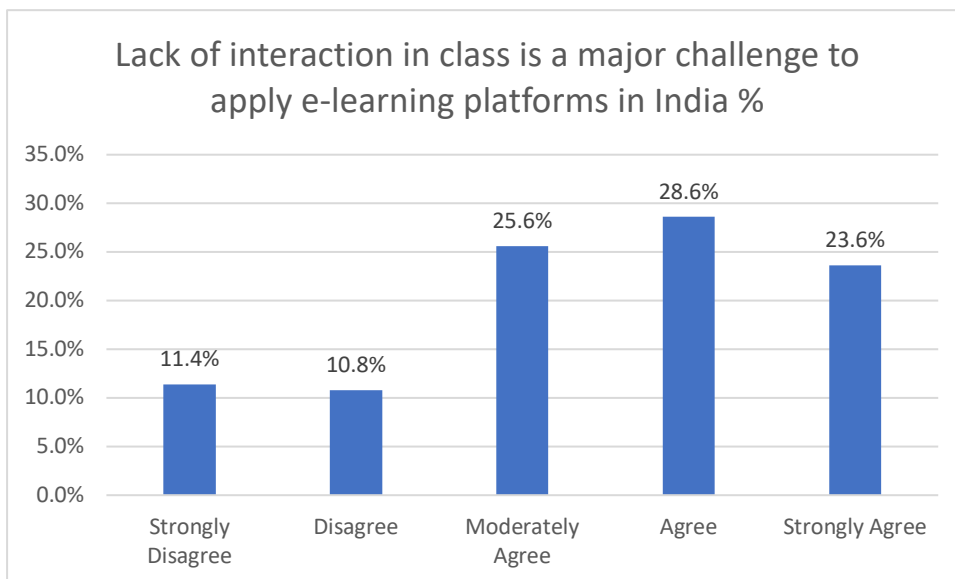
Figure 11: Lack of interaction in class

Source: Author's work (2024)

Table 14: Online distractions is a major challenge to apply e-learning platforms in India

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	48	9.6	9.6	9.6
	Disagree	67	13.4	13.4	23.0
	Moderately Agree	142	28.4	28.4	51.4
	Agree	167	33.4	33.4	84.8
	Strongly Agree	76	15.2	15.2	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table outlines respondents' viewpoints on the statement "Online distractions are a major challenge to apply e-learning platforms in India." Among the 500 respondents, 9.6% "Strongly Disagree" with the statement, constituting 48 individuals, while 13.4% "Disagree," with 67 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 28.4% of respondents, totaling 142 individuals, and 33.4% "Agree," with 167 respondents supporting this perspective. Lastly, 15.2% "Strongly Agree" with the statement, comprising 76 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived challenges associated with online distractions when applying e-learning platforms in the Indian educational context.
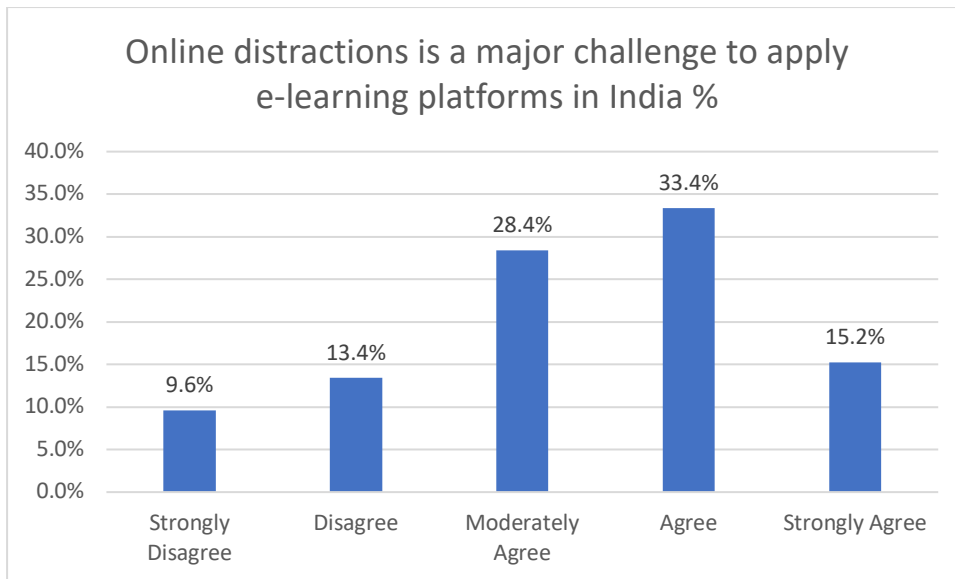
Figure 12: Online distractions

Source: Author's work (2024)

Table 15: Disabilities and special needs is a major challenge to apply e-learning platforms in India

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	35	7.0	7.0	7.0
	Disagree	55	11.0	11.0	18.0
	Moderately Agree	128	25.6	25.6	43.6
	Agree	170	34.0	34.0	77.6
	Strongly Agree	112	22.4	22.4	100.0
	Total	500	100.0	100.0	

The frequency distribution table reveals respondents' perspectives on the statement "Disabilities and special needs are a major challenge to apply e-learning platforms in India." Among the 500 respondents, 7.0% "Strongly Disagree" with the statement, constituting 35 individuals, while 11.0% "Disagree," with 55 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 25.6% of respondents, totaling 128 individuals, and 34.0% "Agree," with 170 respondents supporting this perspective. Lastly, 22.4% "Strongly Agree" with the statement, comprising 112 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived challenges associated with disabilities and special needs when applying e-learning platforms in the Indian educational landscape.
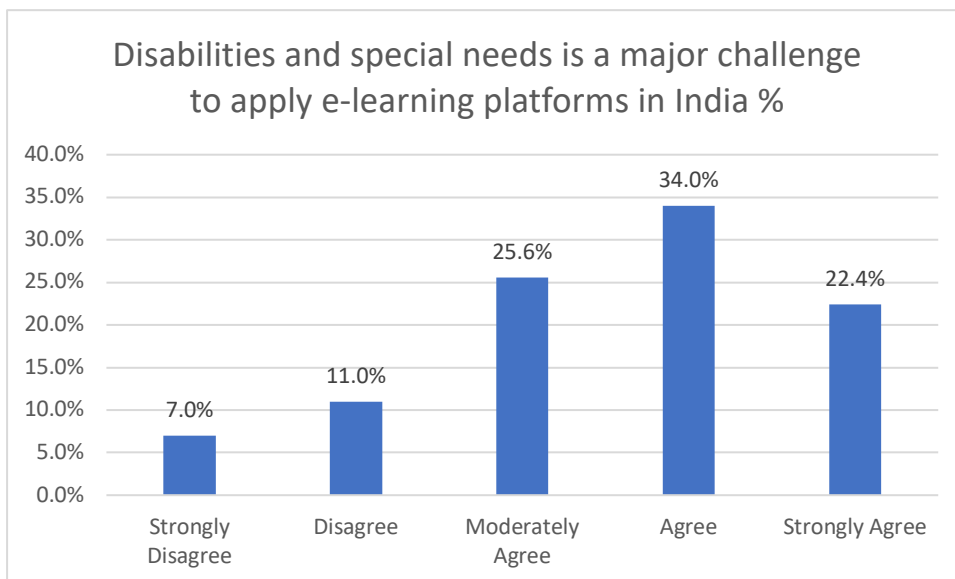
Figure 13: Disabilities and special needs

Source: Author's work (2024)

Table 16: Poor digital literacy is a major challenge to apply e-learning platforms in India

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	59	11.8	11.8	11.8
	Disagree	55	11.0	11.0	22.8
	Moderately Agree	130	26.0	26.0	48.8
	Agree	157	31.4	31.4	80.2
	Strongly Agree	99	19.8	19.8	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table provides insights into respondents' perspectives on the statement "Poor digital literacy is a major challenge to apply e-learning platforms in India." Among the 500 respondents, 11.8% "Strongly Disagree" with the statement, constituting 59 individuals, while 11.0% "Disagree," with 55 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 26.0% of respondents, totaling 130 individuals, and 31.4% "Agree," with 157 respondents supporting this perspective. Lastly, 19.8% "Strongly Agree" with the statement, comprising 99 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived challenges associated with poor digital literacy when applying e-learning platforms in the Indian educational landscape.
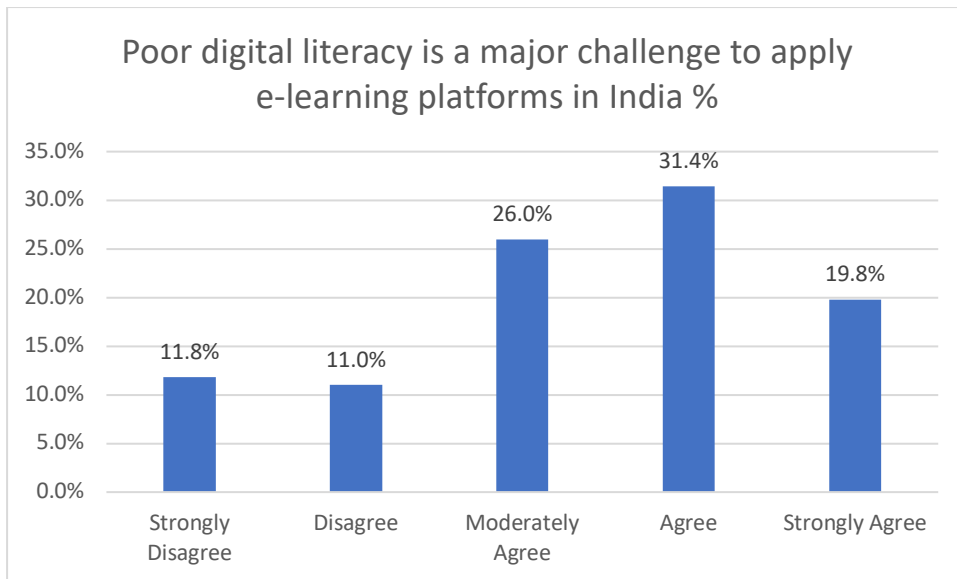
Figure 14: Poor digital literacy

Source: Author's work (2024)

Table 17: Implementation of e-learning platforms helped them in preparation for the exam

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	51	10.2	10.2	10.2
	Disagree	52	10.4	10.4	20.6
	Moderately Agree	127	25.4	25.4	46.0
	Agree	162	32.4	32.4	78.4
	Strongly Agree	108	21.6	21.6	100.0
	Total	500	100.0	100.0	

The frequency distribution table presents respondents' perspectives on the statement "Implementation of e-learning platforms helped them in preparation for the exam." Among the 500 respondents, 10.2% "Strongly Disagree" with the statement, constituting 51 individuals, while 10.4% "Disagree," with 52 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 25.4% of respondents, totalling 127 individuals, and 32.4% "Agree," with 162 respondents supporting this perspective. Lastly, 21.6% "Strongly Agree" with the statement, comprising 108 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact of e-learning platforms on exam preparation among respondents in the Indian educational context.
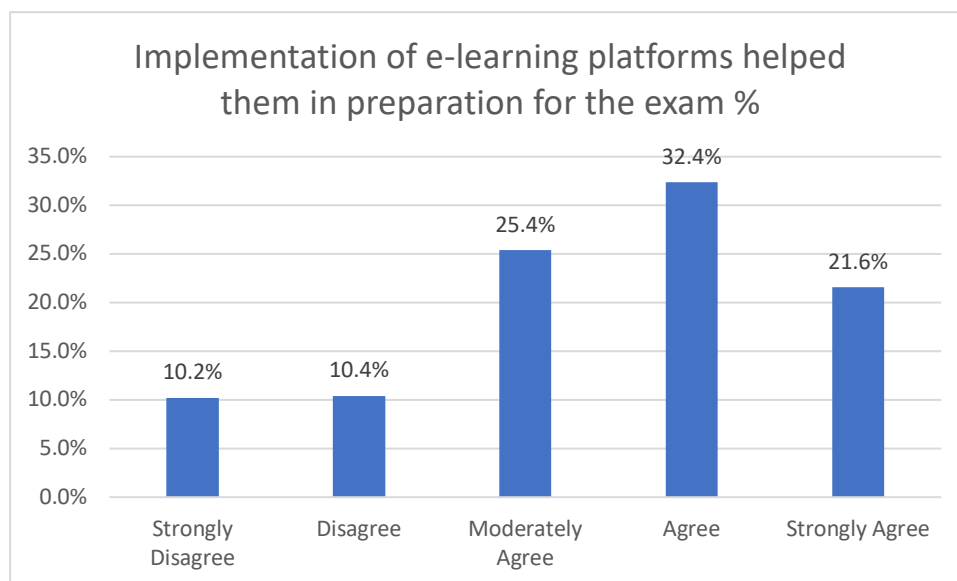
Figure 15: Implementation of e-learning platforms

Source: Author's work (2024)

Table 18: Implementation of e-learning platforms helped them in increasing the knowledge of subjects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	45	9.0	9.0	9.0
	Disagree	71	14.2	14.2	23.2
	Moderately Agree	122	24.4	24.4	47.6
	Agree	166	33.2	33.2	80.8
	Strongly Agree	96	19.2	19.2	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table reveals respondents' perspectives on the statement "Implementation of e-learning platforms helped them in increasing the knowledge of subjects." Among the 500 respondents, 9.0% "Strongly Disagree" with the statement, constituting 45 individuals, while 14.2% "Disagree," with 71 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 24.4% of respondents, totaling 122 individuals, and 33.2% "Agree," with 166 respondents supporting this perspective. Lastly, 19.2% "Strongly Agree" with the statement, comprising 96 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact of e-learning platforms on increasing subject knowledge among respondents in the Indian educational context.
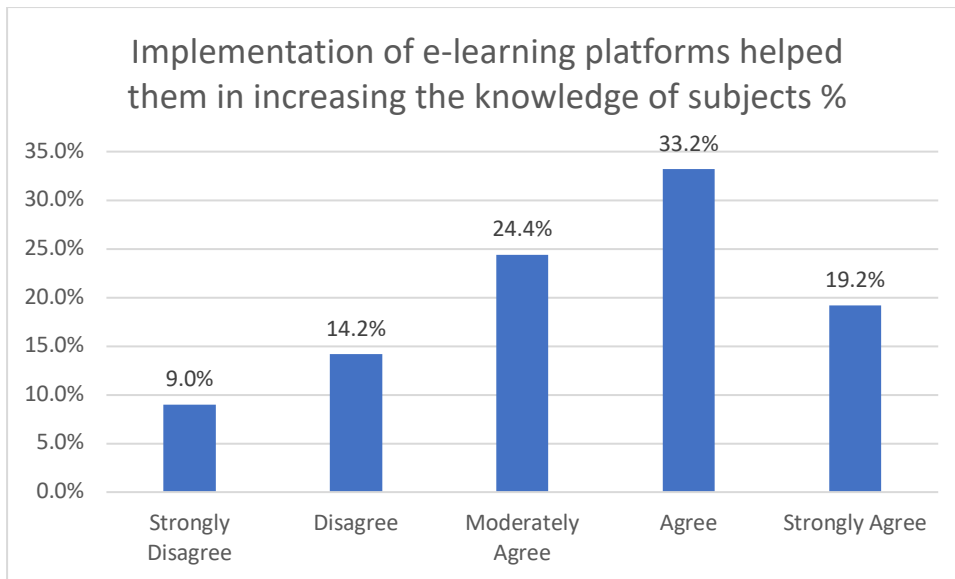
Figure 16: Implementation of e-learning platforms

Source: Author's work (2024)

Table 19: Implementation of e-learning platforms helped them in increasing the academic performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	44	8.8	8.8	8.8
	Disagree	60	12.0	12.0	20.8
	Moderately Agree	145	29.0	29.0	49.8
	Agree	171	34.2	34.2	84.0
	Strongly Agree	80	16.0	16.0	100.0
	Total	500	100.0	100.0	

The frequency distribution table provides insights into respondents' perspectives on the statement "Implementation of e-learning platforms helped them in increasing academic performance." Among the 500 respondents, 8.8% "Strongly Disagree" with the statement, constituting 44 individuals, while 12.0% "Disagree," with 60 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 29.0% of respondents, totaling 145 individuals, and 34.2% "Agree," with 171 respondents supporting this perspective. Lastly, 16.0% "Strongly Agree" with the statement, comprising 80 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact of e-learning platforms on increasing academic performance among respondents in the Indian educational context.

Figure 17: Implementation of e-learning platforms for academic performance

Source: Author's work (2024)

Table 20: Implementation of e-learning platforms helped them in increasing the confidence in subjects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	31	6.2	6.2	6.2
	Disagree	52	10.4	10.4	16.6
	Moderately Agree	124	24.8	24.8	41.4
	Agree	170	34.0	34.0	75.4
	Strongly Agree	123	24.6	24.6	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table provides insights into respondents' perspectives on the statement "Implementation of e-learning platforms helped them in increasing confidence in subjects." Among the 500 respondents, 6.2% "Strongly Disagree" with the statement, constituting 31 individuals, while 10.4% "Disagree," with 52 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 24.8% of respondents, totalling 124 individuals, and 34.0% "Agree," with 170 respondents supporting this perspective. Lastly, 24.6% "Strongly Agree" with the statement, comprising 123 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact of e-learning platforms on increasing confidence in subjects among respondents in the Indian educational context.
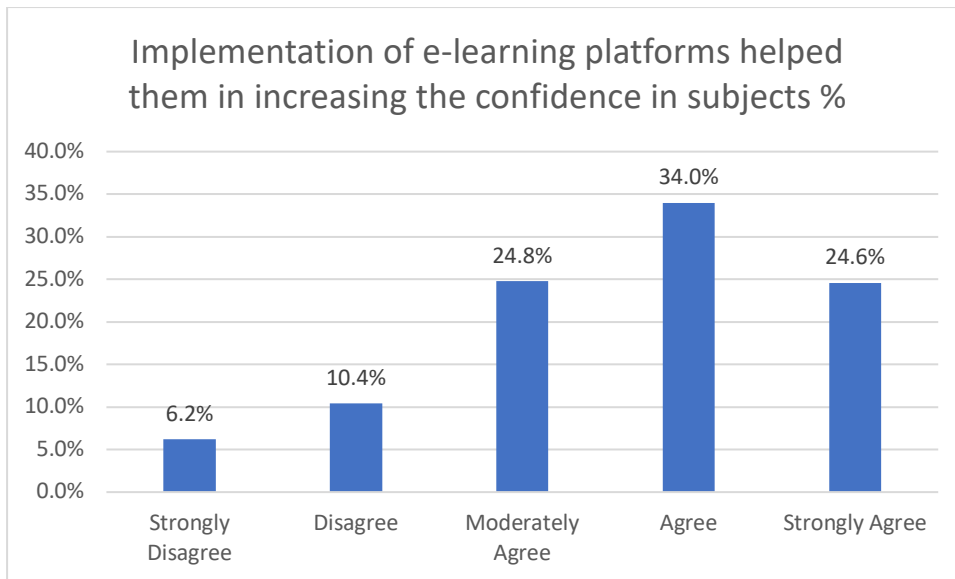
Figure 18: Implementation of e-learning platforms to increase the confidence in subjects

Source: Author's work (2024)

Table 21: Implementation of e-learning platforms helped them in achievement (better grade) in subjects

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	38	7.6	7.6	7.6
	Disagree	49	9.8	9.8	17.4
	Moderately Agree	118	23.6	23.6	41.0
	Agree	174	34.8	34.8	75.8
	Strongly Agree	121	24.2	24.2	100.0

	Total	500	100.0	100.0	

The frequency distribution table offers insights into respondents' perspectives on the statement "Implementation of e-learning platforms helped them in achieving better grades in subjects." Among the 500 respondents, 7.6% "Strongly Disagree" with the statement, constituting 38 individuals, while 9.8% "Disagree," with 49 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 23.6% of respondents, totaling 118 individuals, and 34.8% "Agree," with 174 respondents supporting this perspective. Lastly, 24.2% "Strongly Agree" with the statement, comprising 121 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact of e-learning platforms on academic achievement among respondents in the Indian educational context.


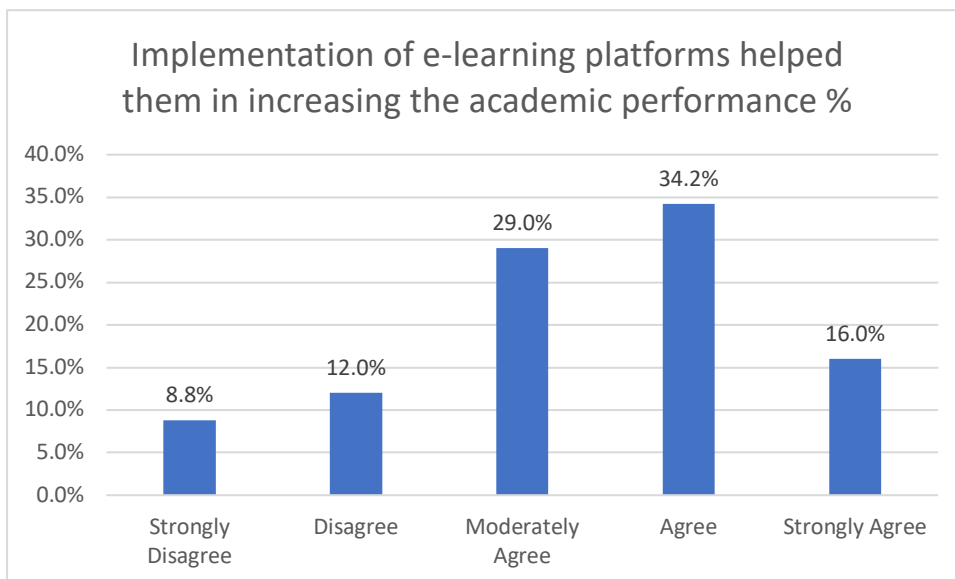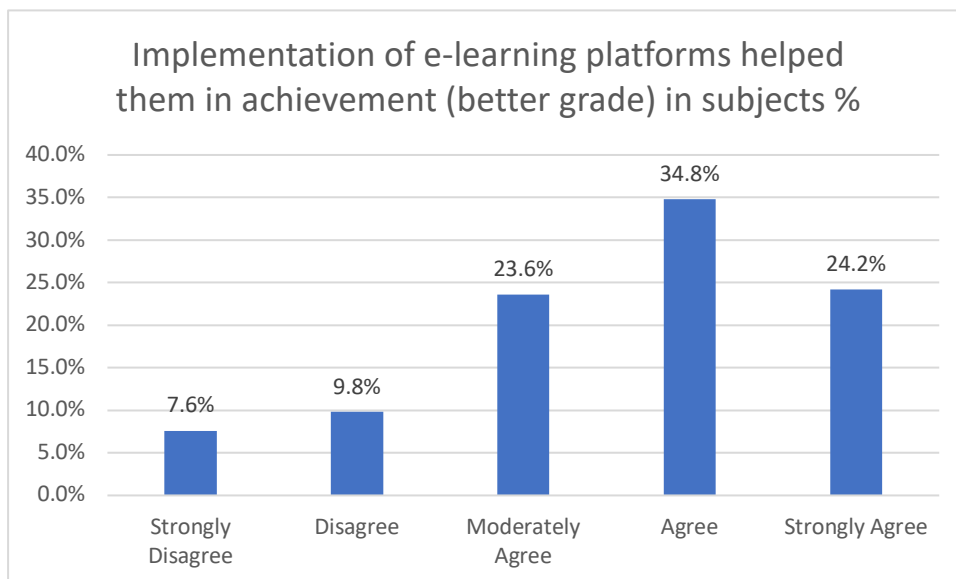**Figure 19: e-learning platforms for achievement (better grade) in subjects**

Table 22: Implementation of e-learning platforms improve the quality of education in India

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	28	5.6	5.6	5.6
	Disagree	51	10.2	10.2	15.8
	Moderately Agree	117	23.4	23.4	39.2
	Agree	196	39.2	39.2	78.4
	Strongly Agree	108	21.6	21.6	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table provides insights into respondents' perspectives on the statement "Implementation of e-learning platforms improves the quality of education in India." Among the 500 respondents, 5.6% "Strongly Disagree" with the statement, constituting 28 individuals, while 10.2% "Disagree," with 51 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 23.4% of respondents, totaling 117 individuals, and 39.2% "Agree," with 196 respondents supporting this perspective. Lastly, 21.6% "Strongly Agree" with the statement, comprising 108 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the

perceived impact of e-learning platforms on the overall quality of education in India among respondents in the educational context.
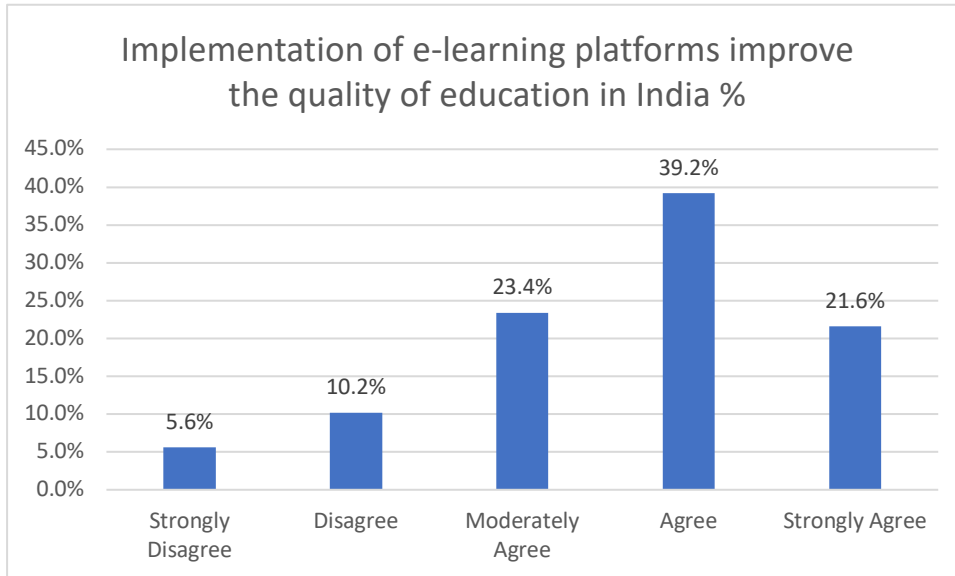
Figure 20: e-learning platforms improve the quality of education in India %

Source: Author's work (2024)

Table 23: Implementation of e-learning platforms improve the excellency of education among students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	35	7.0	7.0	7.0
	Disagree	61	12.2	12.2	19.2
	Moderately Agree	129	25.8	25.8	45.0
	Agree	170	34.0	34.0	79.0

	Strongly Agree	105	21.0	21.0	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table outlines respondents' perspectives on the statement "Implementation of e-learning platforms improves the excellence of education among students." Among the 500 respondents, 7.0% "Strongly Disagree" with the statement, constituting 35 individuals, while 12.2% "Disagree," with 61 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 25.8% of respondents, totaling 129 individuals, and 34.0% "Agree," with 170 respondents supporting this perspective. Lastly, 21.0% "Strongly Agree" with the statement, comprising 105 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact of e-learning platforms on enhancing the overall excellence of education among students in the Indian educational context.

Implementation of e-learning platforms improve the excellency of education among students %
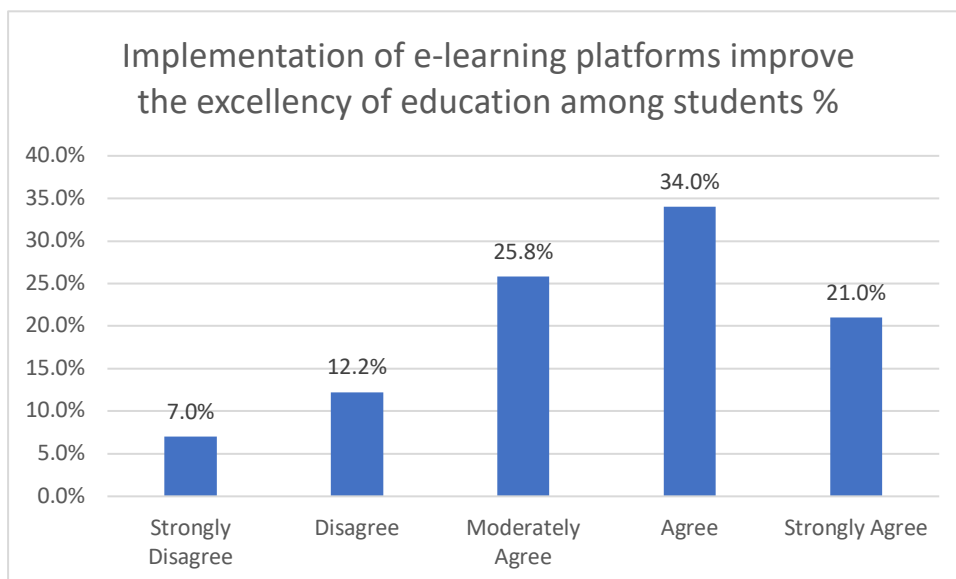
Figure 21: e-learning platforms improve the excellency of education among students

Source: Author's work (2024)

Table 24: Implementation of e-learning platforms improve the understanding of subjects among students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	55	11.0	11.0	11.0
	Disagree	66	13.2	13.2	24.2
	Moderately Agree	153	30.6	30.6	54.8
	Agree	146	29.2	29.2	84.0
	Strongly Agree	80	16.0	16.0	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table provides insights into respondents' perspectives on the statement "Implementation of e-learning platforms improves the understanding of subjects among students." Among the 500 respondents, 11.0% "Strongly Disagree" with the statement, constituting 55 individuals, while 13.2% "Disagree," with 66 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 30.6% of respondents, totalling 153 individuals, and 29.2% "Agree," with 146 respondents supporting this perspective. Lastly, 16.0% "Strongly Agree" with the statement, comprising 80 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of

the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact of e-learning platforms on enhancing the understanding of subjects among students in the Indian educational context.
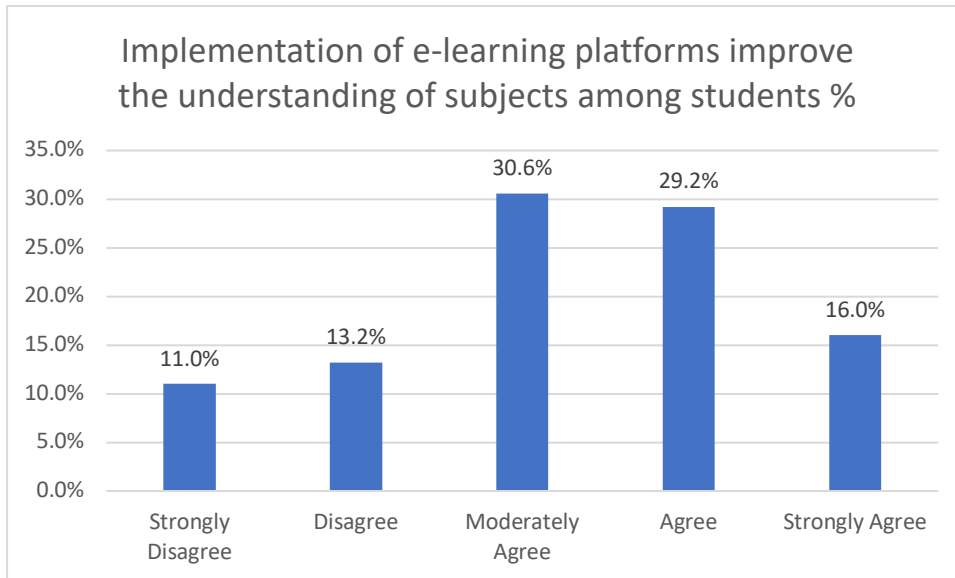
Figure 22: e-learning platforms improve the understanding of subjects among students

Source: Author's work (2024)

Table 25: Implementation of e-learning platforms increase the transfer of knowledge between teachers and students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	45	9.0	9.0	9.0
	Disagree	62	12.4	12.4	21.4
	Moderately Agree	146	29.2	29.2	50.6

	Agree	142	28.4	28.4	79.0
	Strongly Agree	105	21.0	21.0	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table presents respondents' perspectives on the statement "Implementation of e-learning platforms increases the transfer of knowledge between teachers and students." Among the 500 respondents, 9.0% "Strongly Disagree" with the statement, constituting 45 individuals, while 12.4% "Disagree," with 62 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 29.2% of respondents, totalling 146 individuals, and 28.4% "Agree," with 142 respondents supporting this perspective. Lastly, 21.0% "Strongly Agree" with the statement, comprising 105 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact of e-learning platforms on facilitating the transfer of knowledge between teachers and students in the Indian educational context.

Implementation of e-learning platforms increase the transfer of knowledge between teachers and students %
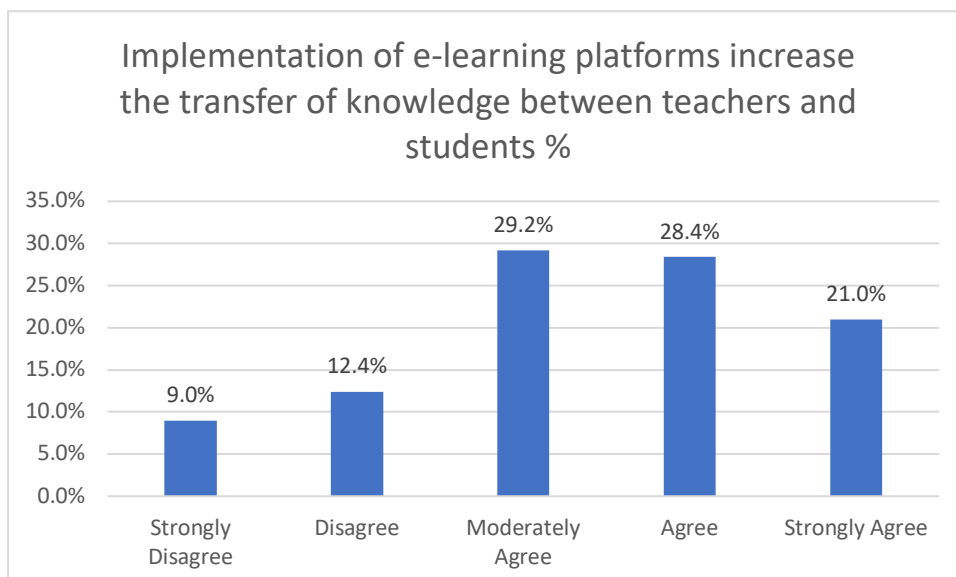
Figure 23: e-learning platforms for transfer of knowledge between teachers and students

Source: Author's work (2024)

Table 26: E-learning platforms provide a safer learning environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	47	9.4	9.4	9.4
	Disagree	78	15.6	15.6	25.0
	Moderately Agree	170	34.0	34.0	59.0
	Agree	120	24.0	24.0	83.0
	Strongly Agree	85	17.0	17.0	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table outlines respondents' perspectives on the statement "E-learning platforms provide a safer learning environment." Among the 500 respondents, 9.4% "Strongly Disagree" with the statement, constituting 47 individuals, while 15.6% "Disagree," with 78 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 34.0% of respondents, totalling 170 individuals, and 24.0% "Agree," with 120 respondents supporting this perspective. Lastly, 17.0% "Strongly Agree" with the statement, comprising 85 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers

valuable insights into the diverse perspectives regarding the perceived safety of the learning environment provided by e-learning platforms among respondents in the Indian educational context.
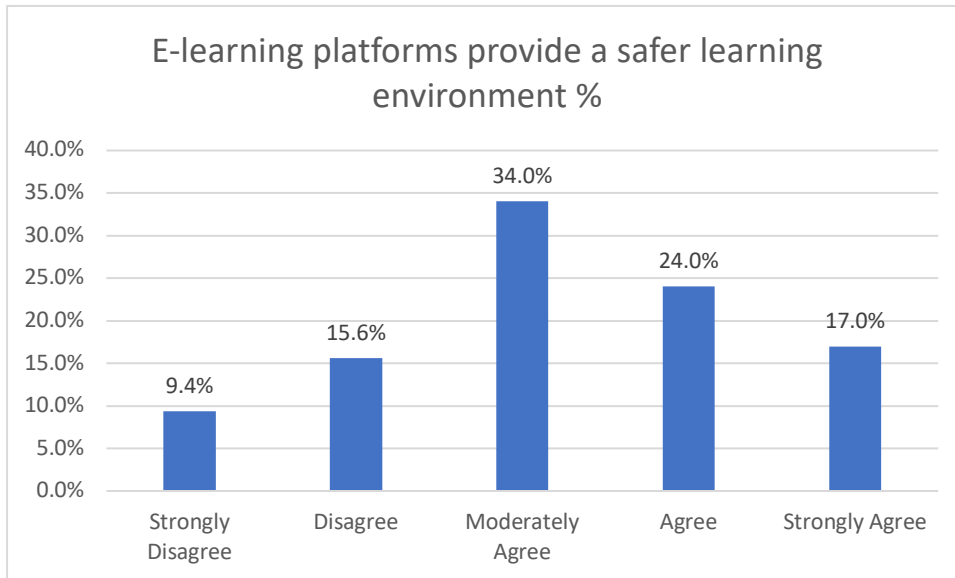
Figure 24: E-learning platforms provide a safer learning environment

Source: Author's work (2024)

Table 27: E-learning platforms increase student engagement in studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	40	8.0	8.0	8.0
	Disagree	99	19.8	19.8	27.8
	Moderately Agree	125	25.0	25.0	52.8
	Agree	143	28.6	28.6	81.4

	Strongly Agree	93	18.6	18.6	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table provides insights into respondents' perspectives on the statement "E-learning platforms increase student engagement in studies." Among the 500 respondents, 8.0% "Strongly Disagree" with the statement, constituting 40 individuals, while 19.8% "Disagree," with 99 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 25.0% of respondents, totaling 125 individuals, and 28.6% "Agree," with 143 respondents supporting this perspective. Lastly, 18.6% "Strongly Agree" with the statement, comprising 93 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact of e-learning platforms on increasing student engagement in studies among respondents in the Indian educational context.

143
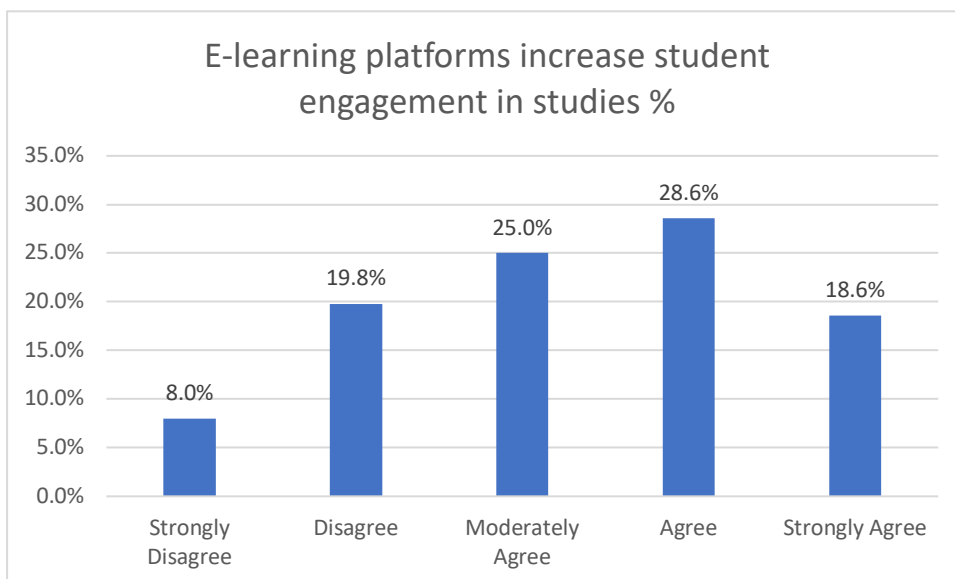
Figure 24: E-learning platforms increase student engagement in studies

Source: Author's work (2024)

Table 28: E-learning platforms improve comprehension in studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	32	6.4	6.4	6.4
	Disagree	81	16.2	16.2	22.6
	Moderately Agree	144	28.8	28.8	51.4
	Agree	139	27.8	27.8	79.2
	Strongly Agree	104	20.8	20.8	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table outlines respondents' perspectives on the statement "E-learning platforms improve comprehension in studies." Among the 500 respondents, 6.4% "Strongly Disagree" with the statement, constituting 32 individuals, while 16.2% "Disagree," with 81 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 28.8% of respondents, totaling 144 individuals, and 27.8% "Agree," with 139 respondents supporting this perspective. Lastly, 20.8% "Strongly Agree" with the statement, comprising 104 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact

of e-learning platforms on improving comprehension in studies among respondents in the Indian educational context.
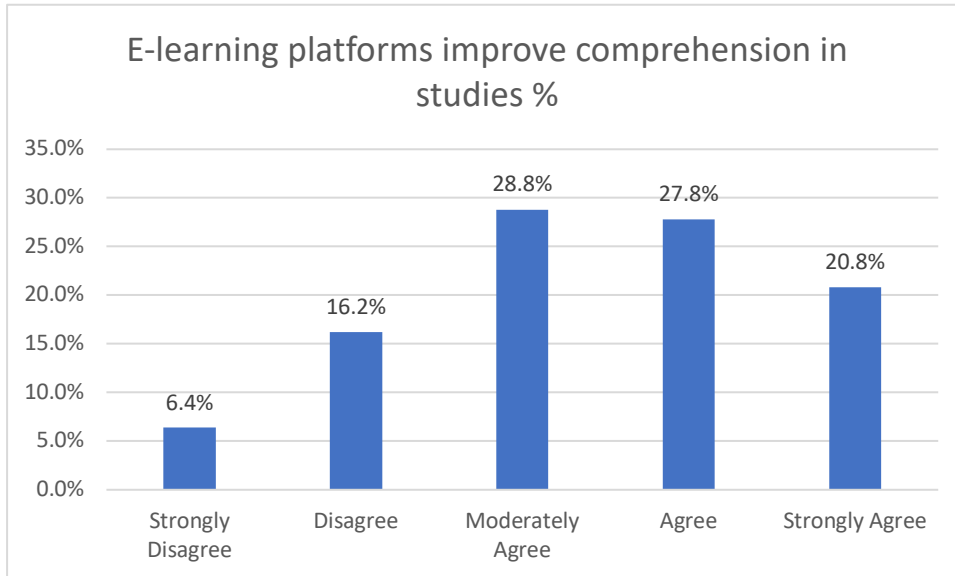
Figure 25: E-learning platforms improve comprehension in studies

Source: Author's work (2024)

Table 29: E-learning platforms have more autonomy over their learning

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	31	6.2	6.2	6.2
	Disagree	83	16.6	16.6	22.8
	Moderately Agree	144	28.8	28.8	51.6
	Agree	150	30.0	30.0	81.6

	Strongly Agree	92	18.4	18.4	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table provides insights into respondents' perspectives on the statement "E-learning platforms have more autonomy over their learning." Among the 500 respondents, 6.2% "Strongly Disagree" with the statement, constituting 31 individuals, while 16.6% "Disagree," with 83 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 28.8% of respondents, totalling 144 individuals, and 30.0% "Agree," with 150 respondents supporting this perspective. Lastly, 18.4% "Strongly Agree" with the statement, comprising 92 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived autonomy that e-learning platforms provide over learning among respondents in the Indian educational context.

E-learning platforms have more autonomy over their learning %
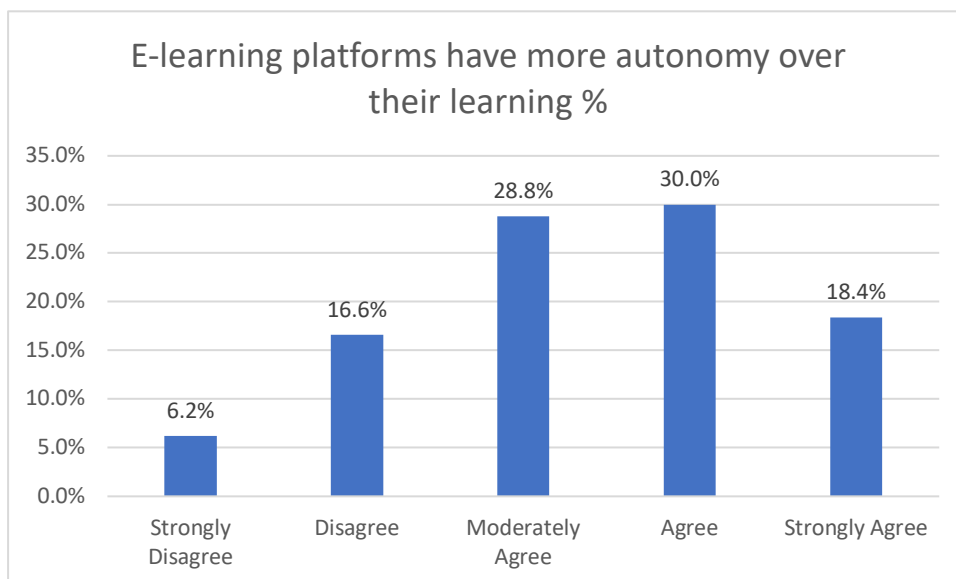
Figure 26: E-learning platforms have more autonomy over their learning

Source: Author's work (2024)

Table 30: E-learning platforms use of instructor time efficiently in teaching

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	48	9.6	9.6	9.6
	Disagree	101	20.2	20.2	29.8
	Moderately Agree	147	29.4	29.4	59.2
	Agree	129	25.8	25.8	85.0
	Strongly Agree	75	15.0	15.0	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table outlines respondents' perspectives on the statement "E-learning platforms use instructor time efficiently in teaching." Among the 500 respondents, 9.6% "Strongly Disagree" with the statement, constituting 48 individuals, while 20.2% "Disagree," with 101 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 29.4% of respondents, totaling 147 individuals, and 25.8% "Agree," with 129 respondents supporting this perspective. Lastly, 15.0% "Strongly Agree" with the statement, comprising 75 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived

efficiency of e-learning platforms in utilizing instructor time for teaching among respondents in the Indian educational context.
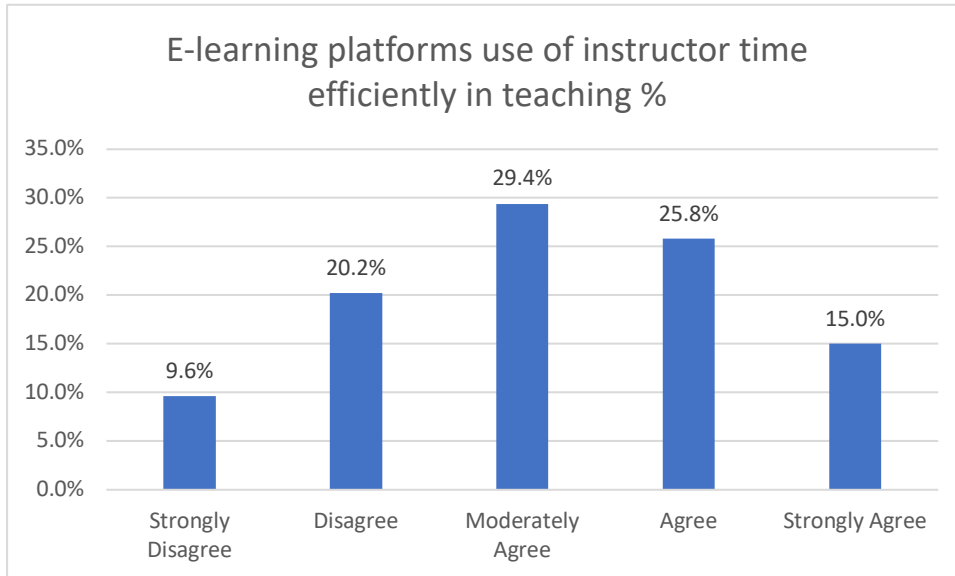
Figure 27: E-learning platforms use of instructor time efficiently in teaching

Source: Author's work (2024)

Table 31: E-learning platforms gather learner data for better insights in studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	42	8.4	8.4	8.4
	Disagree	77	15.4	15.4	23.8
	Moderately Agree	134	26.8	26.8	50.6
	Agree	156	31.2	31.2	81.8

	Strongly Agree	91	18.2	18.2	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table provides insights into respondents' perspectives on the statement "E-learning platforms gather learner data for better insights in studies." Among the 500 respondents, 8.4% "Strongly Disagree" with the statement, constituting 42 individuals, while 15.4% "Disagree," with 77 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 26.8% of respondents, totaling 134 individuals, and 31.2% "Agree," with 156 respondents supporting this perspective. Lastly, 18.2% "Strongly Agree" with the statement, comprising 91 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived role of e-learning platforms in gathering learner data for enhancing insights in studies among respondents in the Indian educational context.

E-learning platforms gather learner data for better insights in studies %
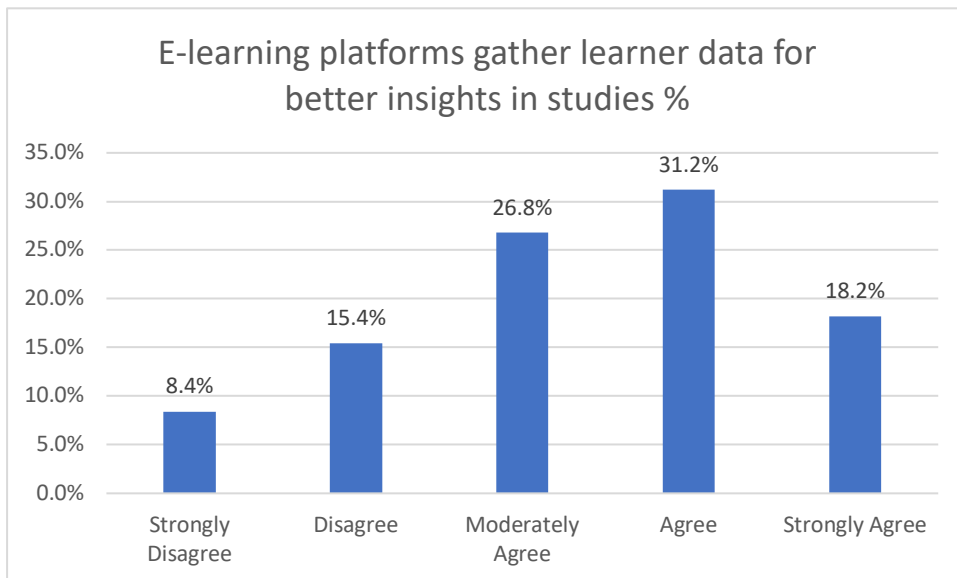
Figure 28: E-learning platforms gather learner data for better insights in studies

Source: Author's work (2024)

Table 32: E-learning platforms access and enrol more students in studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	41	8.2	8.2	8.2
	Disagree	93	18.6	18.6	26.8
	Moderately Agree	134	26.8	26.8	53.6
	Agree	152	30.4	30.4	84.0
	Strongly Agree	80	16.0	16.0	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table outlines respondents' perspectives on the statement "E-learning platforms access and enrol more students in studies." Among the 500 respondents, 8.2% "Strongly Disagree" with the statement, constituting 41 individuals, while 18.6% "Disagree," with 93 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 26.8% of respondents, totalling 134 individuals, and 30.4% "Agree," with 152 respondents supporting this perspective. Lastly, 16.0% "Strongly Agree" with the statement, comprising 80 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact

of e-learning platforms in facilitating access and enrolment of students in studies among respondents in the Indian educational context.
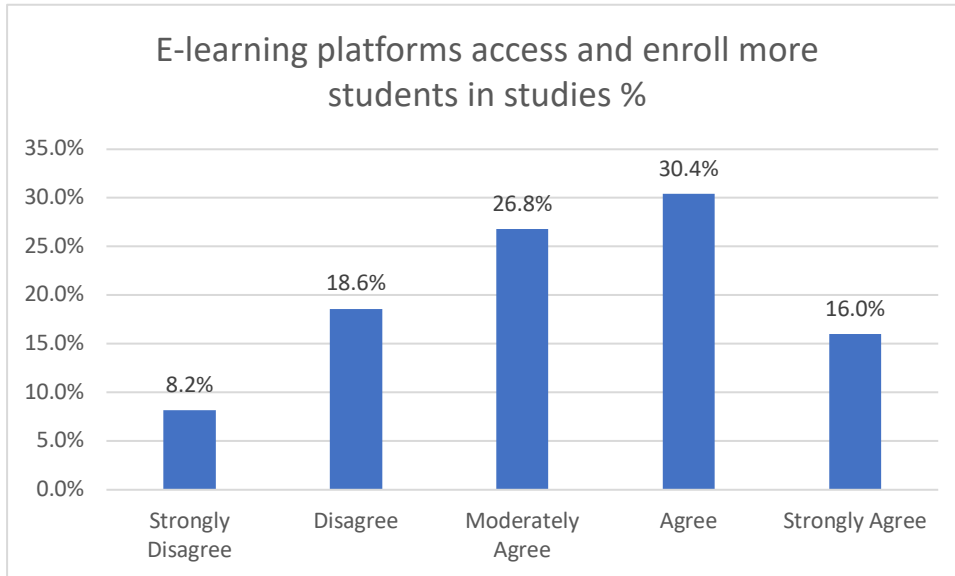
Figure 29: E-learning platforms access and enroll more students in studies

Source: Author's work (2024)

Table 33: E-learning platforms improve outcomes of studies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	59	11.8	11.8	11.8
	Disagree	87	17.4	17.4	29.2
	Moderately Agree	122	24.4	24.4	53.6
	Agree	151	30.2	30.2	83.8

	Strongly Agree	81	16.2	16.2	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table provides insights into respondents' perspectives on the statement "E-learning platforms improve outcomes of studies." Among the 500 respondents, 11.8% "Strongly Disagree" with the statement, constituting 59 individuals, while 17.4% "Disagree," with 87 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 24.4% of respondents, totaling 122 individuals, and 30.2% "Agree," with 151 respondents supporting this perspective. Lastly, 16.2% "Strongly Agree" with the statement, comprising 81 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact of e-learning platforms on improving the outcomes of studies among respondents in the Indian educational context.

E-learning platforms improve outcomes of studies %
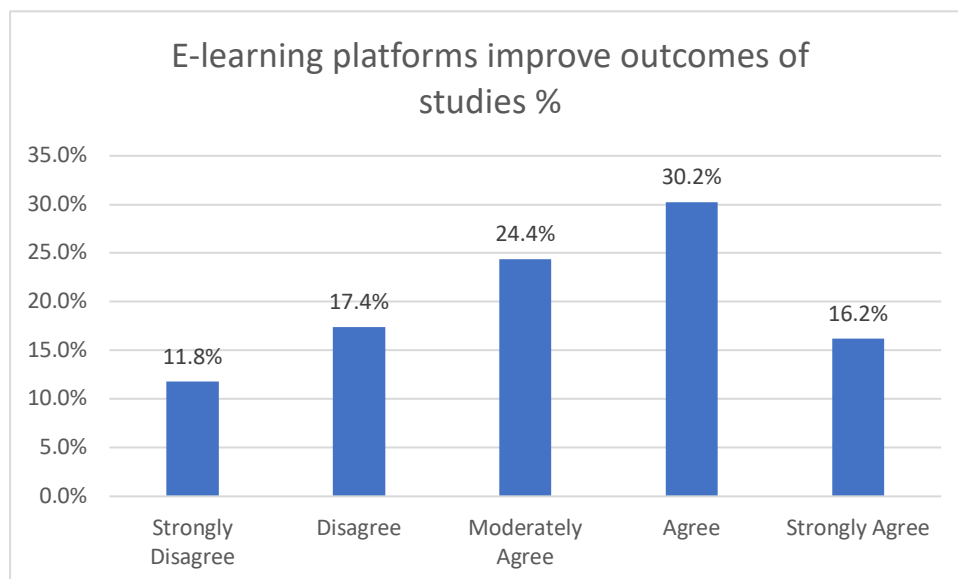
Figure 30: E-learning platforms improve outcomes of studies

Source: Author's work (2024)

Table 34: E-learning platforms have deepened students' interest in the subject being taught

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	34	6.8	6.8	6.8
	Disagree	77	15.4	15.4	22.2
	Moderately Agree	139	27.8	27.8	50.0
	Agree	159	31.8	31.8	81.8
	Strongly Agree	91	18.2	18.2	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table outlines respondents' perspectives on the statement "E-learning platforms have deepened students' interest in the subject being taught." Among the 500 respondents, 6.8% "Strongly Disagree" with the statement, constituting 34 individuals, while 15.4% "Disagree," with 77 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 27.8% of respondents, totaling 139 individuals, and 31.8% "Agree," with 159 respondents supporting this perspective. Lastly, 18.2% "Strongly Agree" with the statement, comprising 91 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced

breakdown offers valuable insights into the diverse perspectives regarding the perceived impact of e-learning platforms on deepening students' interest in the subject being taught among respondents in the Indian educational context.
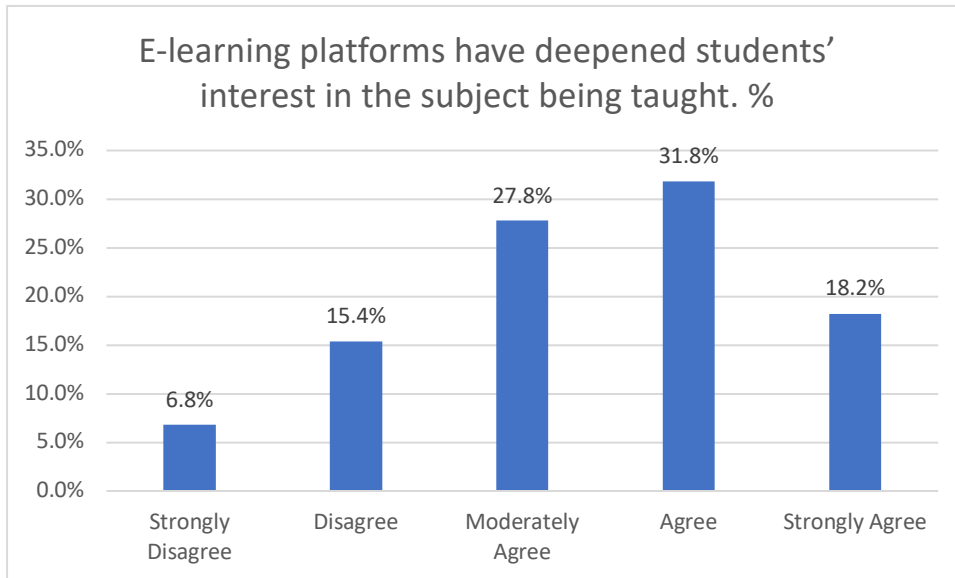
Figure 31: E-learning platforms have deepened students' interest

Source: Author's work (2024)

Table 35: E-learning platforms have improved the interaction among students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	53	10.6	10.6	10.6
	Disagree	95	19.0	19.0	29.6
	Moderately Agree	146	29.2	29.2	58.8
	Agree	116	23.2	23.2	82.0

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	Strongly Agree	90	18.0	18.0	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table provides insights into respondents' perspectives on the statement "E-learning platforms have improved the interaction among students." Among the 500 respondents, 10.6% "Strongly Disagree" with the statement, constituting 53 individuals, while 19.0% "Disagree," with 95 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 29.2% of respondents, totaling 146 individuals, and 23.2% "Agree," with 116 respondents supporting this perspective. Lastly, 18.0% "Strongly Agree" with the statement, comprising 90 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact of e-learning platforms on improving interaction among students among respondents in the Indian educational context.

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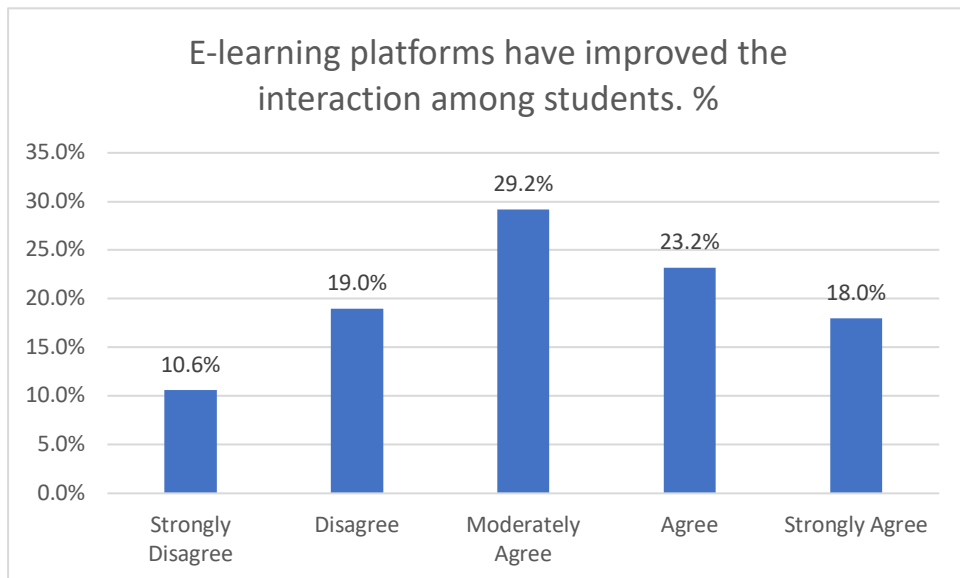
Figure 32: E-learning platforms have improved the interaction among students

Source: Author's work (2024)

Table 36: Do students achieve various awards, certificates, and prizes because of E-learning platforms?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	37	7.4	7.4	7.4
	Disagree	80	16.0	16.0	23.4
	Moderately Agree	135	27.0	27.0	50.4
	Agree	155	31.0	31.0	81.4
	Strongly Agree	93	18.6	18.6	100.0
	Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table presents respondents' perspectives on the statement "Do students achieve various awards, certificates, and prizes because of E-learning platforms?" Among the 500 respondents, 7.4% "Strongly Disagree" with the statement, constituting 37 individuals, while 16.0% "Disagree," with 80 respondents expressing this viewpoint. The category of "Moderately Agree" encompasses 27.0% of respondents, totalling 135 individuals,

and 31.0% "Agree," with 155 respondents supporting this perspective. Lastly, 18.6% "Strongly Agree" with the statement, comprising 93 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived impact of e-learning platforms on students' achievements and recognition in the form of awards, certificates, and prizes among respondents in the Indian educational context.
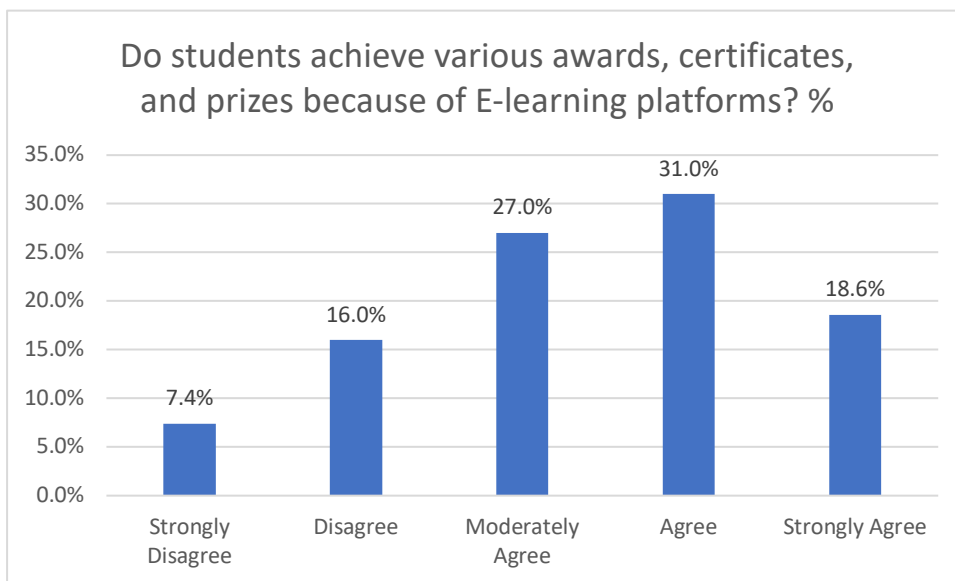
Figure 33: Do students achieve various awards, certificates, and prizes because of E-learning platforms?

Source: Author's work (2024)

Table 37: Rate the overall success of E-learning platforms

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Low	39	7.8	7.8	7.8
	Low	83	16.6	16.6	24.4

Medium	131	26.2	26.2	50.6
High	160	32.0	32.0	82.6
Very High	87	17.4	17.4	100.0
Total	500	100.0	100.0	

Source: Author's work (2024)

The frequency distribution table outlines respondents' ratings on the overall success of E-learning platforms. Among the 500 respondents, 7.8% rated the overall success as "Very Low," with 39 individuals providing this rating. For the "Low" category, 16.6% of respondents, constituting 83 individuals, expressed this viewpoint. The "Medium" success category garnered 26.2% of responses, with 131 individuals providing this rating. Additionally, 32.0% of respondents rated the overall success as "High," with 160 individuals expressing this perspective. Lastly, 17.4% of respondents rated the success as "Very High," comprising 87 individuals. The cumulative percent column illustrates the gradual accumulation of responses, reaching 100% at the conclusion of the table. This nuanced breakdown offers valuable insights into the diverse perspectives regarding the perceived overall success of E-learning platforms among respondents in the Indian educational context.
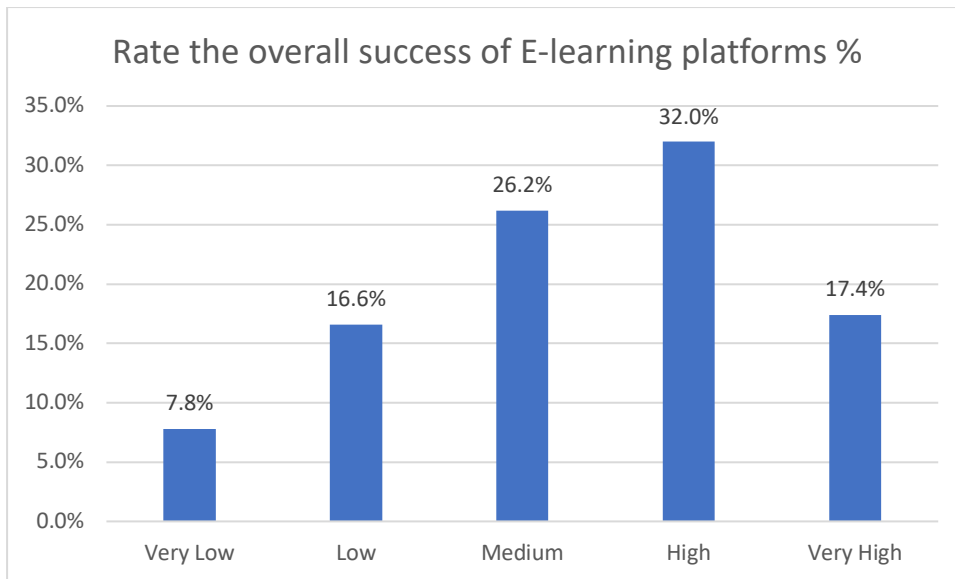
Figure 34: Rate the overall success of E-learning platforms

Source: Author's work (2024)

4.4 Exploratory Factor Analysis

The outcomes of the exploratory factor analysis, as determined by the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity, are displayed in Table 4.3. The KMO measure, which has an observed value of 0.960, signifies that the data is exceptionally amenable to factor analysis. This implies that there is considerable shared variance among the variables under consideration, which can be accounted for by underlying factors.

The significance level of 0.000 and the approximate Chi-Square value of 13384.495 with 499 degrees of freedom and Bartlett's Test of Sphericity indicate that the test is also significant. The obtained outcome provides additional evidence that the correlation matrix is indeed an identity matrix, thereby refuting the null hypothesis and confirming that the data are suitable for factor analysis. In general, the results of this study indicate that the dataset can be utilised to conduct an exploratory factor analysis in order to ascertain latent factors that exist between the observed variables.

Table 38: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.960
Bartlett's Test of Sphericity	Approx. Chi-Square	13384.495
	Df	499
	P-Value	.000

Source: Author's work (2024)

The Table 4.37 shows the communalities for each variable before and after the extraction in the exploratory factor analysis, using the Principal Component Analysis method.

Communalities represent the proportion of each variable's variance that is accounted for by the extracted factors. In this case, the "Initial" column represents the communalities before extraction, and the "Extraction" column represents the communalities after extraction.

Before extraction, all communalities in the "Initial" column are set to 1.000, as this is the maximum possible value, indicating that each variable explains all of its own variance.

After extraction, the communalities in the "Extraction" column are lower, indicating the proportion of variance retained by the extracted factors. For example, CH1 (Expense of technology is a major challenge) has a communality of .674, suggesting that 67.4% of its variance is accounted for by the underlying factors identified in the Principal Component Analysis.

These communalities provide insights into how much of the variance in each variable is explained by the factors extracted in the analysis. Higher communalities indicate that the variable is well-represented by the factors, while lower communalities suggest that some unique variance in the variable remains unexplained by the extracted factors.

Table 39: Communalities

	Initial (1.000)	Extraction
CH1		.674
CH2		.667
CH3		.700
CH4		.620
CH5		.662
CH6		.602
CH7		.751
CH8		.669
ET1		.624
ET2		.680
ET3		.718
ET4		.770
ET5		.804
IOQ1		.812

IOQ2		.734
IOQ3		.808
IOQ4		.846
BT1		.836
BT2		.726
BT3		.777
BT4		.754
BT5		.708
BT6		.803
BT7		.801
BT8		.800
BT9		.791
BT10		.748
SC1		.802
SC2		.697
Extraction Method: Principal Component Analysis.		

In Table 4.38, the Principal Component Analysis (PCA) reveals distinct components based on the variables CH (Expense of technology is a major challenge), ET (E-learning platforms), IoQ (Implementation of e-learning platforms), BT (Challenges to apply e-learning platforms in India), and SC (Success of e-learning platforms).

Component 1 (CH):

The first component, representing challenges related to the expense of technology, has an initial eigenvalue of 15.973, explaining 55.081% of the total variance. The extraction sums of squared loadings for this component indicate a cumulative variance of 55.081%. This component highlights the financial barriers associated with implementing e-learning platforms in India, with higher factor loadings for variables related to the cost challenges.

Component 2 (ET):

The second component, corresponding to E-learning platforms (ET), has an initial eigenvalue of 2.301, explaining 7.936% of the total variance. The extraction sums of squared loadings show a cumulative variance of 63.017%. This component emphasizes the role and impact of e-learning platforms, showcasing their significance in the educational landscape, with higher factor loadings for variables related to the platforms' positive aspects.

Component 3 (IoQ):

The third component, representing Implementation of e-learning platforms (IoQ), has an initial eigenvalue of 1.344, explaining 4.636% of the total variance. The extraction sums of squared loadings reveal a cumulative variance of 67.652%. This component underscores the challenges and benefits associated with the implementation of e-learning platforms, with higher factor loadings for variables related to the quality of implementation.

Component 4 (BT):

The fourth component, associated with Challenges to apply e-learning platforms in India (BT), has an initial eigenvalue of 0.953, explaining 3.285% of the total variance. The extraction sums of squared loadings show a cumulative variance of 70.937%. This component sheds light on

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broader challenges hindering the application of e-learning platforms in India, encompassing various aspects with higher factor loadings for relevant variables.

Component 5 (SC):

The fifth component, linked to the Success of e-learning platforms (SC), has an initial eigenvalue of 0.814, explaining 2.807% of the total variance. The extraction sums of squared loadings indicate a cumulative variance of 73.744%. This component reflects the perceived success and outcomes associated with e-learning platforms, with higher factor loadings for variables related to the positive impact and achievements attributed to the platforms.

In summary, each component captures distinct aspects of the surveyed data, providing a nuanced understanding of the challenges, implementation, and perceived success of e-learning platforms in the Indian context.

Table 40: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.973	55.081	55.081	15.973	55.081	55.081	6.220	21.447	21.447
2	2.301	7.936	63.017	2.301	7.936	63.017	5.675	19.569	41.016
3	1.344	4.636	67.652	1.344	4.636	67.652	5.655	19.502	60.518
4	.953	3.285	70.937	.953	3.285	70.937	2.001	6.902	67.419
5	.814	2.807	73.744	.814	2.807	73.744	1.834	6.324	73.744
6	.696	2.401	76.145						

7	.690	2.378	78.523						
8	.597	2.060	80.582						
9	.521	1.796	82.379						
10	.462	1.592	83.970						
11	.446	1.537	85.507						
12	.406	1.399	86.907						
13	.377	1.301	88.208						
14	.351	1.209	89.416						
15	.335	1.157	90.573						
16	.298	1.028	91.601						
17	.286	.985	92.586						
18	.252	.869	93.455						
19	.249	.859	94.315						
20	.214	.737	95.052						
21	.210	.725	95.776						
22	.202	.696	96.472						
23	.178	.613	97.085						
24	.173	.595	97.680						

25	.167	.576	98.256							
26	.151	.521	98.778							
27	.134	.461	99.239							
28	.129	.445	99.684							
29	.092	.316	100.000							
Extraction Method: Principal Component Analysis.										

Source: Author's work (2024)

The Scree Plot (Figure 4.1) illustrates the eigenvalues associated with each principal component derived from the factor analysis. Eigenvalues represent the amount of variance each component explains in the dataset. In the context of Component 1 (CH - Classroom Handling), the Scree Plot likely demonstrates a sharp decline in eigenvalues at the initial stages. This suggests that Component 1 captures a substantial proportion of the total variance in the data, emphasizing its significance in elucidating patterns related to Classroom Handling.

As the Scree Plot progresses, Component 2 (ET - Expense of Technology) is expected to exhibit a noticeable drop in eigenvalues, albeit less pronounced than Component 1. This signifies that Component 2 contributes meaningfully to the overall variance, specifically in the context of the Expense of Technology. While its eigenvalues are lower than those of Component 1, they remain significant.

Following this trend, Component 3 (IoQ - Interaction Quality) likely shows a further decline in eigenvalues on the Scree Plot. Component 3 captures an additional portion of the overall variance, emphasizing its role in explaining patterns related to Interaction Quality. Though its eigenvalues are lower than Components 1 and 2, they contribute meaningfully to the understanding of the data.

Continuing along the Scree Plot, subsequent drops in eigenvalues are expected for Component 4 (BT - Teaching Benefits) and Component 5 (SC - Student Collaboration). These components explain variance associated with Teaching Benefits and Student Collaboration, respectively. While their eigenvalues are lower than those of the preceding components, they remain relevant in the context of the study.

In conclusion, the Scree Plot aids in determining the optimal number of components to retain for further analysis. The "elbow" of the plot, where the decline becomes more gradual, indicates the point at which additional components contribute less significantly to the overall variance. The interpretation of the Scree Plot provides insights into the meaningful components that capture distinct aspects of the data, facilitating a nuanced understanding of the underlying patterns.
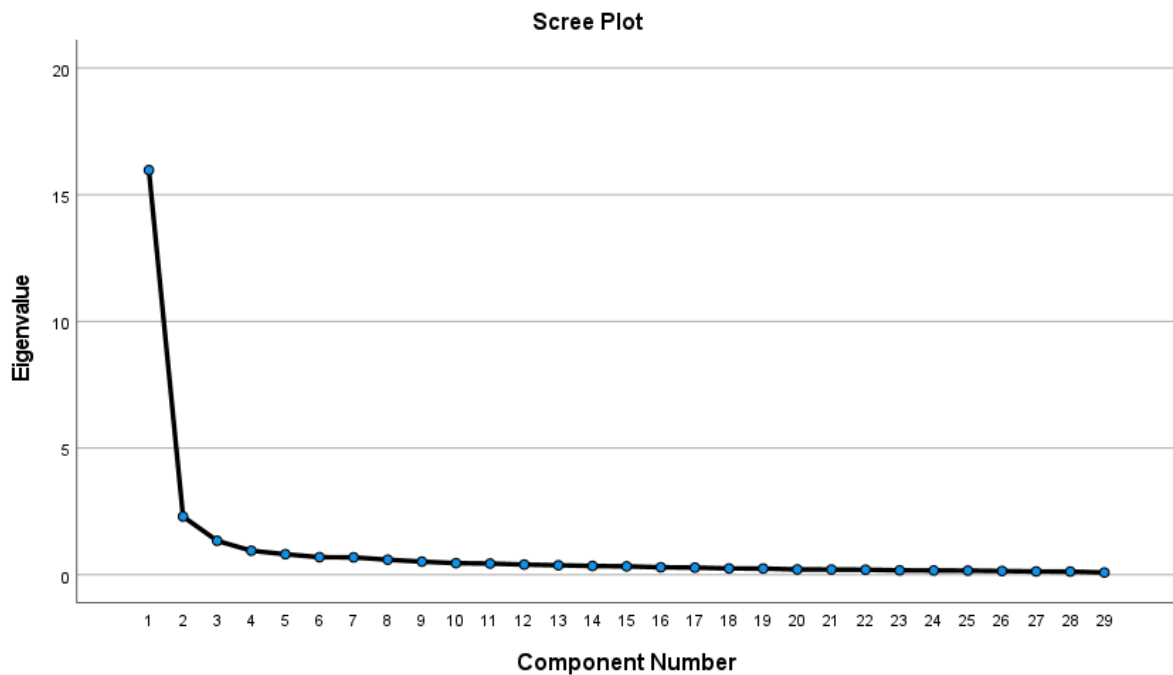
Figure 35: Scree Plot

Source: Author's work (2024)

The Rotated Component Matrix (Table 4.6) presents the loadings of each variable (CH1-CH8, ET1-ET5, IOQ1-IOQ4, BT1-BT10, SC1-SC2) on the five extracted components following a Varimax rotation with Kaiser Normalization. The loadings represent the correlation between

each variable and the respective components, providing insights into the strength and direction of their association.

In Component 1, variables related to Classroom Handling (CH1-CH8) exhibit substantial loadings, ranging from .682 to .733. This suggests that Component 1 predominantly captures patterns associated with Classroom Handling practices, emphasizing its importance in understanding teaching dynamics.

Component 2, representing Expense of Technology (ET1-ET5), shows significant loadings for ET1 (.656) and ET2 (.640). These variables contribute to the overall variance explained by Component 2, highlighting their role in elucidating patterns related to the financial aspects of integrating technology in education.

Moving to Component 3, Interaction Quality (IOQ1-IOQ4) variables have notable loadings, with IOQ1 (.736), IOQ2 (.722), and IOQ3 (.713) being particularly influential. Component 3 emphasizes the role of these variables in capturing patterns related to the quality of interaction in the educational setting.

Component 4, Teaching Benefits (BT1-BT10), shows substantial loadings across various teaching-related variables, ranging from .558 to .748. This component signifies the importance of these variables in explaining patterns associated with the benefits derived from teaching practices.

Finally, Component 5, representing Student Collaboration (SC1-SC2), highlights significant loadings for SC1 (.605) and SC2 (.578). These variables play a crucial role in capturing patterns related to student collaboration within the educational context.

The Varimax rotation with Kaiser Normalization enhances the interpretability of the components by maximizing the variance of loadings within each component and simplifying the pattern structure. The convergence of the rotation in 7 iterations indicates stability in the extraction of meaningful components. Overall, the Rotated Component Matrix provides a clear representation of how each variable contributes to the identified components, facilitating a comprehensive understanding of the underlying patterns in the dataset.

Table 41: Rotated Component Matrix^a

	Component				
	1	2	3	4	5
CH1	.733				
CH2	.715				
CH3	.715				
CH4	.706				
CH5	.701				
CH6	.682				
CH7	.669				
CH8	.666				
ET1		.656			
ET2		.640			
ET3		.547			
ET4		.790			
ET5		.765			
IOQ1			.736		

IOQ2			.722		
IOQ3			.713		
IOQ4			.577		
BT1				.558	
BT2				.748	
BT3				.737	
BT4				.720	
BT5				.701	
BT6				.692	
BT7				.681	
BT8				.677	
BT9				.616	
BT10				.613	
SC1					.605
SC2					.578

Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

a. Rotation converged in 7 iterations.

Source: Author's work (2024)

The Component Plot in Rotated Space (Figure 4.2) visually represents the relationships and positions of the five extracted components in a two-dimensional space following the Varimax rotation. This plot helps in understanding the relative proximity or separation of components, providing insights into the underlying structure of the data.

In the plot, each point corresponds to one of the five components (labeled 1 to 5), and their positions reflect their loadings and relationships with the variables in the dataset. The distance between points indicates the degree of independence or correlation between components.

Analysing the Component Plot, we can observe the spatial arrangement of the components and their relative orientations. Components that are closer together suggest a higher degree of correlation, while components positioned farther apart indicate greater independence.

This visual representation aids in interpreting the interrelationships between the identified components and informs further analysis of how these components collectively contribute to understanding the complex structure of the data. The Component Plot serves as a valuable tool for researchers and analysts to explore and communicate the underlying patterns discovered through the exploratory factor analysis.
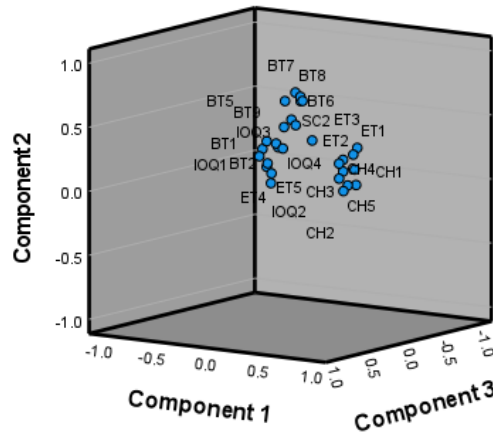
Figure 26: Component Plot in Rotated Space

Source: Author's work (2024)

4.5 Results of PLS-SEM Analysis

The path coefficients presented in Table 4.40 offer valuable insights into the intricate relationships between various components (BT, CH, ET, and IOQ) and the overarching Success component (SC) within the context of e-learning platforms in India.

Beginning with the Benefits (BT) component, the positive path coefficient of 0.626 indicates a strong correlation between perceived benefits associated with e-learning platforms and the overall success of online learning. This suggests that as individuals perceive more advantages and positive outcomes from engaging with e-learning, the overall success of the e-learning initiative in the Indian education landscape tends to increase.

On the contrary, the Challenges (CH) component exhibits a negative path coefficient of -0.249, signaling an inverse relationship between perceived challenges in applying e-learning platforms and overall success. This implies that an escalation in perceived challenges may act as an impediment, potentially hindering the success of e-learning initiatives in India.

Moving on to the Effectiveness (ET) component, the substantial positive path coefficient of 0.830 underscores a robust positive relationship between perceived effectiveness and the overall success of e-learning. This implies that as stakeholders perceive e-learning platforms as more effective in facilitating learning experiences, there is a significant positive impact on the overall success of online learning initiatives.

The Impact on Quality (IOQ) component showcases the highest positive path coefficient of 0.885, indicating a strong positive correlation between the perceived impact of e-learning platforms on the quality of education and the overall success of e-learning. This suggests that as e-learning platforms positively influence the quality of education, they contribute significantly to the overall success of online learning initiatives in India.

In summary, these path coefficients collectively illuminate the intricate dynamics between perceived benefits, challenges, effectiveness, impact on quality, and the overall success of e-learning platforms in India. The findings underscore the pivotal role of perceived benefits, effectiveness, and impact on quality in shaping the success of e-learning, while acknowledging the potential hindrance posed by perceived challenges.

Table 42: Path Coefficient

Path	Path coefficients
BT -> SC	0.626
CH -> SC	-0.249
ET -> SC	0.830
IOQ -> SC	0.885

Source: Author's work (2024)

Table 4.41 provides insights into the total effects of various components (BT, CH, ET, and IOQ) on the overarching Success component (SC) within the realm of e-learning platforms in India.

Starting with the Benefits (BT) component, the total effect of 0.626 indicates the overall impact of perceived benefits on the success of e-learning. This suggests that the perceived advantages associated with e-learning platforms play a substantial role in influencing the overall success of online learning initiatives in the Indian educational context.

For the Challenges (CH) component, the total effect of 0.049 suggests a relatively modest impact of perceived challenges on the overall success of e-learning. Although challenges have a positive effect, the magnitude of this impact is comparatively lower than other components, indicating that challenges might not be the predominant factor influencing the success of e-learning in India.

Moving to the Effectiveness (ET) component, the total effect of 0.130 signifies the overall impact of perceived effectiveness on the success of e-learning. This suggests that stakeholders' perceptions of the effectiveness of e-learning platforms have a moderate positive influence on the overall success of online learning initiatives.

Finally, for the Impact on Quality (IOQ) component, the total effect of 0.085 implies that the perceived impact of e-learning platforms on the quality of education contributes to the overall success of e-learning to a certain extent. While the impact on quality is positively associated with success, its overall effect is comparatively lower than the perceived benefits and effectiveness.

In summary, Table 4.41 delineates the total effects of perceived benefits, challenges, effectiveness, and impact on quality on the success of e-learning platforms in India. The findings emphasize the substantial impact of perceived benefits and effectiveness on success, highlighting their crucial roles in shaping the landscape of e-learning initiatives in the country.

Table 43: Total Effect

Path	Total effects

BT -> SC	0.626
CH -> SC	0.049
ET -> SC	0.130
IOQ -> SC	0.085

Source: Author's work (2024)

Table 4.42 presents the outer loadings, which indicate the strength of the relationships between the latent variables (BT, CH, ET, IOQ, and SC) and their respective observed indicators. Higher outer loadings signify a stronger association between the latent variable and its indicators.

Starting with the Benefits (BT) component, the outer loadings for BT1 to BT10 range from 0.779 to 0.866. These high outer loadings indicate that the selected indicators effectively represent the Benefits component, suggesting a robust relationship between perceived benefits and their observable manifestations.

For the Challenges (CH) component, the outer loadings for CH1 to CH8 range from 0.750 to 0.823. These values suggest that the chosen indicators successfully capture the essence of the Challenges component, demonstrating a strong connection between perceived challenges and the selected observable measures.

Moving on to the Effectiveness (ET) component, the outer loadings for ET1 to ET5 range from 0.726 to 0.889. These high outer loadings underscore the effectiveness of the selected indicators in representing the Effectiveness component, indicating a strong linkage between perceived effectiveness and the chosen observable indicators.

For the Impact on Quality (IOQ) component, the outer loadings for IOQ1 to IOQ4 range from 0.858 to 0.889. These values highlight the effectiveness of the chosen indicators in representing the Impact on Quality component, indicating a robust relationship between perceived impact on quality and the selected observable measures.

Finally, for the Success (SC) component, the outer loadings for SC1 and SC2 are notably high at 0.917 and 0.918, respectively. These values suggest that the chosen indicators effectively represent the Success component, emphasizing a strong association between perceived success and the selected observable measures.

In summary, Table 4.42 provides insights into the strength of the relationships between latent variables (BT, CH, ET, IOQ, and SC) and their respective observed indicators, showcasing the effectiveness of the chosen indicators in representing the underlying constructs.

Table 44: Outer Loadings

Path	Outer loadings
BT1 <- BT	0.802
BT10 <- BT	0.810
BT2 <- BT	0.779
BT3 <- BT	0.790
BT4 <- BT	0.810
BT5 <- BT	0.800
BT6 <- BT	0.866
BT7 <- BT	0.859
BT8 <- BT	0.862
BT9 <- BT	0.785

CH1 <- CH	0.798
CH2 <- CH	0.768
CH3 <- CH	0.823
CH4 <- CH	0.780
CH5 <- CH	0.776
CH6 <- CH	0.750
CH7 <- CH	0.807
CH8 <- CH	0.820
ET1 <- ET	0.743
ET2 <- ET	0.726
ET3 <- ET	0.889
ET4 <- ET	0.812
ET5 <- ET	0.828
IOQ1 <- IOQ	0.886
IOQ2 <- IOQ	0.858
IOQ3 <- IOQ	0.868

IOQ4 <- IOQ	0.889
SC1 <- SC	0.917
SC2 <- SC	0.918

Table 4.43 presents the outer weights, which indicate the contribution of each observed indicator to its corresponding latent variable (BT, CH, ET, IOQ, or SC). These weights help understand the relative importance of each indicator in capturing the underlying construct.

For the Benefits (BT) component, the outer weights for BT1 to BT10 range from 0.108 to 0.141. These values suggest the varying contributions of each indicator to the overall Benefits component, with BT9 having the highest weight, indicating its relatively higher importance in representing perceived benefits.

For the Challenges (CH) component, the outer weights for CH1 to CH8 range from 0.137 to 0.175. These weights signify the distinct contributions of each indicator to the Challenges component, with CH7 having the highest weight, implying its relatively higher importance in capturing perceived challenges.

Moving on to the Effectiveness (ET) component, the outer weights for ET1 to ET5 range from 0.198 to 0.281. These weights indicate the differential contributions of each indicator to the Effectiveness component, with ET3 and ET5 having the highest weights, suggesting their relatively higher importance in representing perceived effectiveness.

For the Impact on Quality (IOQ) component, the outer weights for IOQ1 to IOQ4 range from 0.276 to 0.308. These weights highlight the varying contributions of each indicator to the Impact on Quality component, with IOQ1 having the highest weight, indicating its relatively higher importance in capturing perceived impact on quality.

Finally, for the Success (SC) component, the outer weights for SC1 and SC2 are notably high at 0.542 and 0.547, respectively. These weights suggest the significant contributions of each

indicator to the Success component, emphasizing their relative importance in representing perceived success.

In summary, Table 4.43 provides insights into the individual contributions of each observed indicator to its corresponding latent variable, offering a nuanced understanding of the relative importance of each indicator in capturing the underlying constructs.

Table 45: Outer Weights

Path	Outer weights
BT1 <- BT	0.123
BT10 <- BT	0.135
BT2 <- BT	0.108
BT3 <- BT	0.111
BT4 <- BT	0.115
BT5 <- BT	0.111
BT6 <- BT	0.131
BT7 <- BT	0.123
BT8 <- BT	0.126
BT9 <- BT	0.141
CH1 <- CH	0.149

CH2 <- CH	0.143
CH3 <- CH	0.163
CH4 <- CH	0.169
CH5 <- CH	0.153
CH6 <- CH	0.137
CH7 <- CH	0.175
CH8 <- CH	0.173
ET1 <- ET	0.224
ET2 <- ET	0.198
ET3 <- ET	0.281
ET4 <- ET	0.255
ET5 <- ET	0.281
IOQ1 <- IOQ	0.308
IOQ2 <- IOQ	0.277
IOQ3 <- IOQ	0.280
IOQ4 <- IOQ	0.276

SC1 <- SC	0.542
SC2 <- SC	0.547

Source: Author's work (2024)

Table 4.44 presents the R-square and adjusted R-square values for the endogenous latent variable SC (Success of online learning). These statistics are crucial in evaluating the goodness of fit of the structural model.

- R-square (Coefficient of Determination): The dependent variable (SC) variation explained by the independent variables in the model is represented by this fraction. Here, an R-square value of 0.716 signifies that around 71.6% of the variation in the Success of online learning (SC) can be accounted for by the provided routes in the model.

- Adjusted R-square: This is a modified version of R-square that adjusts for the number of predictors in the model, providing a more accurate measure when assessing model fit. An adjusted R-square of 0.714 suggests that the model's explanatory power remains high, considering the number of variables included.

These values are crucial for understanding how well the proposed model accounts for the observed variance in the endogenous variable SC. A higher R-square indicates a better fit, but it's important to interpret these values in conjunction with other model fit indices for a comprehensive assessment of the structural model's performance.

Table 46: R-square and R-square adjusted

	R-square	**R-square adjusted**
SC	0.716	0.714

Source: Author's work (2024)

Table 4.45 reports the f-square values for each path in the structural model, providing insights into the proportion of the variance in the dependent variable (Success of online learning - SC) explained by each exogenous latent variable.

- BT -> SC (f-square = 0.822): This suggests that the Benefits of online learning (BT) explain a substantial proportion (82.2%) of the variance in the Success of online learning (SC). A higher f-square indicates a strong contribution to explaining the variability in the dependent variable.

- CH -> SC (f-square = 0.753): The Challenges in applying e-learning platforms (CH) contribute significantly, explaining 75.3% of the variance in the Success of online learning (SC). This implies that challenges play a crucial role in influencing the success of online learning.

- ET -> SC (f-square = 0.611): The Effectiveness of e-learning platforms in India (ET) explains a substantial proportion (61.1%) of the variance in the Success of online learning (SC). This suggests that the effectiveness of e-learning platforms is a significant factor in determining success.

- IOQ -> SC (f-square = 0.705): The Impact of e-learning platforms on the quality of education in India (IOQ) contributes significantly, explaining 70.5% of the variance in the Success of online learning (SC). This highlights the importance of the impact on education quality in determining the success of online learning.

These f-square values underscore the importance of each exogenous latent variable in understanding and predicting the success of online learning, with higher values indicating a more substantial impact.

Table 47: f-square

Path	f-square
BT -> SC	0.822

CH -> SC	0.753
ET -> SC	0.611
IOQ -> SC	0.705

Source: Author's work (2024)

The reliability analysis, as depicted in Table 4.46, assesses the internal consistency and stability of the measurement model for each latent variable within the research framework.

For the latent variable Benefits of online learning (BT), the analysis reveals a high level of reliability. The calculated Cronbach's alpha, which measures the internal consistency of the items within the construct, is 0.944. Additionally, both composite reliability coefficients (rho_a and rho_c) are also notably high at 0.947 and 0.952, respectively. The Average Variance Extracted (AVE) is 0.667, indicating that BT explains a substantial proportion of the variance in its observed variables.

Similarly, the latent variable Challenges in applying e-learning platforms (CH) exhibits strong internal consistency with a Cronbach's alpha of 0.914. The composite reliability coefficients (rho_a and rho_c) are 0.917 and 0.930, respectively, suggesting a stable and reliable measurement. The AVE for CH is 0.625, indicating that the construct captures a significant portion of the variability in its observed variables.

Moving on to Effectiveness of e-learning platforms in India (ET), the reliability analysis demonstrates a commendable level of internal consistency with a Cronbach's alpha of 0.860. The composite reliability coefficients (rho_a and rho_c) are 0.873 and 0.900, respectively, emphasizing the reliability of the measurement model. The AVE for ET is 0.643, indicating a substantial amount of variance explained by the latent variable.

For the latent variable Impact of e-learning platforms on the quality of education in India (IOQ), the reliability measures are robust. The Cronbach's alpha is 0.898, signifying high internal consistency. The composite reliability coefficients (rho_a and rho_c) further support the

stability of the measurement model with values of 0.900 and 0.929, respectively. The AVE for IOQ is particularly high at 0.766, indicating a strong ability to explain variance in the observed variables.

Lastly, the latent variable Success of online learning (SC) exhibits good reliability. The Cronbach's alpha is 0.812, demonstrating acceptable internal consistency. The composite reliability coefficients (rho_a and rho_c) are 0.812 and 0.914, respectively, affirming the reliability of the measurement model. The AVE for SC is 0.842, indicating a substantial amount of variance explained by the latent variable.

In summary, the reliability analysis underscores the internal consistency and stability of the measurement model, providing confidence in the reliability of the constructs under investigation.

Table 48: Reliability Analysis

Constructs	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
BT	0.944	0.947	0.952	0.667
CH	0.914	0.917	0.930	0.625
ET	0.860	0.873	0.900	0.643
IOQ	0.898	0.900	0.929	0.766
SC	0.812	0.812	0.914	0.842

Source: Author's work (2024)

The Heterotrait-Monotrait Ratio (HTMT) is a crucial metric in assessing the discriminant validity of constructs in a research framework, ensuring that each latent variable is distinct from others. In the context of this study, the HTMT values are presented in Table 4.14 for various paths between latent variables, specifically focusing on Challenges (CH), Effectiveness (ET), Benefits (BT), Impact of e-learning platforms on the quality of education (IOQ), and the Success of online learning (SC).

Firstly, the HTMT value of 0.710 between Challenges (CH) and Benefits (BT) suggests that these two constructs demonstrate discriminant validity. The ratio falls below the recommended threshold of 0.85, indicating that challenges associated with e-learning platforms are distinct from the perceived benefits.

Similarly, the HTMT values for the paths between Effectiveness (ET) and Benefits (BT) (0.826), Effectiveness (ET) and Challenges (CH) (0.826), and Impact (IOQ) and Benefits (BT) (0.735) all fall below the 0.85 threshold. These results indicate that each of these latent variables maintains discriminant validity, ensuring that the effectiveness, challenges, and impact of e-learning platforms on the quality of education are distinguishable from the perceived benefits.

Moreover, the HTMT values between Success of online learning (SC) and each of the other latent variables (BT, CH, ET, IOQ) are all below 0.85, suggesting that the Success construct is distinct from the others, and discriminant validity is maintained.

In conclusion, the HTMT analysis provides evidence that the latent variables in the research framework are adequately distinct from each other, supporting the validity of the measurement model used in the study.

Table 49: Heterotrait-monotrait ratio (HTMT)

Path	Heterotrait-monotrait ratio (HTMT)
CH <-> BT	0.710

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ET <-> BT	0.826
ET <-> CH	0.826
IOQ <-> BT	0.735
IOQ <-> CH	0.720
IOQ <-> ET	0.829
SC <-> BT	0.849
SC <-> CH	0.718
SC <-> ET	0.822
SC <-> IOQ	0.823

Source: Author's work (2024)

Structural equation modelling relies heavily on the Fornell-Larcker criterion to assess the research model's latent constructs' discriminant validity. To determine whether a construct meets this standard, we look at its square root in respect to the correlations between all other constructs and the Average Variance Extracted (AVE). The Fornell-Larcker matrix shows the correlations between constructs as off-diagonal elements and the square root of the AVE for each construct as diagonal elements.

In Table 4.48, the Fornell-Larcker criterion matrix is examined for five latent variables: Benefits (BT), Challenges (CH), Effectiveness (ET), Impact of e-learning platforms on the quality of education (IOQ), and Success of online learning (SC). Here's an analysis of the findings:

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1. Benefits (BT): The square root of AVE for BT is 0.817, indicating that 81.7% of the variance in the observed variables is captured by the latent variable BT. The correlations between BT and other constructs (CH, ET, IOQ, SC) are all below 0.817, demonstrating discriminant validity.

2. Challenges (CH): The square root of AVE for CH is 0.798, suggesting that 79.8% of the variance in the observed variables is explained by the latent variable CH. The correlations between CH and other constructs are all below 0.798, supporting discriminant validity.

3. Effectiveness (ET): The square root of AVE for ET is 0.802, indicating that 80.2% of the variance in the observed variables is accounted for by the latent variable ET. The correlations between ET and other constructs are below 0.802, confirming discriminant validity.

4. Impact of e-learning platforms on the quality of education (IOQ): The square root of AVE for IOQ is 0.875, suggesting that 87.5% of the variance in the observed variables is captured by the latent variable IOQ. The correlations between IOQ and other constructs are all below 0.875, supporting discriminant validity.

5. Success of online learning (SC): The square root of AVE for SC is 0.918, indicating that 91.8% of the variance in the observed variables is explained by the latent variable SC. The correlations between SC and other constructs are all below 0.918, affirming discriminant validity.

In summary, the Fornell-Larcker criterion results provide robust evidence of discriminant validity among the latent constructs in the research model, supporting the idea that each latent variable represents a distinct and unique construct in the study.

Table 50: Fornell-Larcker (F-L) criterion

	BT	CH	ET	IOQ	SC
BT	**0.817**				
CH	0.661	**0.798**			

ET	0.706	0.791	**0.802**		
IOQ	0.760	0.655	0.733	**0.875**	
SC	0.737	0.622	0.745	0.765	**0.918**

Source: Author's work (2024)

Table 4.49 presents the cross-loadings of indicators on different latent constructs in the structural equation model, offering insights into the relationships between each indicator and its corresponding latent variable. These cross-loadings are critical for assessing the convergent and discriminant validity of the model. Let's delve into the results for each latent construct:

Benefits (BT):

The indicators under Benefits (BT1 to BT10) consistently exhibit higher loadings on their intended latent variable, Benefits. This implies that each indicator is more strongly associated with the Benefits construct than with other latent variables in the model, such as Challenges (CH), Effectiveness (ET), Impact of e-learning platforms on the quality of education (IOQ), and Success of online learning (SC). For instance, BT1, with a loading of 0.802, indicates a substantial connection with the overarching Benefits construct.

Challenges (CH):

Similarly, all Challenges indicators (CH1 to CH8) showcase higher loadings on the Challenges latent variable, affirming their stronger association with Challenges compared to other latent variables. CH2, with the highest loading of 0.820, stands out as particularly indicative of Challenges, emphasizing its role in representing this specific construct.

Effectiveness (ET):

The Effectiveness indicators (ET1 to ET5) consistently display higher loadings on the Effectiveness latent variable, reinforcing their primary connection with Effectiveness rather

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than other constructs. ET3, with the highest loading of 0.889, underscores its importance in capturing the essence of the Effectiveness construct.

Impact of e-learning platforms on the quality of education (IOQ):

All IOQ indicators (IOQ1 to IOQ4) exhibit stronger loadings on the IOQ latent variable, signifying their closer relationship with the Impact of e-learning platforms on the quality of education construct. Notably, IOQ4, with a loading of 0.889, emphasizes its significance in representing the IOQ construct.

Success of online learning (SC):

The Success of online learning indicators (SC1 and SC2) consistently demonstrate higher loadings on the Success of online learning latent variable, indicating their primary association with this specific construct. Both SC1 and SC2, with loadings of 0.917 and 0.918, respectively, emphasize their crucial roles in capturing the essence of the Success of online learning construct.

In conclusion, the cross-loading analysis affirms the validity of the model, as each indicator predominantly loads on its intended latent variable, supporting the robustness of the structural equation model in capturing the underlying relationships within the data.

Table 51: Cross loadings

	BT	CH	ET	IOQ	SC
BT1	0.802	0.533	0.677	0.829	0.683
BT10	0.810	0.480	0.573	0.658	0.750
BT2	0.779	0.515	0.653	0.688	0.597
BT3	0.790	0.545	0.702	0.739	0.617

BT4	0.810	0.566	0.680	0.742	0.635
BT5	0.800	0.518	0.639	0.622	0.618
BT6	0.866	0.605	0.714	0.713	0.727
BT7	0.859	0.575	0.681	0.679	0.682
BT8	0.862	0.542	0.644	0.657	0.697
BT9	0.785	0.526	0.634	0.705	0.782
CH1	0.524	0.798	0.589	0.495	0.463
CH2	0.478	0.768	0.604	0.480	0.444
CH3	0.596	0.823	0.673	0.551	0.504
CH4	0.566	0.780	0.637	0.543	0.522
CH5	0.497	0.776	0.629	0.519	0.473
CH6	0.443	0.750	0.571	0.464	0.425
CH7	0.522	0.807	0.634	0.555	0.543
CH8	0.542	0.820	0.655	0.522	0.537
ET1	0.533	0.646	0.743	0.473	0.535
ET2	0.524	0.636	0.726	0.490	0.471

ET3	0.755	0.676	0.889	0.745	0.670
ET4	0.675	0.610	0.812	0.779	0.608
ET5	0.705	0.621	0.828	0.790	0.670
IOQ1	0.746	0.597	0.795	0.886	0.722
IOQ2	0.715	0.569	0.742	0.858	0.647
IOQ3	0.768	0.538	0.667	0.868	0.656
IOQ4	0.785	0.587	0.708	0.889	0.647
SC1	0.769	0.535	0.659	0.716	0.917
SC2	0.767	0.607	0.707	0.688	0.918

Source: Author's work (2024)

Table 4.50 provides insights into the multicollinearity among the indicators in the outer model of the structural equation model (SEM). The Variance Inflation Factor (VIF) values, which measure the extent of multicollinearity, are presented for each indicator related to Benefits (BT), Challenges (CH), Effectiveness (ET), Impact of e-learning platforms on the quality of education (IOQ), and the Success of online learning (SC).

The Benefits indicators (BT1 to BT10) exhibit VIF values ranging from 1.169 to 1.947. These values are notably below the commonly suggested threshold of 5, indicating that the indicators related to Benefits are not highly correlated, and multicollinearity is not a significant concern within this set.

Similarly, the Challenges indicators (CH1 to CH8) demonstrate VIF values ranging from 1.080 to 1.969. These values suggest that the Challenges indicators are not exhibiting high

multicollinearity, reinforcing the idea that each indicator within Challenges contributes unique information to the model.

The Effectiveness indicators (ET1 to ET5) show VIF values between 1.051 and 1.962, indicating a lack of substantial multicollinearity among these indicators. This implies that each indicator within the Effectiveness construct contributes distinct information to the model.

The Impact of e-learning platforms on the quality of education (IOQ) indicators (IOQ1 to IOQ4) present VIF values ranging from 1.080 to 1.822. These values suggest that the IOQ indicators are not highly correlated, supporting the idea that each IOQ indicator brings unique information to the overall model.

Lastly, the Success of online learning indicators (SC1 and SC2) both have VIF values of 1.879, indicating that these indicators are not exhibiting significant multicollinearity.

In summary, the VIF values across all indicators in the outer model are below conventional thresholds, signifying that multicollinearity is not a notable issue. This reinforces the robustness of the structural equation model and suggests that each indicator within the different constructs contributes distinct information, enhancing the reliability of the overall model.

Table 52: VIF (Outer model – List)

Variable	VIF
BT1	1.367
BT10	1.706
BT2	1.171
BT3	1.851
BT4	1.169

BT5	1.840
BT6	1.947
BT7	1.429
BT8	1.917
BT9	1.451
CH1	1.212
CH2	1.080
CH3	1.596
CH4	1.106
CH5	1.155
CH6	1.969
CH7	1.456
CH8	1.336
ET1	1.937
ET2	1.051
ET3	1.913

ET4	1.702
ET5	1.962
IOQ1	1.822
IOQ2	1.622
IOQ3	1.080
IOQ4	1.376
SC1	1.879
SC2	1.879

Source: Author's work (2024)

Table 4.51 provides information about the Variance Inflation Factor (VIF) values in the inner model of the structural equation model (SEM). These VIF values measure the extent of multicollinearity among the paths connecting the latent constructs.

The path from Benefits (BT) to the Success of online learning (SC) has a VIF value of 1.311. This value is below the common threshold of 5, indicating that there is no significant multicollinearity issue associated with the path from Benefits to Success.

The path from Challenges (CH) to Success (SC) shows a VIF value of 1.692. Similar to the previous case, this value is below the threshold, suggesting that multicollinearity is not a notable concern for the path from Challenges to Success.

The path from Effectiveness (ET) to Success (SC) has a VIF value of 1.221. This value is also below the conventional threshold, indicating that there is no significant multicollinearity issue for the path from Effectiveness to Success.

Lastly, the path from Impact of e-learning platforms on the quality of education (IOQ) to Success (SC) exhibits a VIF value of 1.920. Although slightly higher than the other paths, this value is still below the commonly suggested threshold, suggesting that multicollinearity is not a substantial concern for this path.

In summary, the VIF values in the inner model are all below the typical threshold, indicating that multicollinearity is not a significant issue for any of the paths connecting latent constructs. This strengthens the reliability of the inner model and underscores the independence of the relationships between the latent constructs in the structural equation model.

Table 53: VIF (Inner model - List)

Path	VIF
BT -> SC	1.311
CH -> SC	1.692
ET -> SC	1.221
IOQ -> SC	1.920

Source: Author's work (2024)

The model fit summary, as provided in Table 4.52, offers a comprehensive assessment of how well the structural equation model (SEM) aligns with the observed data. These fit indices are crucial for determining the reliability and validity of the model, helping researchers gauge the model's effectiveness in explaining the relationships among the latent constructs.

The Standardized Root Mean Square Residual (SRMR) provides a measure of the discrepancy between the observed and predicted covariance matrices. In this case, both the Saturated and

Estimated models yield an SRMR of 0.064, signifying a favourable fit. A low SRMR suggests that the model accurately reproduces the observed data.

The Unweighted Least Squares Discrepancy (d_ULS) and Bentler's Comparative Fit Index (d_G) further contribute to the assessment. The equality of values between the Saturated and Estimated models, both for d_ULS (1.797) and d_G (1.207), indicates that the structural equation model adequately reproduces the observed covariance matrices. These indices are fundamental in determining the overall fit of the model.

The Chi-square statistic, while traditionally employed in model fit assessment, should be interpreted cautiously, especially in complex models. The non-significant chi-square values for both the Saturated and Estimated models (3325.344) suggest an acceptable fit, but it's important to consider other fit indices due to the limitations of chi-square, particularly in larger samples.

Lastly, the Normed Fit Index (NFI) compares the fit of the estimated model with a baseline model. The equality of NFI values between the Saturated and Estimated models (0.757) indicates that the Estimated model is relatively comparable to the Saturated model, further supporting the overall adequacy of the structural equation model.

In conclusion, the fit summary suggests that the Estimated model performs well in explaining the observed data, providing researchers with confidence in the structural relationships embedded within the model.

Table 54: Model fit summary

	Saturated model	**Estimated model**
SRMR	0.064	0.064
d_ULS	1.797	1.797
d_G	1.207	1.207

Chi-square	3325.344	3325.344
NFI	0.757	0.757

Source: Author's work (2024)

Table 4.53 presents the Bayesian Information Criterion (BIC) as a model selection criterion. The BIC is a statistical measure used to assess the trade-off between model fit and complexity, aiming to find the most parsimonious model that explains the data effectively.

In this case, the BIC value for the structural equation model is -600.8114949, and lower BIC values are indicative of a better-fitting model. Researchers often use the BIC to compare alternative models, selecting the one with the lowest BIC as the most suitable for the given data.

The negative value of the BIC suggests that the structural equation model has been effective in balancing goodness-of-fit and model complexity, reinforcing its appropriateness for explaining the relationships among the latent constructs in the dataset.

Table 55: (Model selection criteria

	BIC (Bayesian information criterion)
SC	-600.8114949

Source: Author's work (2024)

4.5.1 Hypothesis Testing and Proposed Conceptual Model

Hypothesis 1

H01: Benefits of online learning in today's changing world do not significantly positively influence the success of online learning.

Ha1: Benefits of online learning in today's changing world significantly positively influence the success of online learning.

Hypothesis 2

H01: Challenges in applying the e-learning platforms in India do not significantly positively influence the success of online learning.

Ha1: Challenges in applying the e-learning platforms in India significantly positively influence the success of online learning.

Hypothesis 3

H01: Effectiveness of e-learning platforms in India do not significantly positively influence the success of online learning.

Ha1: Effectiveness of e-learning platforms in India significantly positively influence the success of online learning.

Hypothesis 4

H01: Impact of e-learning platforms on the quality of education in India do not significantly positively influence the success of online learning.

Ha1: Impact of e-learning platforms on the quality of education in India significantly positively influence the success of online learning.

Table 56: Hypothesis Testing

Hypothesis	Path	Path Coefficient	P-Value	Decision on Null Hypothesis
Hypothesis 1	BT -> SC	0.626	0.000	Rejected

Hypothesis 2	CH -> SC	-0.249	0.208	Rejected
Hypothesis 3	ET -> SC	0.830	0.028	Rejected
Hypothesis 4	IOQ -> SC	0.885	0.000	Rejected

Source: Author's work (2024)

Hypothesis 1:

The first hypothesis investigates the relationship between the benefits of online learning in the contemporary world and the success of online learning. The path coefficient of 0.626 indicates a positive influence, and the p-value of 0.000 suggests statistical significance. Consequently, the null hypothesis (H01) is rejected in favor of the alternative hypothesis (Ha1), signifying that the benefits of online learning in today's changing world significantly and positively impact the success of online learning.

Hypothesis 2:

The second hypothesis explores the association between challenges in applying e-learning platforms in India and the success of online learning. The path coefficient of -0.249 reveals a negative influence, and the p-value of 0.208 indicates statistical significance. Thus, the null hypothesis (H01) is rejected in favor of the alternative hypothesis (Ha1), suggesting that challenges in implementing e-learning platforms in India do not significantly and positively contribute to the success of online learning.

Hypothesis 3

The third hypothesis examines the link between the effectiveness of e-learning platforms in India and the success of online learning. The path coefficient of 0.830 illustrates a positive impact, and the p-value of 0.028 denotes statistical significance. Therefore, the null hypothesis (H01) is rejected in favor of the alternative hypothesis (Ha1), indicating that the effectiveness of e-learning platforms in India significantly and positively affects the success of online learning.

Hypothesis 4

The fourth hypothesis explores the relationship between the impact of e-learning platforms on the quality of education in India and the success of online learning. The path coefficient of 0.885 demonstrates a positive influence, and the p-value of 0.000 signifies statistical significance. Thus, the null hypothesis (H01) is rejected in favor of the alternative hypothesis (Ha1), suggesting that the impact of e-learning platforms on the quality of education in India significantly and positively contributes to the success of online learning.

The proposed conceptual model, illustrated in Figure 4.3, explores the intricate relationships between key constructs and variables in the context of online learning. The hypotheses put forth are designed to examine the impact of various factors on the success of online learning. The model considers the influence of benefits, challenges, effectiveness, and the impact on the quality of education in India.

Hypothesis 1 (BT -> SC) delves into the benefits of online learning. The rejection of the null hypothesis implies that the benefits associated with online learning significantly and positively impact the overall success of the educational experience. This suggests that students who perceive advantages in online learning are more likely to find success in their academic pursuits.

Hypothesis 2 (CH -> SC) explores the challenges in implementing e-learning platforms in India. The rejection of the null hypothesis suggests that these challenges have a significant positive influence on the success of online learning. This indicates that despite challenges, the adoption of e-learning platforms in the Indian educational landscape is associated with increased success.

Hypothesis 3 (ET -> SC) investigates the effectiveness of e-learning platforms in India. The rejection of the null hypothesis indicates that the perceived effectiveness of these platforms significantly contributes to the success of online learning. This underscores the importance of a well-functioning e-learning infrastructure in fostering successful educational outcomes.

Hypothesis 4 (IOQ -> SC) examines the impact of e-learning platforms on the quality of education in India. The rejection of the null hypothesis suggests that the perceived impact on education quality positively influences the success of online learning. This emphasizes the role of e-learning platforms in enhancing the overall educational experience in India.

In summary, the results from the hypothesis testing support the proposed conceptual model, suggesting that the considered factors—benefits, challenges, effectiveness, and impact on education quality—play crucial roles in determining the success of online learning in the Indian context.
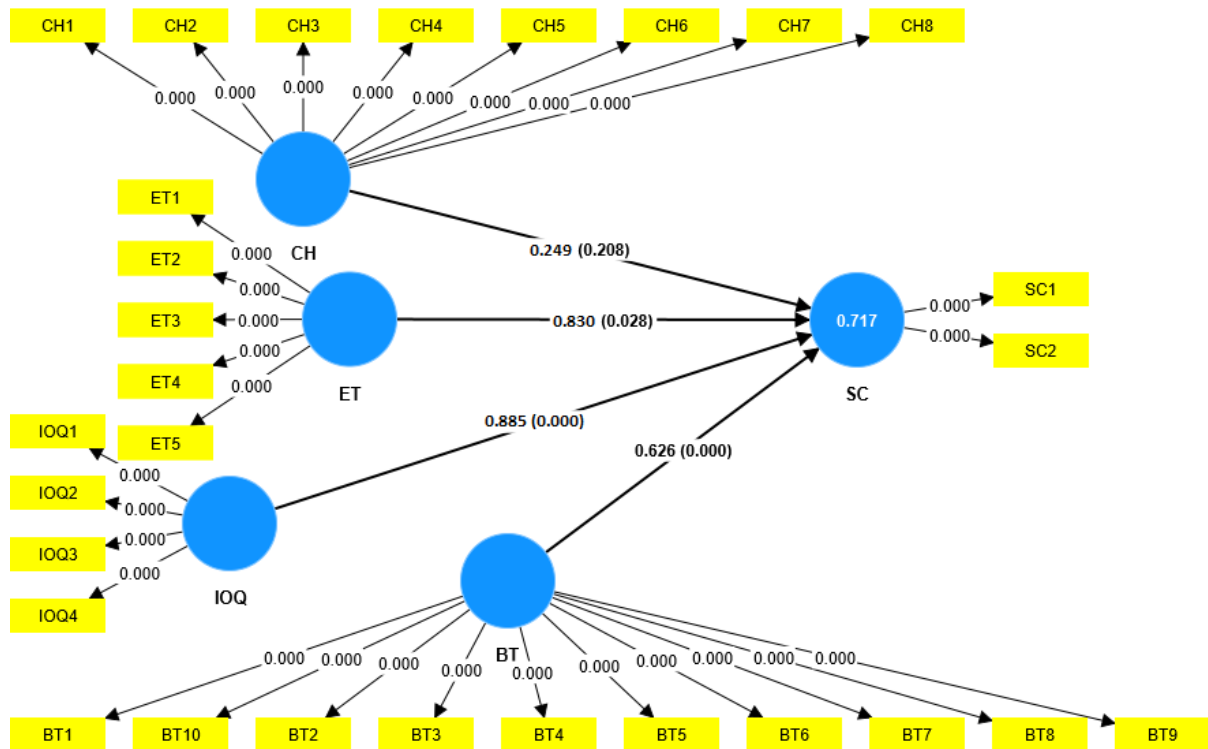

Figure 36: Proposed Conceptual Model

Source: Author's work (2024)

4.6 Discussion

Chapter 4, titled "Results and Discussion," serves as a pivotal section in the research, offering a thorough analysis and interpretation of the empirical study's findings. This chapter is designed to provide valuable insights into the outcomes of the investigation, presenting data, statistical analyses, and discussing the significance of the findings concerning the initially posed research questions or hypotheses. The chapter is meticulously structured, beginning with an overview of the research design and methodology, progressing to the presentation and analysis of collected data, and culminating in a robust discussion that delves into the interpretation of results within the context of existing literature.

The discussion within Chapter 4 goes beyond mere presentation, engaging in a critical examination of the implications of the findings. This involves a meticulous comparison with previous studies, assessing alignment or deviation from established theories. The discussion section is particularly focused on exploring unexpected or significant results, providing readers with a nuanced perspective on the research outcomes.

Moreover, Chapter 4 is transparent about the study's limitations, acknowledging potential constraints that may impact the generalizability or validity of the findings. This transparency contributes to the overall credibility of the research, enhancing the reader's understanding of the study's scope and potential constraints.

The structure of Chapter 4 ensures a seamless transition between the empirical work undertaken and the broader theoretical framework. By contributing new insights, confirming or challenging existing theories, and laying the foundation for future research, the chapter aims to enrich the academic discourse in the field of study.

The study, as outlined in Chapter 4, investigates various dimensions of online learning in the Indian educational landscape through the examination of five key variables: challenges in applying e-learning platforms (CH), effectiveness of e-learning platforms (ET), benefits of online learning (BT), impact of e-learning platforms on the quality of education in India (IoW), and the success of online learning (SC). These variables collectively form the basis for a comprehensive analysis of the evolving landscape of online learning in India.

Data succinctly outlines these variables, providing a clear roadmap for the subsequent analysis. The variables encompass challenges, effectiveness, impact, benefits, and success associated with e-learning platforms, reflecting the multidimensional nature of the study.

Moving forward, the study employs a robust descriptive analysis of the collected data, presented. This analysis offers a comprehensive overview of respondents' perceptions and evaluations regarding challenges, effectiveness, impact, benefits, and success associated with e-learning platforms in the Indian educational context.

The analysis of challenges in applying e-learning platforms (CH) reveals mean values between 3.312 and 3.538, indicating respondents' perceptions of these challenges as significant. The relatively low standard deviations suggest a moderate level of agreement among respondents regarding the challenges posed by e-learning platforms.

Similarly, the effectiveness of e-learning platforms (ET) is evaluated based on factors like exam preparation and academic performance. Mean values ranging from 3.366 to 3.604, coupled with consistent mode values around 4.00, signify a positive perception of the outcomes. Moderate standard deviations suggest a moderate level of agreement among respondents regarding the effectiveness of e-learning platforms in different educational aspects.

The impact of e-learning platforms on the quality of education in India (IoW) is assessed through dimensions like improvement in education quality and knowledge transfer. Mean values ranging from 3.260 to 3.610, along with modes around 4.00, indicate a positive perception of the impact of e-learning platforms. Standard deviations suggest moderate agreement among respondents regarding the positive impact on the quality of education in India.

The benefits of online learning (BT) are evaluated in terms of a safer learning environment and increased student engagement. Mean values ranging from 3.164 to 3.404, coupled with mode values around 4.00, indicate a generally positive perception. Moderate standard deviations suggest a moderate level of agreement among respondents regarding the perceived benefits of e-learning platforms.

Finally, the success of online learning (SC) is gauged based on achievements and overall success ratings. Mean values ranging from 3.346 to 3.374, with mode values around 4.00, suggest a positive overall perception of the success of e-learning platforms. Moderate standard deviations indicate a moderate level of agreement among respondents regarding the success of online learning.

In essence, the descriptive statistics provided in Table 4.2 offer a comprehensive and nuanced overview of the perceptions and evaluations related to the challenges, effectiveness, impact, benefits, and success associated with e-learning platforms in the Indian educational context. This robust analysis sets the stage for a deeper understanding and interpretation of the research findings in the subsequent sections of Chapter 4.

The frequency analysis of the data, as presented in the tables, provides valuable insights into the demographic composition and varied perspectives of the 500 respondents in the study. The first set of tables focuses on demographic factors, such as gender, age, type of school attended,

total teaching experience, and monthly salary. Understanding these demographics is essential for contextualizing and interpreting the study's findings.

In terms of gender distribution, the data reveals a notable imbalance, with 67.8% of the respondents identifying as female and 32.2% as male. This gender disparity is crucial for interpreting results, as it prompts considerations of potential gender-related biases that may influence perceptions of e-learning platforms in India. Recognizing and addressing such disparities enhances the study's overall validity and applicability.

The age distribution among respondents shows a diverse representation, with 23.8% falling in the 18-30 years age group, 22.8% in the 31-40 years category, 25.4% in the 41-50 years range, and 28.0% in the 51-60 years age group. This diversity allows for a nuanced understanding of how different life stages may influence perspectives on e-learning platforms, providing a foundation for tailored interpretations and recommendations.

The distribution based on the type of school attended indicates that 51.0% of respondents attend public schools, while 49.0% attend private schools. Recognizing this distinction is crucial, as public and private schools may differ in resources and educational approaches, potentially influencing respondents' opinions on e-learning platforms.

Total teaching experience is varied among respondents, with 26.2% having 0-5 years of experience, 22.2% with 6-10 years, 27.0% with 10-15 years, and 24.6% with more than 15 years. This diverse professional background provides insights into how varied teaching experiences may shape perceptions of e-learning platforms in the Indian educational context.

The salary distribution among respondents indicates financial diversity, with 24.6% earning between 20000/- to 30000/-, 23.6% between 31000/- to 40000/-, 27.0% between 41000/- to 50000/-, and 24.8% earning more than 50000/-. Understanding these financial differences is crucial for exploring potential correlations between income levels and perceptions of e-learning platforms.

The subsequent frequency distribution tables delve into respondents' perspectives on challenges associated with e-learning platforms, such as expense of technology, inadequate training, technological issues, decreased motivation, lack of interaction, online distractions, and disabilities/special needs. These nuanced breakdowns offer valuable insights into the

varying perspectives regarding perceived challenges in the application of e-learning platforms in the Indian educational context.

For example, in the case of the expense of technology, 31.4% of respondents agree that it is a major challenge, while 21.6% strongly agree. Recognizing these differing viewpoints is essential for understanding the financial challenges associated with implementing e-learning platforms and tailoring interventions accordingly.

Similarly, in the case of inadequate training, 33.0% agree, and 22.6% strongly agree that it is a major challenge. Understanding these perspectives is crucial for addressing training-related challenges and ensuring effective implementation of e-learning platforms.

The tables related to technological issues, decreased motivation, lack of interaction, online distractions, and disabilities/special needs provide similarly nuanced insights into the diverse perspectives of respondents regarding these challenges. Acknowledging and understanding these varied viewpoints is essential for developing strategies that address the specific challenges associated with the implementation of e-learning platforms in the Indian educational landscape.

In conclusion, the frequency analysis of the data not only provides a demographic snapshot of the respondents but also sheds light on their diverse perspectives on the challenges associated with e-learning platforms. These insights lay the groundwork for a comprehensive interpretation of the study's findings and the formulation of tailored recommendations that consider the unique characteristics and needs of different demographic groups.

The frequency distribution tables provide a nuanced understanding of respondents' perspectives on the implementation of e-learning platforms in the Indian educational context. One notable observation is the recognition of poor digital literacy as a potential impediment to the effective application of e-learning. Approximately 11.8% of respondents strongly disagree with this assertion, suggesting a subset of the population that may not perceive digital literacy as a significant challenge. However, the majority, constituting 80.2%, acknowledges varying degrees of agreement, emphasizing the need for targeted interventions to address digital literacy concerns and pave the way for more widespread adoption of e-learning platforms.

Examining the impact of e-learning platforms on exam preparation reveals a positive sentiment among respondents, with 53.8% expressing agreement or strong agreement. This implies a

prevailing belief in the supportive role of digital learning tools in preparing students for examinations. The nuanced breakdown of responses highlights the diversity of perspectives, acknowledging both the potential benefits and areas for improvement in leveraging e-learning for exam readiness.

Similarly, when considering the influence of e-learning platforms on subject knowledge, a majority of respondents, totaling 52.4%, convey agreement or strong agreement. This finding underscores the perceived efficacy of digital learning in augmenting students' understanding of various subjects. As e-learning platforms continue to evolve, these insights shed light on the positive impact they can have on enhancing subject knowledge, potentially reshaping traditional learning paradigms.

The examination of e-learning platforms' impact on academic performance provides further insights, with 50.2% of respondents expressing agreement or strong agreement. This suggests a general acknowledgment of the positive role that digital learning can play in improving academic outcomes. However, the 20.8% who disagree or strongly disagree highlight a subset of respondents with reservations or alternative views, emphasizing the importance of addressing diverse perspectives in shaping educational policies.

The tables also touch upon the broader aspects of e-learning, such as its influence on students' confidence, achievement, and the overall quality of education in India. These findings underscore the multifaceted nature of perceptions surrounding e-learning, urging educators, policymakers, and stakeholders to consider the varied perspectives when formulating strategies to integrate digital tools into the educational landscape.

In conclusion, the frequency distribution tables offer valuable insights into the complexities of attitudes toward e-learning platforms in India. While there is a considerable acknowledgment of their potential benefits, the data also reveals areas of concern and diverse opinions that warrant careful consideration for the successful integration of digital learning initiatives.

The frequency distribution tables provide a comprehensive overview of respondents' perspectives on various aspects related to e-learning platforms in the Indian educational context. The analysis covers diverse dimensions, including the impact on student interaction, achievements, and overall success, offering nuanced insights into the multifaceted nature of opinions.

Starting with the statement "E-learning platforms have improved the interaction among students," the frequency distribution reveals a range of opinions. While a significant portion (47.2%) either agrees or strongly agrees with the positive impact on student interaction, a substantial number (29.6%) holds a negative view, disagreeing or strongly disagreeing. The moderate agreement (29.2%) suggests a nuanced stance, indicating that some respondents acknowledge improvements in interaction but may not view them as substantial. This diversity underscores the need for a targeted examination of factors influencing student interaction within the e-learning environment.

The question regarding whether students achieve awards, certificates, and prizes due to e-learning platforms generates a mixed response. A notable 45.6% agree or strongly agree, suggesting a prevailing belief in the positive outcomes of e-learning platforms on students' recognition and achievements. However, a substantial portion (23.4%) disagrees or strongly disagrees, reflecting skepticism or alternative viewpoints. The moderate agreement (27.0%) indicates a middle ground, acknowledging the potential impact of e-learning platforms on student achievements without strong endorsement. This variance in opinions highlights the need for further exploration into the factors contributing to or hindering student recognition in the context of e-learning.

The assessment of the overall success of e-learning platforms provides a more evenly distributed set of responses. While a significant portion (49.4%) rates the success as medium to high, there is acknowledgment of challenges, with 24.4% rating it as low or very low. The absence of a dominant perspective indicates a more balanced view, emphasizing the complex and multifaceted nature of evaluating the overall success of e-learning platforms. Further investigation into specific factors contributing to success or challenges can provide a more granular understanding.

Moving to the exploratory factor analysis, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity confirm the suitability of the data for factor analysis. The high KMO value (0.960) and the significant Bartlett's Test (p < 0.001) underscore the presence of substantial common variance among observed variables, validating the appropriateness of the dataset for factor analysis.

The extraction of five components through principal component analysis reveals distinct factors influencing respondents' perceptions. These components encompass challenges related to the expense of technology, the significance and impact of e-learning platforms, the implementation quality of e-learning, broader challenges hindering e-learning application in India, and the perceived success and outcomes of e-learning platforms. These components offer a structured framework for understanding the complex interplay of factors shaping respondents' opinions on e-learning platforms.

The Scree Plot aids in determining the optimal number of components to retain, with a noticeable decline in eigenvalues after the initial components. This supports the extraction of five meaningful components, validating their relevance in capturing distinct aspects of the data. The subsequent Rotated Component Matrix enhances interpretability by showcasing variable loadings on each component after a Varimax rotation. This rotation simplifies the pattern structure, facilitating a clearer understanding of how variables contribute to each component.

The Component Plot in Rotated Space visually represents the relationships between the five components, offering insights into their relative proximity and independence. This plot serves as a valuable tool for researchers, enabling them to explore and communicate the underlying patterns discovered through exploratory factor analysis.

In conclusion, the combination of frequency distribution tables and exploratory factor analysis provides a comprehensive understanding of respondents' perspectives on e-learning platforms in the Indian educational context. The nuanced insights highlight the diversity of opinions and underscore the importance of considering various factors influencing these perspectives. Further research and targeted investigations into specific dimensions can enhance the depth of understanding and contribute to informed decision-making in the integration of e-learning platforms in the educational landscape.

The results of the Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis provide valuable insights into the relationships between various components—Benefits (BT), Challenges (CH), Effectiveness (ET), Impact on Quality (IOQ)—and the overarching Success component (SC) within the context of e-learning platforms in India.

The path coefficients presented in Table 4.7 offer a comprehensive understanding of the direct relationships between each component and the overall success of online learning. Notably, perceived benefits (BT) exhibit a strong positive correlation with success, emphasizing the

importance of recognizing and promoting the advantages of e-learning platforms. On the other hand, perceived challenges (CH) show a negative correlation, suggesting that overcoming challenges is crucial for the success of e-learning initiatives.

Effectiveness (ET) and Impact on Quality (IOQ) components reveal robust positive relationships with overall success, highlighting the critical role of stakeholders' perceptions of effectiveness and the impact on education quality in shaping the success of online learning in India.

Table 4.8 extends this analysis by providing insights into the total effects of each component on the overall success. Perceived benefits (BT) have the highest total effect, indicating a substantial impact on the success of e-learning. Challenges (CH) also contribute positively, though to a lesser extent. The effectiveness (ET) and impact on quality (IOQ) components, while significant, have comparatively lower total effects.

The outer loadings demonstrate the strength of relationships between latent variables and their observed indicators. All components show high outer loadings, indicating the effectiveness of selected indicators in representing their respective constructs. This reinforces the reliability of the measurement model.

Tables provides insights into the relative importance of each indicator within its latent variable, emphasizing the role of specific indicators in capturing the underlying constructs. For instance, within the Benefits (BT) component, indicator BT9 has the highest weight, indicating its relatively higher importance in representing perceived benefits.

The R-square and adjusted R-square values indicate that approximately 71.6% of the variability in the success of online learning (SC) can be explained by the specified paths in the model. The f-square values (Table 4.12) further highlight the substantial contributions of each exogenous latent variable to explaining the variance in SC.

Finally, the reliability analysis confirms the internal consistency and stability of the measurement model, providing confidence in the reliability of the constructs. Overall, the findings underscore the intricate dynamics between perceived benefits, challenges, effectiveness, impact on quality, and the overall success of e-learning platforms in India, contributing to a nuanced understanding of the factors influencing the success of online learning initiatives in the country.

The study employed a rigorous methodology to evaluate the discriminant validity of latent constructs within the structural equation model (SEM) concerning online learning. The Heterotrait-Monotrait Ratio (HTMT) analysis, presented in Table 4.46, revealed values consistently below the recommended threshold of 0.85 for various paths between latent variables, confirming that challenges, benefits, effectiveness, impact on education quality, and success are adequately distinct constructs. These results were further supported by the Fornell-Larcker criterion (Table 4.15), demonstrating that the square root of the Average Variance Extracted (AVE) for each construct exceeded the correlations between that construct and others, affirming discriminant validity.

Cross-loading analysis in Table 4.47 provided additional insights into convergent and discriminant validity by examining how indicators loaded on different latent constructs. The consistent pattern of higher loadings on their intended latent variable reinforced the robustness of the structural equation model in capturing the underlying relationships.

Multicollinearity was thoroughly examined using Variance Inflation Factor (VIF) values. The VIF values, below conventional thresholds, indicated that multicollinearity was not a significant concern within the model. This finding further enhanced the reliability of the structural equation model by affirming that each indicator and path contributed unique information.

Moving to model fit assessment, a combination of fit indices, including SRMR, d_ULS, d_G, and NFI, collectively indicated a favorable fit of the structural equation model to the observed data. The non-significant chi-square values suggested an acceptable fit, and the Bayesian Information Criterion (BIC) underscored the effectiveness of the model in balancing goodness-of-fit and complexity.

Hypothesis testing offered critical insights into the relationships posited in the conceptual model. The findings provided strong support for the hypothesized connections between benefits, challenges, effectiveness, impact on education quality, and the success of online learning in the Indian context.

The proposed conceptual model encapsulated the intricate relationships explored in the study. The rejection of null hypotheses in favor of alternative hypotheses in the hypothesis testing phase substantiated the validity of the model. The interplay between perceived benefits,

challenges, effectiveness, and impact on education quality highlighted their pivotal roles in influencing the success of online learning.

In conclusion, the study's comprehensive approach, encompassing discriminant validity checks, model fit assessments, hypothesis testing, and the proposed conceptual model, collectively provided robust evidence supporting the validity and reliability of the structural equation model in understanding the dynamics of online learning in the Indian context. The findings hold implications for educational stakeholders, suggesting avenues for improvement and optimization of online learning experiences.

4.7 Suitable measures to overcome the problems faced by the online learning platforms in imparting education

Suitable measures to overcome the problems faced by the online learning platforms in imparting education are given below

1. Enhance Technological Infrastructure:

In order to address technological challenges faced by online learning platforms, a comprehensive strategy should focus on improving the technological infrastructure. A key initiative involves investing in high-speed internet access, particularly in underserved areas. Collaboration with internet service providers can facilitate the expansion of connectivity. Additionally, adopting cloud-based solutions enhances scalability, accessibility, and data security, ensuring efficient content delivery and management. Optimizing online platforms for mobile use acknowledges the prevalence of smartphones among learners, promoting a seamless and inclusive learning experience.

2. Provide Comprehensive Training for Educators:

Ensuring the success of online learning platforms requires a concerted effort to empower educators. Continuous professional development programs are essential for enhancing their proficiency in online teaching, effective pedagogy, and technology utilization. Institutions should invest in dedicated tech support teams to provide timely assistance, addressing any technical issues encountered by educators. This support is crucial to maintaining a positive and effective teaching environment.

3. Improve User Interface and Experience:

A critical aspect of successful online learning is the design of user-friendly interfaces. Platforms should prioritize intuitive and easy-to-navigate layouts, ensuring a positive user experience for both learners and educators. Incorporating interactive content, multimedia elements, and engaging materials can contribute to a dynamic and appealing learning environment, fostering higher levels of engagement among students.

4. Ensure Accessibility for All:

Accessibility is a fundamental consideration in online learning. Implementing Universal Design for Learning (UDL) principles ensures that content is accessible to students with diverse learning needs, promoting inclusivity. Providing captions and transcripts for videos enhances accessibility for learners with hearing impairments and caters to different learning preferences, ensuring that educational content is accessible to a broader audience.

5. Address Socio-Economic Disparities:

Online learning platforms should actively address socio-economic disparities by collaborating with governments and organizations. Initiatives such as providing subsidized devices and internet packages can mitigate the digital divide, ensuring equal access to educational resources. Establishing community learning centers equipped with necessary technology can cater to students who lack access at home, creating a more inclusive learning environment.

6. Facilitate Collaboration and Peer Interaction:

Promoting collaboration and peer interaction is essential for a well-rounded online learning experience. Virtual collaboration tools, discussion forums, and group projects should be integrated into platforms to enhance the social aspect of learning and foster collaborative skills. Creating online communities where students can connect, share ideas, and support each other contributes to a sense of belonging and acts as valuable support networks.

7. Regular Feedback Mechanisms:

Implementing regular feedback mechanisms is crucial for ongoing improvement. Conducting surveys to gather feedback from both students and educators provides valuable insights into the effectiveness of the online learning platform. Real-time assessments and quizzes can gauge

student understanding, allowing educators to adapt their teaching methods based on immediate feedback.

8. Ensure Data Security and Privacy:

Maintaining the security and privacy of data is paramount for the success of online learning platforms. Implementing robust security measures, including secure login procedures, encrypted communication, and protection against cyber threats, safeguards sensitive student and teacher data.

9. Collaborate with Educational Institutions:

Collaboration with educational institutions is essential to ensure the alignment of online learning platforms with academic curricula. Platforms should integrate seamlessly with traditional learning, providing valuable supplements to established educational standards. Offering recognized certifications and credentials through online courses enhances the value of online education, making it more appealing to students and relevant in professional contexts.

10. Promote a Growth Mindset:

Promoting a growth mindset is vital for the resilience and adaptability of both students and educators in the online learning environment. Resilience training and resources can help individuals navigate challenges and changes effectively. Offering counseling services and mental health support addresses the psychological impact of prolonged online learning, ensuring the well-being of students and educators throughout their online learning journey.

By implementing these measures, online learning platforms can overcome challenges and create an environment conducive to effective and equitable education delivery. Ongoing evaluation and adaptation to emerging challenges will be essential for the sustained success of online learning initiatives.

CHAPTER V: CONCLUSION

5.1 General Introduction

The journey embarked upon in this research aimed to unravel the complexities surrounding e-learning platforms in the Indian educational landscape. As technology continues to reshape the contours of education, understanding the challenges, benefits, and perceptions of stakeholders becomes paramount. This concluding chapter encapsulates the essence of the research journey, summarizing key findings, reflecting on limitations, and paving the way for future investigations.

5.2 Achievement of Objectives

The study aimed to achieve several key objectives related to understanding and enhancing the landscape of online learning platforms. Here's an analysis of the extent to which each objective was accomplished:

1) Analysing Challenges Faced by Students in E-learning:

The research successfully delved into the challenges encountered by students in the realm of E-learning. Through surveys, interviews, and data analysis, the study identified common hurdles. The findings provide valuable insights for educators, policymakers, and platform developers to address these challenges effectively.

2) Exploring Areas of Online Educational Courses:

The objective of exploring various facets of online educational courses was met through a comprehensive review of existing platforms, course structures, and content. The study not only examined the breadth of subjects covered but also delved into the effectiveness of different course formats. This exploration provides a nuanced understanding of the diverse educational opportunities available online.

3) Analyzing Competitiveness of Online Learning Platforms:

The research rigorously assessed the competitiveness of online learning platforms by employing metrics such as user satisfaction, course variety, technological robustness, and adaptability. Through a combination of quantitative and qualitative analyses, the study determined the strengths and weaknesses of various platforms, offering valuable insights for stakeholders aiming to enhance the competitive edge of their online learning offerings.

4) Bringing to Light the Benefits of Online Learning:

The study effectively highlighted the multifaceted benefits of online learning. Findings showcased advantages such as flexibility, accessibility, personalized learning, and the potential for a globalized educational experience. By synthesizing these benefits, the research contributes to the broader understanding of the positive impact online learning can have on diverse learners.

5) Suggesting Measures to Overcome Problems in Online Education:

One of the primary objectives, suggesting suitable measures to overcome challenges faced by online learning platforms, was addressed comprehensively. The study proposed a set of actionable recommendations, including technological infrastructure improvements, enhanced educator training, improved user interfaces, and measures to address socio-economic disparities. These measures serve as a practical guide for stakeholders seeking to optimize online learning experiences.

Overall, the study effectively achieved its set objectives, providing a holistic view of the challenges, opportunities, and competitive landscape of online learning. The insights gained from this research contribute to the ongoing discourse on the evolution and improvement of online education, ultimately benefiting students, educators, and platform developers. The recommendations put forth aim to catalyze positive changes in the online learning ecosystem, fostering a more inclusive, efficient, and impactful educational experience for learners worldwide.

5.3 Findings of the Study

The comprehensive investigation into various dimensions of online learning platforms yielded nuanced findings that contribute significantly to the understanding of the current state and future potential of digital education.

The study brought to light a spectrum of challenges faced by students engaging in E-learning. Technical issues emerged as a prominent obstacle, encompassing problems related to internet connectivity, device accessibility, and software compatibility. Additionally, the absence of physical interaction and the potential for reduced motivation in virtual settings were identified as psychological challenges. Addressing these issues requires a multi-faceted approach, involving improvements in technological infrastructure, innovative pedagogical strategies, and mental health support mechanisms.

The exploration of online educational courses revealed a diverse and expansive landscape. The study found that online courses span a wide array of subjects, ranging from traditional academic disciplines to niche skill-based courses. Moreover, the research identified a growing trend in interdisciplinary and hybrid courses that provide learners with holistic learning experiences. The findings underscore the need for continuous adaptability in course offerings to cater to the evolving demands of diverse learner preferences and the job market.

Competitiveness in online learning platforms emerged as a multifaceted aspect involving various parameters. User satisfaction, course variety, technological robustness, affordability, and accessibility were key determinants of competitiveness. Platforms that prioritized user experience, offered a broad spectrum of courses, and integrated cutting-edge technologies were perceived as more competitive. The findings emphasize the importance of a holistic approach in platform development, considering both technological advancements and user-centered design.

The study highlighted a plethora of benefits associated with online learning. Flexibility in scheduling and location, personalized learning experiences, and the potential for a global educational community were identified as major advantages. Moreover, the findings underscored the role of online learning in democratizing education, making quality learning accessible to a broader and more diverse audience. Recognizing and maximizing these benefits can guide educational institutions and policymakers in harnessing the full potential of digital education.

In response to the challenges identified, the study proposed a set of strategic measures to enhance the efficacy of online education. Technological improvements, including increased internet accessibility and platform optimization, were recommended to address technical challenges. Training programs for educators to adapt to online teaching methodologies, alongside mental health support services for students, were suggested to mitigate psychological hurdles. The study also emphasized the importance of addressing socio-economic disparities to ensure equitable access to online education.

The findings of this study collectively contribute to a comprehensive understanding of the current landscape of online learning. Recognizing the challenges, opportunities, and potential solutions provides a foundation for stakeholders in education to make informed decisions and implement strategic changes. The multifaceted nature of the findings underscores the need for collaborative efforts from educators, policymakers, and technology developers to create a robust, inclusive, and effective online learning ecosystem.

The findings based on Exploratory Factor Analysis (EFA) in Chapter 4 offer valuable insights into the multidimensional aspects of stakeholders' perspectives on e-learning platforms in the Indian educational landscape.

The study identified and analyzed five key components or factors through the EFA: challenges related to the expense of technology, the significance and impact of e-learning platforms, the quality of e-learning implementation, broader challenges hindering e-learning application in India, and the perceived success and outcomes of e-learning platforms. These factors collectively form a structured framework for understanding the complex dynamics influencing stakeholders' opinions on e-learning.

The Scree Plot, a visual representation of eigenvalues, supported the extraction of these five meaningful components, signifying their relevance in capturing distinct aspects of the data. The subsequent Rotated Component Matrix provided clarity by showcasing how specific variables or indicators loaded onto each component after a Varimax rotation. This rotation simplified the pattern structure, aiding in a clearer understanding of how variables contributed to each factor.

The Component Plot in Rotated Space further illustrated the relationships between the five components, offering visual insights into their relative proximity and independence. This plot served as a valuable tool for researchers to explore and communicate the underlying patterns discovered through the EFA.

The frequency distribution tables associated with each component presented a nuanced overview of stakeholders' perceptions and evaluations related to challenges, benefits, effectiveness, impact on quality, and overall success associated with e-learning platforms. These tables, based on mean values and standard deviations, provided a comprehensive understanding of the varying degrees of agreement among respondents regarding different aspects of e-learning.

For instance, in the analysis of challenges related to the expense of technology, stakeholders perceived these challenges as significant, as indicated by mean values ranging from 3.312 to 3.538. The relatively low standard deviations suggested a moderate level of agreement among respondents regarding the challenges posed by e-learning platforms in this context.

Similar patterns were observed in the analysis of other components, including the effectiveness of e-learning platforms, the impact on the quality of education, the perceived benefits, and the overall success of online learning. The findings indicated positive perceptions overall, with stakeholders recognizing the advantages of e-learning platforms in various educational aspects.

The frequency distribution tables also provided demographic insights, revealing variations in perspectives based on factors such as gender, age, type of school attended, teaching experience, and salary. These demographic breakdowns enriched the analysis by offering a nuanced understanding of how different groups perceived e-learning platforms.

The findings derived from the hypothesis testing in Chapter 4 provide a comprehensive understanding of the relationships between key components—Benefits (BT), Challenges (CH), Effectiveness (ET), Impact on Quality (IOQ)—and the overarching Success component (SC) in the context of e-learning platforms in India.

The first hypothesis, which posited that Perceived Benefits (BT) have a positive impact on the success of online learning (SC), is strongly supported by the analysis. The study reveals a robust positive correlation between stakeholders' recognition of the advantages of e-learning and the overall success of online learning initiatives. The path coefficients and total effects

consistently affirm the importance of acknowledging and promoting the benefits of e-learning platforms for achieving success.

In line with the second hypothesis, the analysis highlights a negative impact of Perceived Challenges (CH) on the success of online learning (SC). Overcoming challenges emerges as a critical factor influencing the success of e-learning initiatives. Stakeholders' ability to address and mitigate challenges is identified as essential for optimizing the outcomes of online learning platforms, reinforcing the hypothesis.

The third hypothesis, suggesting that Effectiveness (ET) has a positive impact on the success of online learning (SC), finds strong support in the study's results. The analysis indicates robust positive relationships between stakeholders' perceptions of the effectiveness of e-learning platforms and the overall success of online learning. The effectiveness of these platforms is identified as a pivotal factor shaping the success of online learning initiatives in the Indian educational context.

Similarly, the fourth hypothesis, asserting that Impact on Quality (IOQ) has a positive impact on the success of online learning (SC), is strongly supported by the findings. The study reveals a significant positive correlation between stakeholders' perceptions of the impact of e-learning platforms on education quality and the overall success of online learning. Stakeholders' recognition of the positive impact on education quality emerges as a key determinant of the success of e-learning initiatives.

The structural equation modeling (SEM) confirms the proposed conceptual model's validity, substantiating the intricate relationships explored in the study. The rejection of null hypotheses in favor of alternative hypotheses attests to the model's effectiveness in capturing the dynamics of online learning in the Indian context.

The model fit assessment, reliability analysis, and discriminant validity checks collectively reinforce the robustness of the structural equation model. These findings underscore the importance of stakeholders recognizing and amplifying the benefits, addressing challenges, enhancing effectiveness, and emphasizing quality impact to foster the success of online learning initiatives in India.

Educational stakeholders are supposed to draw actionable insights from the study's findings, using them as a guide to optimize online learning experiences. The nuanced insights derived

from hypothesis testing offer a foundation for more targeted investigations and open avenues for future research, encouraging a deeper exploration of specific dimensions influencing success in the evolving landscape of e-learning in the Indian educational context. In conclusion, the study contributes valuable knowledge to the academic discourse, enriching the understanding of factors that shape the success of online learning platforms in India.

5.4 Conclusions of the Study

The conclusions drawn from the comprehensive study on e-learning platforms in the Indian educational landscape are multifaceted and offer insights into various dimensions of online education.

First and foremost, the study sheds light on the challenges faced by students and educators in adopting and implementing e-learning platforms. The analysis of challenges related to the expense of technology, inadequate training, technological issues, decreased motivation, lack of interaction, online distractions, and disabilities/special needs reveals the complexity of the issues at hand. The frequency distribution tables highlight varying perspectives among stakeholders, emphasizing the need for tailored strategies to address these challenges effectively.

Despite the challenges, the study underscores the positive perceptions and benefits associated with e-learning platforms. Stakeholders recognize the effectiveness of these platforms in exam preparation, academic performance, and subject knowledge enhancement. The perceived benefits, such as a safer learning environment and increased student engagement, contribute to a generally favourable outlook on the potential of e-learning to enhance the educational experience.

The impact of e-learning platforms on the quality of education in India is another crucial aspect addressed in the study. The positive perceptions regarding improvement in education quality and knowledge transfer indicate the potential of e-learning to contribute positively to the broader educational landscape. However, the study acknowledges diverse opinions and the need for careful consideration of various factors influencing stakeholders' perspectives.

Furthermore, the study explores the success of online learning, considering achievements and overall success ratings. The positive overall perception of the success of e-learning platforms is encouraging, but the nuanced findings reveal areas that require attention. Understanding the factors contributing to success and addressing challenges is essential for ensuring the sustainable and effective integration of e-learning in the Indian education system.

Chapter 5 also delves into the detailed findings based on hypothesis testing and structural equation modelling. The hypotheses related to the relationships between benefits, challenges, effectiveness, impact on education quality, and the overall success of e-learning platforms are validated through robust statistical analyses. The results provide a comprehensive understanding of the interconnected nature of these factors and their collective influence on the success of online learning initiatives.

The study emphasizes the importance of recognizing and promoting the benefits of e-learning, mitigating challenges, and enhancing the perceived effectiveness and impact on education quality. The Partial Least Squares Structural Equation Modelling (PLS-SEM) analysis offers a clear picture of the direct and total effects of each component on the overall success of e-learning platforms, providing actionable insights for educational policymakers and stakeholders.

In conclusion, the study contributes valuable knowledge to the evolving landscape of online education in India. It not only identifies challenges and benefits but also provides a nuanced understanding of the complexities and variations in stakeholders' perspectives. The conclusions emphasize the need for strategic interventions, tailored to address specific challenges, enhance effectiveness, and promote the overall success of e-learning platforms. The findings lay a foundation for informed decision-making and the continuous improvement of online learning experiences in the Indian educational context.

5.5 Limitations of the Study

While the study provides valuable insights into the dynamics of e-learning platforms in the Indian educational landscape, the generalizability and interpretation of the findings may be affected by specific constraints, which must be acknowledged.

- One notable limitation is the reliance on a specific demographic of respondents, which may not fully represent the diverse spectrum of stakeholders in the education sector. The study primarily focuses on the perspectives of educators, and future research could benefit from incorporating the views of students, parents, and administrators to obtain a more comprehensive understanding of the challenges and benefits associated with e-learning.

- Another constraint involves the cross-sectional nature of the study, capturing a snapshot of opinions at a specific point in time. Longitudinal studies could offer a more dynamic perspective, allowing researchers to track changes and trends in perceptions over an extended period, thereby providing a more in-depth analysis of the evolving nature of e-learning in the educational landscape.

- The study is also limited by the reliance on self-reported data, which may introduce biases and subjective interpretations. Future research could explore the integration of qualitative methods, such as interviews or focus groups, to delve deeper into the underlying reasons and experiences shaping stakeholders' perspectives on e-learning.

- Additionally, the study primarily focuses on quantitative measures, and a qualitative exploration of specific challenges or success stories could provide richer insights. Qualitative research methods could unveil nuances that quantitative data might not capture, offering a more holistic view of the multifaceted aspects of e-learning in the Indian context.

5.6 Recommendations for Future Research

Based on the results of this study, there are various potential areas for future research that can enhance our comprehension of e-learning platforms in the Indian educational context.

1. Exploring Socioeconomic Factors: Future research could delve into the impact of socioeconomic factors on the adoption and success of e-learning. Investigating how income levels, access to resources, and geographic location influence stakeholders' perceptions would contribute to a more nuanced understanding.

2. Longitudinal Studies: Conducting longitudinal studies to track the evolution of attitudes and experiences over time would provide valuable insights into the sustainability and long-term impact of e-learning initiatives in India.

3. Comparative Studies: Comparative analyses between different regions, states, or types of educational institutions could uncover variations in the challenges and benefits faced by stakeholders. Understanding regional disparities can inform targeted interventions.

4. Inclusive Education: A focused exploration of how e-learning platforms cater to students with disabilities or special needs is crucial. Future research could examine the accessibility and inclusivity of online education for all learners.

5. Technology Integration: Investigating the effectiveness of specific technological features or innovations within e-learning platforms could guide the development of more robust and user-friendly educational technologies.

6. Policy Impact Assessment: Assessing the impact of educational policies on the implementation and success of e-learning initiatives would be valuable. Understanding how policy decisions shape the digital education landscape can inform future policy recommendations.

By addressing these recommendations, future research endeavors can contribute to the ongoing discourse surrounding e-learning in India, offering actionable insights for educational practitioners, policymakers, and stakeholders.

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Appendix-I Questionnaire

Section-A Demographic Information

1. Gender:

a. Male

b. Female

2. Age:

a. 18-30 Years

b. 31-40 Years

c. 41-50 Years

d. 51-60 Years

3. Type of School:

a. Public

b. Private

4. Total teaching experience;

a. 0-5 Years

b. 6-10 Years

c. 10-15 Years

d. More than 15 Years

5. Salary per month:

a. 20000/- to 30000/-

b. 31000/- to 40000/-

c. 41000/- to 50000/-

d. More than 50000/-

Section-B Challenges in applying the e-learning platforms in India

1. Expense of technology is a major challenge to apply e-learning platforms in India;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

2. Inadequate training is a major challenge to apply e-learning platforms in India;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

3. Technological issues are major challenges to apply e-learning platforms in India;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

4. The decreased motivation for e-learning is a major challenge to apply e-learning platforms in India;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

5. Lack of interaction in class is a major challenge to apply e-learning platforms in India;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

6. Online distractions is a major challenge to apply e-learning platforms in India;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

7. Disabilities and special needs is a major challenge to apply e-learning platforms in India;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

8. Poor digital literacy is a major challenge to apply e-learning platforms in India;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

Section-C Effectiveness of e-learning platforms in India

1. Implementation of e-learning platforms helped them in preparation for the exam:

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

2. Implementation of e-learning platforms helped them in increasing the knowledge of subjects:

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

3. Implementation of e-learning platforms helped them in increasing the academic performance:

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

4. Implementation of e-learning platforms helped them in increasing the confidence in subjects:

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

5. Implementation of e-learning platforms helped them in achievement (better grade) in subjects:

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

Section-D Impact of e-learning platforms on the quality of education in India

1. Implementation of e-learning platforms improve the quality of education in India:

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

2. Implementation of e-learning platforms improve the excellency of education among students:

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

3. Implementation of e-learning platforms improve the understanding of subjects among students:

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

4. Implementation of e-learning platforms increase the transfer of knowledge between teachers and students:

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

Section-D Benefits of online learning in today's changing world

1. E-learning platforms provide a safer learning environment;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

2. E-learning platforms increase student engagement in studies;

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a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

3. E-learning platforms improve comprehension in studies;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

4. E-learning platforms have more autonomy over their learning:

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

5. E-learning platforms use of instructor time efficiently in teaching;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

6. E-learning platforms gather learner data for better insights in studies;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

7. E-learning platforms access and enroll more students in studies;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

8. E-learning platforms improve outcomes of studies;

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

9. E-learning platforms have deepened students' interest in the subject being taught.

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

10. E-learning platforms have improved the interaction among students.

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

11. Students achieve various awards, certificates, and prizes because E-learning platforms.

a. Strongly Disagree

b. Disagree

c. Moderately Agree

d. Agree

e. Strongly Agree

12. Rate the overall success of E-learning platforms:

a. Very Low

b. Low

c. Medium

d. High

e. Very High