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Message from the Editor-in-Chief

Dear Colleagues,

TOJDEL welcomes you. TOJDEL would like to thank you for your online journal interest. We are delighted that a lot of academicians, teachers, and students from around the world have visited for one year. It means that TOJDEL has continued to diffuse new trends in distance education. We hope that the volume 12, issue 2 will also successfully accomplish our distance education goal.

TOJDEL is confident that readers will learn and get different aspects on distance education. Any views expressed in this publication are the views of the authors and are not the views of the Editor and TOJDEL.

TOJDEL thanks and appreciate the editorial board who have acted as reviewers for one or more submissions of this issue for their valuable contributions.

Call for Papers

TOJDEL invites you article contributions. Submitted articles should be about all aspects of distance education. The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJDEL. Manuscripts must be submitted in English.

TOJDEL is guided by it's editors, guest editors and advisory boards. If you are interested in contributing to TOJDEL as an author, guest editor or reviewer, please send your cv to tojdel.editor@gmail.com.

April 01, 2024
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EDUCATIONAL EQUALITY: DISTANCE LEARNING'S CONTRIBUTION TO ACCESSIBLE EDUCATION IN INDIA

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ABSTRACT
In the rapidly evolving landscape of education, the advent of distance learning has emerged as a transformative force, especially in a diverse and populous country like India. This paper explores the role of distance learning in promoting educational equality and accessibility across various demographics in India. As the world grapples with the challenges of traditional education, exacerbated by factors such as geographical constraints, socio-economic disparities, and the recent global health crisis, distance learning has emerged as a viable solution. The study delves into the impact of distance learning on breaking down barriers to education, emphasizing its ability to reach learners in remote and underserved regions. Through the analysis of existing literature, case studies, and statistical data, this paper seeks to highlight the success stories and challenges faced in implementing distance learning initiatives in India. The examination of government policies, technological infrastructure, and socio-cultural factors provides a comprehensive understanding of the evolving educational landscape. Furthermore, the paper addresses the potential of distance learning in fostering inclusivity by accommodating diverse learning styles and individual paces. It explores the role of technology in enhancing the quality of education and overcoming traditional constraints, thereby contributing to a more equitable educational system. The study also investigates the evolving role of educators in the digital era, emphasizing the need for pedagogical innovation and professional development to ensure effective distance learning experiences. In this paper synthesizes the current state of distance learning in India and its impact on educational equality. It offers insights into the opportunities and challenges posed by this educational paradigm shift and proposes recommendations for further integration and improvement. By understanding the nuances of distance learning's contribution to accessible education in India, policymakers, educators, and stakeholders can collaboratively work towards creating a more inclusive and equitable educational system for the diverse population of the country.
Keywords: Equality, Distance Learning, Accessible, socio-cultural, technology in enhancing

Introduction

In the vast and diverse landscape of India, where opportunities are as varied as its cultures, the pursuit of education has long been considered a powerful catalyst for social and economic advancement. However, the accessibility of quality education remains a formidable challenge, particularly in remote and underserved regions. The advent of distance learning has emerged as a transformative force, striving to bridge the gap and enhance educational equality across the country.

India's commitment to education is underscored by its demographic dividend, where a youthful population seeks knowledge and skills to navigate an increasingly competitive global landscape. However, traditional barriers such as geographical remoteness, socio-economic disparities, and inadequate infrastructure have historically hindered the equitable distribution of educational resources.

In this context, distance learning, bolstered by technological advancements, has emerged as a promising solution to democratize education. The integration of information and communication technologies (ICTs) has facilitated the delivery of academic content to learners regardless of their location, enabling a more inclusive and accessible educational ecosystem.

One of the key advantages of distance learning is its ability to transcend physical boundaries, bringing education to the doorsteps of learners in even the remotest corners of the country. This is particularly significant in a nation as vast and geographically diverse as India, where traditional brick-and-mortar educational institutions may be scarce or inaccessible. Moreover, distance learning has proven to be a great equalizer by mitigating socio-economic disparities that often hinder educational pursuits. The flexibility offered by online education allows individuals to balance their learning commitments with work, family responsibilities, and other challenges, fostering a more inclusive approach to education.

As we explore the impact of distance learning on educational equality in India, this article will delve into the various facets of this transformative approach. From the role of technology in enhancing accessibility to the socio-economic implications of a more inclusive education system, we will critically examine how distance learning is reshaping the educational landscape in India and contributing to a more equitable future for learners across the nation.

From its modest origins, distance education in India has come a long way to become a crucial modality of education for millions of people. This blog examines the amazing development of remote learning in the nation, outlining its background, significant turning points, difficulties encountered, and effects on educational accessibility and inclusivity.

Early Starting
The Directorate of Correspondence Courses, which was founded by the University of Mumbai in 1971, is where the origins of remote learning in India may be found. This programme ushered in a new era by enabling students to pursue higher education while juggling other responsibilities. Correspondence courses required the mailing of reading materials and assignment submissions via postal services.

Technological Progress
In the diverse landscape of India, where geographical, economic, and social disparities persist, the advent of distance learning has emerged as a powerful tool to promote educational equality. This article delves into the transformative impact of technological progress on making education more accessible across the country, narrowing the gap between urban and rural areas, and fostering inclusivity.

1. **Overcoming Geographical Barriers:**

Distance learning has effectively transcended the limitations imposed by geographical distances. In a vast country like India, where remote and rural areas often lack quality educational institutions, technology-driven learning platforms provide students with access to a wide array of courses and educational resources. This is particularly significant in empowering students who would otherwise face challenges in pursuing higher education.

2. **Rural Empowerment:**

Technological progress has played a pivotal role in extending educational opportunities to rural communities. The penetration of smartphones and internet connectivity has facilitated the adoption of online learning modules even in the remotest parts of the country. This has not only broadened the academic horizons for students but has also empowered communities by providing them with the means to acquire knowledge and skills that were previously elusive.

3. **Affordability and Inclusivity:**

Distance learning platforms often come with a more affordable price tag compared to traditional educational institutions. This affordability factor contributes significantly to making education more inclusive, ensuring that students from economically disadvantaged backgrounds have the opportunity to access quality learning resources. As technology continues to advance, the cost of devices and internet connectivity is likely to decrease, further promoting accessibility.

4. **Customized Learning Paths:**

One of the advantages of distance learning is the ability to cater to diverse learning styles and paces. Technology allows for personalized and adaptive learning experiences, accommodating the individual needs of students. This flexibility is crucial in addressing the varied educational backgrounds and learning capacities prevalent in a country as diverse as India.

5. **Government Initiatives and Policies:**

Recognizing the potential of distance learning in promoting educational equality, the Indian government has initiated several programs to enhance digital infrastructure and connectivity. Policies aimed at bolstering online education have been implemented, creating an environment conducive to the growth of distance learning platforms and ensuring that they adhere to quality standards.

6. **Challenges and Future Prospects:**

While distance learning has made significant strides, challenges such as the digital divide and the need for a robust assessment and accreditation system remain. Future progress hinges on addressing these challenges and continually innovating to improve the quality of online education.

In the fusion of technological progress and distance learning has become a catalyst for educational equality in India. By overcoming geographical barriers, empowering rural communities, ensuring affordability, and offering customized learning paths, technology has opened new avenues for students across the country. As India moves forward, sustained efforts in addressing challenges and fostering a supportive ecosystem will be key to realizing the full potential of distance learning in advancing accessible education. Distance learning in India has

undergone a transformation because to technology, particularly the internet. E-learning resources and online learning platforms first became popular in the middle of the 1990s. This removed geographic restrictions and made it possible for students to access study materials, lectures, and assignments online, resulting in more engaging educational opportunities.

Establishment of Open Universities

The Indira Gandhi National Open University (IGNOU), the country's first open university, was founded in 1985. A flexible learning framework that catered to students of various ages and educational backgrounds was created by open universities. They offered personalised support and held exams at regional centres, and they had study centres all across the country.

India's journey towards educational equality has witnessed a revolutionary chapter with the establishment of open universities. This article explores the significant contribution of open universities and distance learning in democratizing education, breaking down barriers, and fostering inclusive learning environments in the diverse landscape of India.

1. **Genesis of Open Universities:**

The establishment of open universities in India marked a paradigm shift in the education landscape. These institutions were conceived with the vision of making education accessible to a broader demographic, especially those who were geographically isolated or economically disadvantaged. The pioneering role of open universities in embracing distance learning methodologies has played a crucial role in achieving this goal.

2. **Accessibility Beyond Boundaries:**

Open universities leverage distance learning technologies to extend educational opportunities to learners irrespective of their location. This is particularly impactful in a country as vast and diverse as India, where traditional universities may not reach remote areas. Through virtual classrooms, online resources, and interactive learning modules, open universities bridge the gap between urban and rural education, ensuring that knowledge reaches every corner of the nation.

3. **Flexibility and Lifelong Learning:**

Open universities emphasize flexibility in education, catering to the needs of individuals who may be working or have other responsibilities. The concept of lifelong learning is promoted, allowing learners to acquire new skills and knowledge at their own pace. This flexibility is essential for adults seeking to enhance their qualifications or embark on a new career path.

4. **Affordability and Inclusivity:**

One of the cornerstones of open universities is their commitment to affordability. By reducing infrastructure costs and offering courses through distance learning, these institutions make education more economically accessible. This affordability factor contributes significantly to inclusivity, ensuring that individuals from diverse socio-economic backgrounds have the opportunity to pursue higher education.

5. **Diverse Course Offerings and Specializations:**

Open universities often boast a wide array of courses and specializations, catering to the diverse interests and career aspirations of learners. This diversity is crucial in addressing the varied needs of a population with diverse linguistic, cultural, and professional backgrounds.

6. **Government Support and Accreditation:**

The Indian government has recognized the pivotal role of open universities in promoting accessible education. Supportive policies and accreditation mechanisms have been put in place to ensure that the degrees and certifications offered by open universities hold value in the job market. This has boosted the credibility of distance learning programs and encouraged more learners to opt for this mode of education.

The establishment of open universities and the integration of distance learning in India represent a significant stride towards educational equality. By transcending geographical boundaries, offering flexibility, ensuring affordability, and providing a diverse range of courses, these institutions have become key players in democratizing education. As India continues its pursuit of inclusive and accessible education, open universities stand as beacons of progress, transforming the educational landscape and empowering learners across the nation.

Electronic Transformation

The number of online learning platforms increased dramatically in the 2000s. Universities and organisations started providing online degree programmes so that students could obtain degrees without taking regular lectures. Virtual classrooms, webinars, and video conferencing all improved the learning process.

MOOCs (Massive Open Online Courses)

In the 2010s, the idea of MOOCs gained popularity by providing a huge audience with free online courses. High-quality courses on a variety of topics are now available because to partnerships between prominent

universities and platforms like Coursera, edX, and Udacity. Due to the democratisation of education, anyone with access to the internet can now learn important information.

Governmental Programmes

Digital India, a government initiative, and the National Digital Library have been instrumental in advancing digital learning. Initiatives like SWAYAM (Study Webs of Active Learning for Young Aspiring Minds), which promotes skill development and lifelong learning, offer free online courses from eminent instructors.

In India, several governmental programs aimed at promoting accessible education through distance learning have been implemented. These initiatives primarily focus on leveraging technology to reach remote areas, providing quality education, and bridging the gap in educational opportunities. Some key components include:

1. **National Digital Literacy Mission (NDLM):** The NDLM, launched by the government of India, aims to make at least one person in every family digitally literate. This includes providing basic digital literacy skills, which can be instrumental in accessing online educational resources.
2. **Digital India Initiative:** Launched with the vision to transform India into a digitally empowered society, Digital India encompasses various programs to improve digital infrastructure, promote digital literacy, and facilitate online services. This initiative contributes to creating an environment conducive to distance learning.
3. **SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds):** SWAYAM is an online platform that offers free courses from school to postgraduate levels. It enables students to access high-quality education material prepared by experts. SWAYAM is a significant step toward democratizing education by making it accessible to a wider audience.
4. **e-Pathshala:** The e-Pathshala initiative provides digital textbooks and other educational resources to students from class I to class XII. This initiative enhances the accessibility of learning materials, especially for students in remote areas.
5. **National Mission on Education through Information and Communication Technology (NMEICT):** NMEICT aims to leverage ICT for education and enhance the reach of quality education to all corners of the country. It includes initiatives like Virtual Labs, NPTEL (National Programme on Technology Enhanced Learning), and more.
6. **Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA):** This scheme focuses on making rural households digitally literate. Digital literacy is a crucial aspect of enabling individuals to access online educational content.

It's important to note that the landscape of educational initiatives is dynamic, and new programs may have been introduced since my last update. For the latest and most accurate information, I recommend checking official government websites or recent news sources.

Problems and Prospects for the Future

Even though distant education has transformed in India, issues like internet accessibility, quality assurance, and accessibility still need to be addressed. But these problems are gradually being solved because to advancements in edtech, digital infrastructure, and 5G technology.

The advent of distance learning has promised a transformative impact on education accessibility in India. With a vast and diverse population, the traditional brick-and-mortar model faces limitations in reaching every corner of the country. Distance learning, facilitated by advancements in technology, holds the promise of bridging this gap and providing education to the masses.

Current Landscape:

- *Technological Disparities:* Despite progress, a significant digital divide exists, hindering the accessibility of online education. Many rural areas lack consistent internet connectivity and access to digital devices, exacerbating educational inequalities.
- *Quality Concerns:* While distance learning offers flexibility, concerns about the quality of education provided through online platforms persist. The absence of hands-on learning experiences and face-to-face interactions raises questions about the efficacy of remote education.
- *Inequitable Access:* Social and economic disparities further contribute to unequal access to distance learning. Marginalized communities often face barriers, such as a lack of awareness, language challenges, and financial constraints.

Challenges:

1. *Infrastructure and Connectivity:* Insufficient digital infrastructure and uneven internet connectivity in remote areas impede the seamless implementation of distance learning programs.
2. *Quality Assurance:* Ensuring and maintaining the quality of education in a virtual environment is a critical challenge. Strategies for interactive learning, assessments, and skill development need to be refined.
3. *Inclusive Policies:* Current policies may not adequately address the diverse needs of the population. Tailored initiatives for marginalized groups, differently-abled individuals, and non-traditional learners are essential.

Prospects for the Future:

1. *Digital Infrastructure Development:* Continued efforts to improve digital infrastructure, expand internet connectivity, and provide affordable devices can enhance the accessibility of distance learning.
2. *Pedagogical Innovation:* Research and development in innovative teaching methodologies, augmented reality, and virtual labs can enrich the quality of distance education, offering a more comprehensive learning experience.
3. *Inclusive Policies and Outreach:* Governments and educational institutions should formulate policies that actively address the needs of diverse learners. Outreach programs to promote awareness and facilitate participation in remote areas are crucial.
4. *Public-Private Partnerships:* Collaborations between the government, private sector, and NGOs can leverage resources and expertise to create a more robust and inclusive distance learning ecosystem.

Conclusion

The development of distance learning in India is proof of how innovation and technology can democratise education. Distance education has provided numerous people with the opportunity to pursue their educational goals, from conventional correspondence courses to interactive online programmes and MOOCs. Moving forward, the development of online learning promises to open up access to high-quality education to everyone, regardless of obstacles. While distance learning in India has made strides in advancing accessible education, challenges persist. The future lies in a comprehensive approach that addresses technological, pedagogical, and policy-related aspects, ensuring that the benefits of distance learning are equitably distributed across the diverse landscape of the country. Only through collective efforts can India pave the way for a more inclusive and egalitarian education system

In the vast and diverse landscape of education in India, the advent of distance learning has emerged as a transformative force, significantly contributing to the pursuit of accessible education and striving to bridge the gaps that have historically hindered educational equality. As we conclude our exploration of this topic, it becomes evident that distance learning has played a crucial role in democratizing education, breaking down barriers, and empowering learners across the country.In conclusion, the landscape of education in India is undergoing a paradigm shift, with distance learning emerging as a beacon of hope for a more inclusive and accessible future. The journey towards educational equality is ongoing, but the strides made in recent years demonstrate the potential of distance learning to be a catalyst for positive change. By addressing challenges, fostering technological inclusivity, and continually refining educational strategies, India has the opportunity to build a more equitable and empowered society through the transformative power of distance learning.

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EMOTIONAL INTELLIGENCE AND TEACHER EFFECTIVENESS: A CORRELATIONAL STUDY

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ABSTRACT
Numerous studies on the relationship between emotional intelligence and teacher effectiveness have been done in light of the growing demand for emotional intelligence in the educational setting. Studies have shown how important emotional intelligence is to improving teaching and learning effectiveness. This study has highlighted emotional intelligence and teacher effectiveness among higher secondary school teachers in Thoubal district, Manipur. It has also explored the relationship between emotional intelligence and teacher effectiveness. For this study, the sample of 236 higher secondary school teachers, 129 men and 107 women, was chosen using a stratified random sampling technique. Data were gathered using two questionnaires: the Emotional Intelligence Scale (EIS), developed by Anukool Hyde, Upinder Dhar, and Sanjyot Pethe and the Teacher Effectiveness Scale (TES-KU), developed by Dr. Umme Kulsum. The data were analyzed using statistical methods such as mean, graph and Pearson's product-moment correlation. The study's findings revealed that the higher secondary school teachers in the Thoubal district had the highest level of emotional intelligence and the most effective teachers. It has also shown a positive and significant relationship between emotional intelligence and teacher effectiveness.
Keywords: Emotional Intelligence, Teacher Effectiveness, Managing Relations

Introduction
The fundamental instrument for raising consciousness and reconstructing society is education. The key weapon for developing knowledge and creating society is the teacher. This goal is achieved through the teacher as the medium. Teachers must be emotionally mature since they are the ones who will rehabilitate future citizens. "A teacher's place in society is of vital importance," stated S. Radhakrishnan once. He serves as the focal point for the generational transfer of technological skills and intellectual traditions, keeping the flame of civilization alive. To be successful and productive educators, teachers must possess high emotional intelligence. Teachers serve as a guiding and directing influence on the lives of their students. He needs to encourage pupils to aim high and bring out their best qualities in them. He must encourage pupils to aim high and bring forth their best qualities. A country's future lies in students. Thus, educators play a crucial role in the growth of any country. Teachers with emotional intelligence are better equipped to handle stressful situations where their actions may affect their students' learning and well-being.

Emotional intelligence
Emotional intelligence, a relatively recent idea in psychology and education, is one of the most crucial abilities to adjust to the modern world's ever-changing circumstances. High emotional intelligence individuals have happy, satisfying lives. It is the capacity to adapt to survive, gain knowledge from events, and engage in abstract thought. It is the capacity to adapt to survive, gain knowledge from events, and engage in abstract thought. According to Salovey and Mayer (1990), emotional intelligence is the capacity to be aware of, distinguish between, and monitor one's own and other people's feelings and emotions to inform one's decisions and behaviour. Our behaviours are actively guided and directed by our emotions. Numerous studies found that an individual's emotional intelligence is responsible for 80% of their success in life, with intelligence quotient accounting for the remaining 20%. Emotional intelligence was characterized by Goleman (1998) as the ability to identify our feelings and those of others, to motivate oneself, and to manage emotions in one's own effective and one's relationships. Additionally, he has outlined the five elements that make up emotional intelligence: self-awareness, self-regulation, motivation, empathy, and social skills. The first three components are internal factors, and the last two are external factors.

Importance of Emotional Intelligence in Teaching and Learning

Having emotional intelligence is essential for teaching and learning. It involves recognizing, understanding, managing, and effectively using one's emotions and those of others. In an educational context, the importance of emotional intelligence is evident in various aspects:

1. **Building Positive Teacher-Student Relationships:** Teachers with high emotional intelligence can establish positive and supportive relationships with their students. They are more attuned to students' emotions, which helps create a nurturing and conducive learning environment.
2. **Effective Classroom Management:** Teachers with strong emotional intelligence can better manage their own emotions in challenging situations, leading to more effective classroom management. They are able to remain calm and composed, even in stressful situations, which can positively impact the overall classroom atmosphere.
3. **Understanding and Addressing Student Needs:** Emotional intelligence enables teachers to understand the diverse emotional needs of students. This understanding allows for more personalized and responsive teaching approaches, considering each student's emotional well-being.
4. **Enhanced Communication Skills:** Teachers with high emotional intelligence are often better communicators. They can convey information in a way that considers the emotional responses of their students, leading to clearer understanding and improved retention of information.
5. **Creating a Positive Learning Environment:** EI contributes to the creation of a positive and inclusive learning environment. Teachers who are empathetic and understanding foster a sense of belonging among students, making the classroom a place where students feel safe to express themselves.
6. **Promoting Social and Emotional Learning (SEL):** Emotional intelligence aligns with the goals of social and emotional learning programs. Teachers who model and incorporate emotional intelligence concepts into their teaching can help students develop their own emotional awareness, interpersonal skills, and resilience.
7. **Handling Conflicts and Challenges:** Teachers encounter various challenges and conflicts in the classroom. Emotional intelligence equips educators with the ability to navigate these situations with empathy, understanding, and effective problem-solving, contributing to a healthier classroom dynamic.
8. **Supporting Students' Emotional Development:** Education is not only about academic knowledge but also about the holistic development of students. Teachers with emotional intelligence can support students in navigating the complexities of their own emotions, helping them develop emotional resilience and self-regulation.
9. **Teacher Well-being:** Emotional intelligence is not only beneficial for students but also for teachers themselves. It contributes to teacher well-being by helping them manage stress, maintain positive relationships with colleagues, and navigate the emotional demands of the profession.
10. **Fostering a Positive Learning Culture:** A teacher's emotional intelligence can contribute to the overall culture of the learning institution. Teachers who model emotional intelligence help create a positive, collaborative culture beyond individual classrooms.

Teacher Effectiveness

The capacity of a teacher to positively impact pupils' learning and development is known as teacher effectiveness. Good teachers may captivate students, promote learning, and encourage academic and personal development. According to Borich (1996), a proficient teacher utilizes his knowledge of students' skills in the classroom; proficient teachers are aware of each student's needs and support their learning process. Positive psychological traits, attitudes, and experience are all traits of effective teachers. In addition to their practical abilities and professional qualifications, teachers' efficacy also rests on their dedication to quality work.   Effective teacher education is dependent mainly on this dedication. Therefore, encouraging teachers' professional dedication needs to be the primary focus of teacher education.

Characteristics of Teacher Effectiveness

Effective teaching is a complex and multifaceted process that involves a combination of skills, knowledge, and personal qualities. While the characteristics of effective teachers can vary, depending on the educational context and individual student needs, some common traits and practices are associated with teacher effectiveness. Here are several characteristics of effective teachers:

1. **Content Knowledge:** Effective teachers have a deep and thorough understanding of the subjects they teach. They are knowledgeable about their content area and can convey information in a clear and understandable manner.

2. **Pedagogical Skills:** Strong pedagogical skills, such as the capacity to plan and execute exciting and productive classes, are possessed by competent teachers. They are skilled in instructional methods that cater to diverse learning styles and needs.

3. **Communication Skills:** Clear and effective communication is crucial for teaching. Effective teachers can articulate ideas clearly, listen actively to students, and foster a positive and open line of communication in the classroom.

4. **Adaptability:** Effective teachers are flexible and can modify their instruction methods to suit their pupils' needs. They are responsive to changes in the learning environment and can adjust their approaches to address diverse student needs.

5. **Classroom Management:** Creating a positive and well-managed learning environment is essential. Effective teachers have strong classroom management skills, which include establishing clear expectations, maintaining discipline, and promoting a positive atmosphere for learning.

6. **Student Engagement:** Effective teachers are skilled at engaging students in the learning process. They use varied and interactive teaching methods, encourage active participation, and make learning exciting and relevant to students' lives.

7. **Building Positive Relationships:** Effective teachers establish positive relationships with their students. They create a supportive and respectful classroom culture that fosters trust and encourages students to take risks in their learning.

8. **High Expectations:** Effective teachers set high expectations for their students and provide the necessary support to help them meet them. This creates a culture of excellence and promotes student achievement.

9. **Passion for Teaching:** Passionate teachers inspire students and create a positive attitude toward learning. Their enthusiasm for the subject matter is contagious and motivates students to engage more deeply in learning.

10. **Lifelong Learning:** Effective teachers are committed to ongoing professional development. They stay current with educational research, technology, and pedagogical advancements, demonstrating a commitment to lifelong learning.

It is important to note that these characteristics are interconnected, and effective teaching is a dynamic process that requires a combination of these traits. Moreover, effective teachers continually strive to improve and adapt their practices to meet the evolving needs of their students and the changing landscape of education.

Objectives
1. To assess the levels of emotional intelligence and teacher effectiveness in higher secondary schools in Thoubal district.
2. To examine the relationship between emotional intelligence and teacher effectiveness among the higher secondary schools.

Hypotheses
1. There exist high levels of emotional intelligence and teacher effectiveness among the higher secondary schools in Thoubal district.
2. There exists a significant relationship between emotional intelligence and teacher effectiveness among the higher secondary schools.

Justification of the Study
The 21st-century educational landscape has prioritized quality over quantity. The quality of teachers determines their level of education. Artificial intelligence (AI) and robots cannot replace emotional intelligence, particularly in education, given the advancements in science and technology. As they can improve education, teachers moderate the quality of education. To face the challenges of today, the quality of teachers must rise. The qualifications and skills of the teacher determine the quality of the instruction. Since it can facilitate effective teaching and learning, emotional intelligence is highly valued in the teaching profession. It is true, as V.S. Mathews stated, "No educational system, syllabus, methodology, or textbook can rise above the level of its teachers." A nation needs excellent instructors to have a high-quality education."

The teacher's level of EQ is the most essential variable in creating a classroom environment. High emotional intelligence teachers can motivate their students better and understand their needs and feelings. It helps them to deal with different varieties of students tactfully and thoughtfully. Teaching is an emotional practice that involves

emotional relationships, understanding, and labour. Teachers' emotional competence is necessary both, in general, for their well-being and for effectiveness and quality in creating the teaching-learning process in the classroom and, in particular, for students' socio-emotional development (Sutton and Whealthy, 2003). They should know how to deal with students according to their interests, needs and feelings. They should make the lesson enjoyable so the students are eager to learn. The teacher should have positive feelings and emotions towards students to create a love for education, hope, good ideas and development. They must value emotional bonds with students and educate them on social and emotional being. Meera, T. (2017), in a study of teacher effectiveness related to cognitive style and emotional competence, found that teachers with high overall emotional competence had significantly better teacher effectiveness than secondary school teachers with low overall emotional competence.

Effective teachers should have good feelings and emotions for their students to eliminate fear and wrath from the minds of young learners. Teachers should be able to work with a variety of pupils. Their emotional intelligence enables them to handle such situations. They endeavour to comprehend and remain aware of the kids' needs, interests, and emotions. They have many roles to play in directing students' lives. They should devote their time, love, and attention to every student. Between teachers and students, a heart-to-heart contact is essential. They design the lives of the students. To meet the obstacles of the teaching-learning process, they have to be highly emotional intelligence. Effectiveness and success depend on empathy, self-control, and self-awareness.

Methodology
The descriptive survey method was adopted for the present study.

Population and Sample of the Study
In the present study, the population comprised all the higher secondary school teachers in the Thoubal district of Manipur. Of these, 236 teachers of higher secondary schools, 129 were males and 107 were females had taken part in the study to collect the data. Stratified random sampling had been used for the selection of samples.

Statistical Techniques Used
Descriptive statistics and inferential statistics like Pearson's Product-Moment Coefficient of correlation 'r' had been used to compute the relationship between the teachers' emotional intelligence and teacher effectiveness.

Tools Used
The following are the tools used for collecting data:
1. **Emotional Intelligence Scale (EIS):**
   This emotional intelligence tool was developed by Anukool Hyde, Upinder Dhar and Sanjyot Pethe. It has ten factors. They are self-awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self-development, value orientation, commitment, and altruistic behaviour. It has consisted of a 5-point scale of 1- strongly disagree, 2- disagree, 3-uncertain, 4-agree, and 5-strongly agree.

2. **Teacher Effectiveness Scale (TES):**
   The teacher effectiveness scale developed by Dr Umme Kulsum has been used to determine teacher effectiveness. It has 60 items and is administered on five areas/ dimensions, namely-
   1. Preparation and planning for teaching,
   2. Classroom management,
   3. Knowledge of subject matter, its delivery, and presentation, including B.B summary,
   4. Teacher's characteristics, and
   5. Interpersonal relations.

Data Analysis and Interpretation

Table 1: Gender-Wise Distribution of the Sample

Gender	Numbers of teachers	Percentage
Male	129	54.7
Female	107	45.33
Total	236	100.0
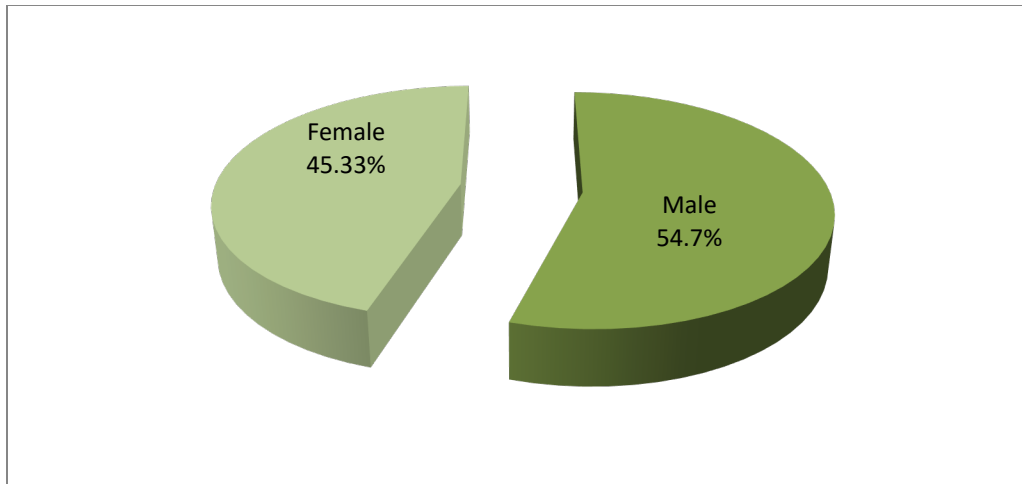
Fig. 1: Pie-Chart Representation of Gender-Wise Distribution of the Sample

Table 1and Fig. 1 show the description of gender-wise distribution of the sample. It can be interpreted that the maximum number of representative sample of the study was male (129), with a percentage of 55%   and females (107) with a percentage of 45% were minimum.

Objective 1: To assess the levels of emotional intelligence and teacher effectiveness in higher secondary schools in Thoubal district.

Table 2: Table showing the Mean Scores of Emotional Intelligence of Higher Secondary School Teachers

Sl. No.	Ten Factors of Emotional Intelligence	Mean Scores	
		Male (N₁=129)	Female(N₂=107)
1	Self-Awareness	16.84	17.06
2	Empathy	19.19	19.36
3	Self-motivation	24.53	24.72
4	Emotional Stability	16.24	16.16
5	Managing Relations	15.20	15.78
6	Integrity	12.20	12.37
7	Self-Development	8.06	8.20
8	Value Orientation	7.84	8.02
9	Commitment	8.76	8.59
10	Altruistic Behaviour	8.23	8.11
Overall		137.07	138.07

The above table 1 highlighted the levels of emotional intelligence of teachers of higher secondary schools in Thoubal district on their Emotional Intelligence Scale. It can be analyzed in the mean scores of ten factors of emotional intelligence. The mean scores of male and female teachers were: 16.84 and 17.06 for self-awareness, 19.19 and 19.36 for empathy, 24.53 and 24.72 for self-motivation, 16.24 and 16.16 for emotional stability, 15.20 and 15.78 for managing relations, 12.20 and 12.37 for integrity, 8.06 and 8.20 for self-development, 7.84 and 8.02 for value orientation, 8.76 and 8.59 for commitment, 8.23 and 8.11 for altruistic behaviour with a overall mean scores of 137.07 for male and 138.07 for female teachers.

So, it can be concluded that female teachers had slightly higher mean than the male. Considering all the factors, the higher secondary school teachers of Thoubal district exhibited high emotional intelligence and were probably the most effective.

Table 3: Table showing the Mean Scores of Teacher Effectiveness of Higher Secondary School Teachers

Sl. No.	Five Dimensions of Teacher Effectiveness	Mean Scores	
		Male (N_1=129)	Female(N_2=107)
1	Preparation and Planning for Teaching	92.27	94.21
2	Classroom Management	114.79	116.25
3	Knowledge of the Subject Matter	58.94	59.87
4	Teacher Characteristics	142.31	143.53
5	Interpersonal Relations	91.66	92.36
Overall		499.97	504.94

The above table 3 highlighted the levels of teacher effectiveness of higher secondary schools in Thoubal district on their Teacher Effectiveness Scale. It can be analyzed in the mean scores of five dimensions of teacher effectiveness. The overall mean scores of five dimensions of male and female teachers of higher secondary schools of Thoubal district were 92.27 and 94.21 for preparation and planning for teaching, 114.79 and 116.25 for classroom management, 58.94 and 59.87 for knowledge of the subject matter, 142.31 and 143.53 for teacher characteristics and 91.6 and 92.36 for interpersonal relations respectively with a mean score of 499.7 and 504.94.

Thus, it may be said that mean scores for female teachers were higher than those for male teachers. The higher secondary school instructors of Thoubal district demonstrated most teacher effectiveness and were likely the most efficient when all the factors were considered.

Objective 2: To examine the relationship between emotional intelligence and teacher effectiveness among the higher secondary schools.

Table 4: Indicating Karl Pearson's Coefficient Correlation between the Emotional Intelligence and Teacher Effectiveness

Sl. No.	Variables	Pearson Correlation (r)
1	Emotional Intelligence	**.371****
2	Teacher Effectiveness	

**Correlation is significant at 0.01 levels (2 tailed)

From the above table 4, it can be observed that there is a positive correlation between emotional intelligence and teacher effectiveness among the higher secondary school teachers in Thoubal district of Manipur(r=.371). It can be interpreted that emotional intelligence has a significant relationship with teacher effectiveness. As such, the alternate hypothesis "There exists a significant relationship between emotional intelligence and teacher effectiveness among the higher secondary schools" is accepted.

Main Findings
1. **Levels of Emotional intelligence**
   The teachers in the Thoubal district of Manipur reported high level of emotional intelligence overall among higher secondary school instructors. Compared to male instructors, female teachers' means were somewhat higher. They were sensitive to the emotions of their coworkers and students. They are better at managing stress, more positive about themselves, the school, and their families, and they have a tendency to inspire and excite their kids. They also get along well in groups.
2. **Levels of Teacher Effectiveness**
   It was shown that the teachers in the Thoubal district of Manipur had the highest level of effectiveness among higher secondary school teachers. In terms of gender, female teachers outscored male teachers in

mean scores. They have acquired the necessary proficiency in their jobs and responsibilities as well as in their personality traits, including subject-matter knowledge, classroom management, teacher qualities, and interpersonal interactions.

3. **Relationship between emotional intelligence and teacher effectiveness**

   A positive significant relationship exists between emotional intelligence and teacher effectiveness of higher secondary school teachers in Thoubal district of Manipur (r=.371). It indicates that the higher secondary school teachers with high emotional intelligence enjoy a high degree of teacher effectiveness, while the teachers with average or low emotional intelligence enjoy average and low teacher effectiveness, respectively.

Educational Implications

Maintaining excellent performance in the workplace, modeling positive behavior, and enhancing life success all depend heavily on emotional intelligence. He needs a high level of emotional intelligence in order to be a successful and insightful teacher. The growth of an educator determines the direction and well-being of a country. They are able to create excellent citizens and a decent country. Since emotional intelligence is the capacity to reason, organize, and assess work, educators should help kids expand their thinking about wholeness and rationalization. They ought to make an effort to build strong bonds with their pupils on a personal level.

It should be possible for educators, policymakers, administrators, and stakeholders to comprehend the attitudes, emotions, and feelings of their students and adjust the curriculum accordingly. The social and emotional development of the pupils should be the foundation of the curriculum. To increase their emotional intelligence, teachers can also offer a variety of programs that address social and emotional management, emotional change understanding, sensation, and emotional and social learning lessons.

It is well acknowledged that training programs serve as hubs for human development resources. In order to deliver high-quality training programs for teacher education, the training institutions must take appropriate and creative action. They must develop educators who are capable of being practical, accountable, expressive, self-assured, aggressive, emotionally secure, mature, resourceful, autonomous, in control, willing to try new things, and more accepting of change.

Conclusion

In conclusion, emotional intelligence is valuable for educators, influencing their interactions with students, colleagues, and the overall classroom atmosphere. By incorporating emotional intelligence into teaching practices, educators can enhance the learning experience and making a contribution to their students' emotional well-being and development. Since it is becoming increasingly important in teaching and learning, research has been done in these areas. Many studies findings indicated that there was a strong correlation between emotional intelligence and teacher effectiveness. Thus, the previous research indicated that the more emotional intelligence, the better the level of teacher effectiveness would be.

The current study focuses on the emotional intelligence and teacher effectiveness of higher secondary schools in Thoubal district, Manipur. It also draws attention to the possibility of a relationship between higher secondary school teachers' emotional intelligence and effectiveness. The study's main findings were that Thoubal district higher secondary school teachers possessed a high degree of emotional intelligence and were perceptive to the feelings of both their pupils and coworkers. They tend to excite and motivate their children, are better at handling stress, and were happier with their families, the school, and themselves. In groups, they also get along well. Moreover, the teachers were on level with the most effective teachers in terms of effectiveness. They have gained the requisite competence in their roles and duties as well as in their personality attributes, which include understanding of the subject matter, classroom management, teaching characteristics, and interpersonal interactions.

Additionally, the study found a significant relationship between the emotional intelligence of higher secondary school teachers and their effectiveness as teachers. The findings indicated that higher secondary teachers' effectiveness increased significantly with an increase in emotional intelligence.

Therefore, emotional intelligence has a significant influence on how teachers behave. It is the set of abilities that educators need to succeed in both their professional and teaching-learning endeavors. They ought to be capable of

managing both situations and students. Most researchers have found that emotional intelligence is an independent variable and has a significant role in the effectiveness of teachers.

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EXAMINING THE IMPACT OF SOCIAL MEDIA PLATFORMS ON THE PROFESSIONAL DEVELOPMENT OF EDUCATORS

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ABSTRACT
This considers points to examine the part of social media stages in encouraging the professional advancement of educators. In later a long time, social media has gotten to be a necessarily part of communication and information-sharing, giving educators with modern opportunities for collaboration, learning, and organizing. The research explores the ways in which educators utilize social media for their professional growth, examining the benefits, challenges in teaching practices. The study employs a descriptive survey method in quantitative research of West Medinipur as population, taking 90 teachers as sample drawn from 10 undergraduate education level institutions by random sampling. Findings from this research enhance knowledge of the changing professional development scenario in education and offer practical recommendations for educators, administrators, and policymakers.
Keywords: Social media, Professional development, Teacher Education.

Introduction
social media platforms have emerged as powerful tools for the professional development of educators. They provide a global, accessible, and customizable means of networking, learning, and collaboration. Educators are no longer limited to traditional modes of professional development; instead, they can curate their own learning experiences, engage with a diverse global community, and continuously enhance their teaching practices. Further investigation into this topic will focus on the particular ways that social media platforms are being utilized by educators, the benefits they offer, and the challenges they present in the context of professional development.

You can engage with various social networks to connect with educators and enhance your professional development:
LinkedIn: A professional platform for networking and reputation-building. It provides access to educational articles, tips, and global education updates.

Facebook: Allows individual or group connections, particularly for teachers. There are subject-specific, location-based, and curriculum-focused groups and pages to share information and content.

Twitter: Useful for quick news, asking questions, following interesting people, and participating in chats. It offers concise content and the ability to engage in discussions and debates.

Twitter chats, based on hashtags, connect educators worldwide for public conversations. You can join chats at specific times and follow hashtags for topics of interest. It's a way to learn from diverse perspectives and share your own expertise. You can use Twitter to find educators with similar interests, join chats when comfortable, use hashtags to discover topics, and engage by commenting or sharing content. Some popular education hashtags and chats include **#aussieEd** (Australian chat), **#HALTNetwork** (for highly accomplished or lead teachers), and **#PSTchat** (supporting new teachers). These platforms are valuable for professional growth and collaboration (https://www.aitsl.edu.au).

The accessibility of social media also contributes to its effectiveness in professional development. Educators can access a vast array of content at their convenience, making it possible to engage with new ideas and strategies as

time allows. Blogs, podcasts, webinars, and YouTube channels created by educators and educational experts provide an extensive library of resources that can be tailored to individual professional development needs. These digital resources cater to diverse learning preferences and can accommodate different learning styles, further enhancing their effectiveness.

The traditional landscape of professional development for educators has often been characterized by in-person workshops, seminars, and conferences. While these avenues remain valuable, the emergence of social media has provided a dynamic and versatile alternative for continuous learning and growth. Through platforms such as Twitter, LinkedIn, Facebook, and Instagram, educators are not only connecting with their peers worldwide but are also accessing a treasure trove of resources and experiences that enrich their teaching methodologies.

Additionally, the visual and interactive nature of certain social media platforms lends itself to creative expression and idea sharing. Platforms like Instagram and Pinterest allow educators to showcase their classroom setups, innovative projects, and teaching materials. By sharing their work, educators can inspire and learn from one another, fostering a culture of continuous improvement in the education community.

One of the most significant effects of social media on professional development is its ability to break down geographical barriers. Educators can now collaborate and exchange ideas with colleagues from different corners of the globe without leaving their classrooms. This globalized approach to professional development exposes them to diverse teaching philosophies, cultural perspectives, and innovative practices, ultimately enriching their own pedagogical approaches.

Twitter, for example, has emerged as a powerful platform for educators to engage in professional learning networks (PLNs). Educators can participate in Twitter chats and follow relevant hashtags to discover and share resources, research findings, and best practices in education. These online communities provide a virtual space for educators to engage in meaningful conversations, share insights, and build relationships that extend far beyond their immediate surroundings.

Review Of The Related Literature

(Ohara, 2023) explored how social media impacts education. It's a qualitative study that gathered information and analyzed it. Social media is found to play a vital role in education by facilitating the exchange of knowledge, teamwork, involvement, and career advancement. (Xu et al, 2023) looked at how social media apps like DingTalk, WeChat, and TikTok affect pre-service teachers' learning in STEM education. They collected 383 surveys and found that social media applications offer advantages as well as disadvantages effects on education. (Kotsidis & Anastasiades, 2023) explored how teachers feel about using social networks for their training, focusing on a new one called Learning Social Network (LSN). They surveyed 45 trained teachers participating in a distance learning program. The findings show that social networks, like LSN, can be used for communication, collaboration, interaction, and participatory learning, and social networking environment. (Fancera, 2020) looked at how school leaders in the United States use social media, especially Twitter, for professional growth. The study suggests that the future uilized of social media for career development may depend on whether teachers receive credit for it. (Goodyear et al., 2019) examined a Twitter-based professional learning community and its impact on teacher learning and practice. Findings revealed that #pechat functions as a community where participants engage in discussions, facilitated by moderators. The study suggests that online professional development experiences like #pechat can positively impact teacher practices and should be considered in future design. (Macia & Garcia, 2018) "bridging teachers" are involved, proactive, and actively disseminate knowledge. The research used teacher interviews, blogs, webpages, and Twitter activity to understand their practices. These teachers use participatory methods with technology in their classrooms, actively use social networking sites, and prefer Twitter for professional purposes. (Bruguera et al., 2017) examined studies conducted between 2013 and 2017 on social media and professional development. It was discovered that there is an increasing amount of interest in this subject, and that surveys are being used in many of the studies. The fields with the most research were education and health. The social media platform with the most research was Twitter. Because social media is flexible and open, it seems to be a useful tool for professional development. (Gleddie et al., 2016) suggested that for technology in education to be effective, there should be genuine networks for teachers, an understanding of power dynamics on social media, and cultural awareness. It emphasizes the importance of self-improvement and relates it to historical practices. Joey represents the increasing use of social media by physical education teachers. (Donelan, 2016) looks at how academics in the UK use social media is used professionally in higher education. Interviews and a survey were used

to study how academics use social media. They found that the more active academics are on social media, the more reasons they have to use it, including for career advancement. To improve participation, the study suggests providing training and discussing the career benefits of social media within institutions. (Davis, 2015) focused on how US school teachers view using Twitter for professional development. They used tweet data, interviews, and Twitter profiles to understand teachers' perceptions. The findings revealed that Twitter serves as a platform for teachers to share knowledge, connect with colleagues, and gain professional development. The study suggests that social network sites like Twitter can support educators and students, including those with disabilities.

Objective
1. To reanalyze the benefits of use the social media platform for professional development of Educators.
2. To find out the challenges of social media platform for professional development of Educators.

Research Questions
1. What are the benefits of use the social media platforms of educator's professional development?
2. What is the challenges face by educators when using social media for professional development?

Methodology
The study was descriptive study in which primary data was collected under descriptive survey research including the population of Educators of undergraduate education level institutions of West Medinipur district sample of 90 Educators under Random Sampling technique were taken from 10 undergraduate education level institutions at West Medinipur district in West Bengal. Data collected was tabulated in MS Excel and SPSS 22.0 was used for Items analyses, percentage and depicted using the tables and graphs.

Results And Findings Of The Study
In the present study data analysis was done as per the objective.

Objective 1: To reanalyze the benefits of use the social media platform for professional development of Educators.
To analyse the first objectives the benefits of use the social media platform for professional development of educators. The researcher used a questionnaire on Educators.

Table-1 showing the benefits of use the social media platform for professional development of Educators.

Level of Usability	Frequency	Percentage (%)
Strongly Agree	558	37.2%
Agree	642	42.8%
Neutral	45	3%
Disagree	180	12%
Strongly Disagree	75	5%
Total	1500	100

By the observation of Table-1 it was found that 37.2% Educators from 10 undergraduate education level institutions were Strongly Agree towards the use of Social Media Platforms and 42.8% Educators were belonging to Agree position and were 3% were Neutral and 12% Educators from undergraduate education level institutions were Disagree and 5% were belonging to Strongly Disagree towards social media platforms used by educators for their professional development.

So, it concluded that Educators from undergraduate education level institutions were also highly used the Social Media Platforms for professional development and for better understanding a graph is generated from the obtained data showing the use of Social Media Platforms for professional development of Educators.

Figure-1: showing the benefits of use the social media platform for professional development of Educators
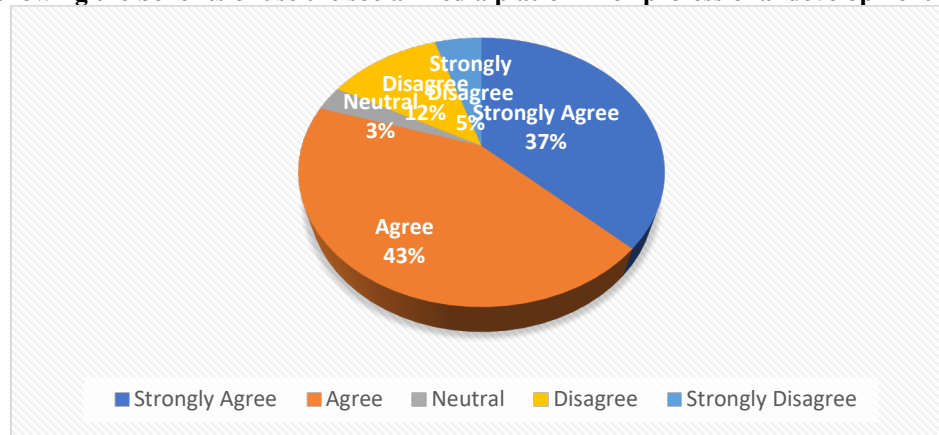
Objective 2: The challenges of social media platform for professional development of Educators.

In the present study, 90 Educators from 10 undergraduate education level institutions at West Medinipur district in West Bengal were randomly selected who were provide we open-ended questionnaire. This response often is described in this below.

While social media platforms offer numerous benefits for educators, they also present several challenges that can impact their professional development. Social media can be a significant distraction for educators. The constant influx of notifications and content may divert their attention from more productive professional development activities. Not all educators have equal access to technology or high-speed internet. This creates a digital divide that can limit some educators' ability to participate in online professional development via social media. Certain social media platforms may not be conducive to fostering an inclusive environment. Educators must navigate potential biases and exclusivity within online communities.

To address these challenges, educators should undergo training on responsible social media use, establish clear guidelines for their online presence, and stay informed about the evolving landscape of social media and education. Additionally, colleges and districts should provide support and policies to help educators navigate these challenges effectively.

Educational Implication

- Educators can access a vast array of educational resources, research, and best practices on social media platforms.
- Educators can engage in continuous learning, adapting quickly to new educational technologies and methodologies.
- Social media platforms can serve as a space for educators to reflect on their teaching practices and receive constructive feedback.
- This access enhances their knowledge base, keeping them updated on the latest pedagogical trends and strategies.

Conclusion

In conclusion, the utilize of social media platforms in the career development of educators is both significant and multifaceted. Social media has emerged as a dynamic and powerful tool that can positively impact educators' growth, collaboration, and engagement in the educational community. However, it also presents challenges that require careful consideration and strategic management. The positive aspects of social media in professional development include the accessibility of diverse resources, the establishment of global professional learning communities, and the amplification of educators' voices. These platforms offer opportunities for continuous learning, collaboration, and the exchange of innovative ideas that can enhance teaching practices and contribute to a vibrant educational landscape. Despite these benefits, challenges such as maintaining professional boundaries, addressing privacy concerns, and managing time effectively must be navigated. The potential for digital distractions, misinformation, and cyberbullying underscores the importance of thoughtful guidelines, training, and a strong

emphasis on digital literacy. Ultimately, use of social media in professional development is dynamic and evolving. With a balanced and strategic approach, educators can harness the potential of social media to foster a culture of continuous learning, collaboration, and innovation in the field of education.

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IMPACT OF COMPUTER SIMULATION IN THE BIOLOGY CLASSROOM

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ABSTRACT
This study aimed to examine the impact of computer simulation on the academic performance of secondary biology students. Conducted within authentic biology classroom settings, it involved a comparative analysis between treatment and control groups, utilizing a quantitative research approach. Two secondary schools in the Pilibhit district were selected, with one designated as the treatment group, integrating computer simulation, and the other as the control group, employing traditional teaching methods. Sixty students (30 from each school's Biology class) participated in the study, undertaking the Biology Achievement Test to assess the influence of computer simulation on their academic performance. Findings revealed significantly higher mean gains among participants in the treatment group compared to those in the control group, indicative of the positive impact of computer simulation on learning outcomes. Statistical analysis further confirmed a notable disparity in mean values between the experimental and control groups, with the treatment group demonstrating clear benefits. Consequently, the study suggests that incorporating computer simulations into traditional biology instruction holds considerable potential to enhance secondary biology education.
Keywords: Computer-simulation, traditional methods, biology classroom, secondary schools.

Introduction
The cultivation of imaginative and creative minds is one of the main goals of science education. The fact that biology studies nature as it is distinguishing it from other science disciplines like chemistry, physics, and mathematics. Therefore, it calls for both theory and a thorough understanding of all biological ideas. Research shows that even after the school day is over, many secondary students still don't fully comprehend plant tissue systems and related fundamental concepts of plant physiology. These are some topics ranked close to the top of the list that are challenging for students to understand and/or for teachers to teach. Therefore, there is a pressing need for innovative teaching strategies that might advance realism in this field.

In contemporary science education, the integration of computer simulations has become commonplace, facilitated by the widespread availability of computing devices such as smartboards and mobile technology, alongside the accessibility of simulation resources across various scientific disciplines, exemplified by platforms like PhET simulations (PhET Interactive Simulations, 2011). This proliferation prompts an inquiry into the optimal utilization of simulations to augment science instruction. Wellington (2004) posits that computer simulation stands as a highly effective pedagogical tool, yielding favorable educational outcomes within science classrooms. De Jong and van Joolingen (1998) define computer simulation as a program housing a model of a system or process, whether natural or artificial, thereby expanding the possibilities for enhanced learning experiences in scientific domains (Akpan, 2001). By actively engaging students in exploration and discovery, computer simulations have demonstrated efficacy as instructional aids, leveraging experiential learning to foster deeper understanding compared to passive modes of instruction (Akpan, 2001).

 The transformative potential of computer simulations in biology education is underscored by Nireti, Morenike, and Joyce (2014), who highlight their capacity to positively influence students' attitudes towards biology while serving as effective teaching instruments in classroom settings. Additionally, Guy and Lownes-Jackson (2015) assert that computer simulations stimulate student interest and active participation, bolster memory retention, and afford opportunities for affective and behavioral learning, further reinforcing their pedagogical value. In sum, the strategic integration of computer simulations holds promise for enriching science education by offering immersive and interactive learning experiences that resonate with contemporary pedagogical paradigms.

Computer simulations offer a multifaceted approach that surpasses the limitations of traditional methods by providing dynamic, visually compelling representations, particularly beneficial in illustrating the intricate dynamics of plant tissue systems. Given these advantages, computer simulations hold significant promise as a pedagogical tool for teaching plant tissue systems within the realm of school biology. To address these pedagogical potentials, the study outlined in this paper was formulated to investigate the impact of computer-mediated simulations on students' academic performance, perceptions of the biology classroom, and attitudes toward the subject matter.

Educators may opt to integrate computer simulations into their teaching practices for several reasons. These include efficiency gains, as simulations reduce the time required for setting up and overseeing experimental setups. Additionally, the flexibility inherent in simulations facilitates rapid hypothesis formulation and testing by enabling swift manipulation of experimental variables. Moreover, the availability of diverse visual aids, such as graphs and diagrams, enhances comprehension and aids in conceptual understanding (Blake & Scanlon, 2007).

Research problem
Are there significant differences in learning outcomes between students who experience traditional teaching methods versus those exposed to a curriculum enriched with computer simulations?

Significance of research
- Educational institutions commonly allocate resources towards educational technology initiatives. The outcomes of this study, which assesses the comparative efficacy of digital simulations versus conventional methodologies in enhancing student outcomes, offer valuable insights for optimizing resource allocation strategies.
- Empirical evidence from the study underscores the positive impact of computer simulations on student engagement and enthusiasm in the learning process. This substantiates the case for integrating such technologies into educational frameworks to enhance overall learning experiences.
- The study outcomes serve as a significant resource for policymakers and educators seeking to gauge the efficacy of computer simulations in enhancing student learning outcomes. Informed decisions pertaining to curriculum design and the integration of technology within educational contexts can be better formulated with the insights garnered from this research.

Objectives of research
- The primary objective is to evaluate the impact of computer simulations on students' comprehension of complex biological concepts.
- The study aims to scrutinize disparities in learning outcomes between cohorts utilizing computer simulations and those employing conventional pedagogical methods.
- An integral aspect of the investigation involves assessing the levels of motivation and engagement exhibited by students within biology classrooms facilitated by computer simulations.
- The study seeks to explore the potential of computer simulations in fostering long-term retention of biological concepts among students.

Hypotheses of research
1. There exists no statistically noteworthy variance in the academic achievement of students within the treatment group from the pre-test to the post-implementation assessment subsequent to their exposure to the topic via computer simulation.
2. No statistically significant disparities are evident in the pre-test and post-implementation achievement scores of the control group students following their instruction utilizing traditional teaching methodologies.
3. The analysis reveals no statistically significant discrepancies in the post-implementation achievement scores between the treatment group students, who were instructed using computer simulations, and the control group students, who underwent traditional teaching methodologies.

Literature review

Sr. No.	Paper	Insights
1	Lara, K., Smetana., Randy, L., Bell. (2012). Computer	The document provided does not

	Simulations to Support Science Instruction and Learning: A critical review of the literature. International Journal of Science Education, doi: 10.1080/09500693.2011.605182	specifically delve into the direct influence of computer simulations within the biology classroom. Instead, it centers on the broader efficacy of computer simulations as a tool for enhancing science education and learning outcomes across various contexts.
2	Tomáš, Helikar., Christine, E., Cutucache., Lauren, M., Dahlquist., Tyler, A., Herek., Joshua, J., Larson., Jim, A., Rogers. (2015). Integrating Interactive Computational Modeling in Biology Curricula. PLOS Computational Biology, doi: 10.1371/JOURNAL.PCBI.1004131	In this paper emphasis is placed on the utilization of the Cell Collective platform as an instructional resource aimed at augmenting student engagement and comprehension in biology coursework. It posits that computational modeling and software applications offer novel avenues for pedagogical innovation within biology education.
3	Tahir, Atici., Ahmet, Gökmen., Tuğba, Tafli. (2016). Application and evaluation of biology laboratory experiments with computer-based digital experimental tools. journal of new results in science, doi: 10.14687/JHS.V13I3.3953	The document explores the utilization of computer-based digital experimental tools within biology laboratories and their potential impact on students' self-efficacy and attitudes towards science learning. Notably, it does not singularly focus on the specific implications of computer simulation within the educational landscape of biology classrooms.
4	Orna, Zeira. (2016). Computerized Simulation as a Meaningful Learning Factor in Biology Teaching. American Journal of Educational Research, doi: 10.12691/EDUCATION-4-10-8	The paper delves into the integration of computer simulation as a teaching methodology within biology lessons, citing its potential to enhance students' mastery of content and analytical skills, particularly in modules such as "The Immune System - Models and Simulation." However, it does not exclusively address the ramifications of computer simulation within the broader educational framework of biology classrooms.
5	Hillary, Swanson., Gabriella, Anton., Connor, Bain., Michael, S., Horn., Uriel, J, Wilensky. (2017). Computational thinking in science classroom.	The document investigates the effects of a computationally-enriched science curriculum on students' development of computational thinking practices within a biology classroom setting. Nevertheless, it does not explicitly examine the isolated impact of computer simulation within the educational domain.
6	Dhanush, Kumar., Pratheeksha, Subramanyan., Amitha, Prasad., Athira, Kaimal., Aiswarya, Santhosh., Bipin, G., Nair., Krishnashree, Achuthan., Shyam, Diwakar. (2018). Mathematical Models as Bioscience Educational Informatics Tools. doi: 10.1109/ICACCI.2018.8554810	The document offers insights into various facets of utilizing computer simulations within bioscience education, particularly through the integration of mathematical models as virtual laboratories. However, it does not explicitly delve into the specific implications of computer simulation within the confines of the biology classroom.
7	Gavin, A., Buxton. (2018). Mathematical Modelling and Computer Simulations in Undergraduate Biology Education. Spreadsheets in Education,	The paper explores the role of computer simulations in undergraduate biology education, highlighting their significance in acquainting students with mathematical

		modeling and computational thinking methodologies.
8	Erin, N., Bodine., Robert, M., Panoff., Eberhard, O., Voit., Anton, E., Weisstein. (2020). Agent-Based Modeling and Simulation in Mathematics and Biology Education.. Bulletin of Mathematical Biology, doi: 10.1007/S11538-020-00778-Z	The document discusses the utilization of agent-based models (ABMs) as potent tools for modeling, applicable across both biology and mathematics classrooms. Nevertheless, it does not directly tackle the ramifications of computer simulation within the specific context of the biology classroom.
9	Julian, Fischer., Nils, Machts., Till, Bruckermann., Jens, Möller., Ute, Harms. (2022). The Simulated Classroom Biology - A simulated classroom environment for capturing the action-oriented professional knowledge of pre-service teachers about evolution. Journal of Computer Assisted Learning, doi: 10.1111/jcal.12718	The paper outlines the development of Simulated Classroom Biology (SCRBio), a simulated learning environment designed to evaluate pre-service biology teachers' pedagogical content knowledge (PCK) concerning evolution. Notably, it does not expound upon the impact of computer simulation within the educational framework of biology classrooms.
10	Hongxia, Li., Aidong, Fang. (2022). The Application of Computer Virtual Simulation Technology in General Biological Experiment Teaching. doi: 10.1145/3582580.3582599	The document addresses the application of computer virtual simulation technology within experimental teaching in general biology. However, it refrains from specifically addressing the implications of computer simulation within the educational domain of biology classrooms.

Methodology
Research design
This research adopts a quantitative approach within a quasi-experimental framework, incorporating factors such as dependent and independent variables along with measurement mechanisms. The independent variables in this study encompass computer simulation-based learning and traditional teaching methods, while the dependent variables pertain to the academic achievement and retention of biological concepts among students.

Sample selection
The trial took place in two schools within the Pilibhit district, with one designated as the treatment group exposed to computer simulation and the other as the control group receiving instruction through traditional teaching methodologies. Utilizing a random sampling technique, a total of 60 ninth-grade biology students (30 from each school) were selected from the accessible population to participate in the study.

Tools and tool development
The research employed pre- and post-tests utilizing the Biology Achievement Test, which comprised two written exams created by the researcher. Each exam consisted of 50 multiple-choice questions (MCQs) covering topics presented in classes across the experimental (computer simulation-exposed) and control groups (utilizing traditional teaching methods). Four possible answers were provided for each question, with a maximum score of 50 for both assessments. The instrument underwent validation by five professionals experienced in teaching biology at the secondary level. The primary objective of the study was to gather quantitative data to impartially evaluate the impact of computer simulation on student learning outcomes.

Data collection method
The research instrument utilized in this study, the Biology Achievement Test (BAT), served as a robust tool for data collection. Given the experimental nature of the study, employing both pre- and post-test designs was deemed appropriate. Prior to instruction on the designated topic, a pre-test was administered to assess baseline knowledge across both control and treatment groups.

Following instruction, a post-achievement test was promptly administered to students in both the control and treatment groups, who were taught the same topic through traditional teaching methods and computer simulations, respectively. This post-test aimed to evaluate and juxtapose the learning outcomes between the two groups.

Data analysis technique

To ascertain variance between pre- and post-test mean scores within each group, the t-test was utilized. Both paired and unpaired samples t-tests were employed for data analysis, with a significance level set at $p < 0.05$, ensuring a confidence level of 95%.

Results

Presentation of findings

The Biological Achievement Test (BAT) was administered to a total of 60 students drawn from two distinct schools: 30 students from a school exposed to computer simulation comprised the treatment group, while another 30 students from a separate school served as the control group, instructed via traditional methods.

Table 1 delineates the specific analytical approaches applied to address each of the study's research questions.

No.	Research question	Data analysis technique
1.	Is there any difference in treatment group students' achievement between the pre-test and post achievement test after learning the topic with computer simulation?	Paired Samples t-test
2.	Is there any difference between the pre-test and post achievement test scores of the control group students after learning the topic with traditional teaching methods?	Paired Samples t-test
3.	Are there any differences in the post achievement test scores between the treatment group students who learnt with computer simulation and control group students who learnt with traditional teaching methods?	Unpaired samples t-test

Table 1: Scientific methods used for the analysis

Data analysis and interpretation

Group	Test	n	mean	SD	t-test	df
Computer Simulation (treatment group)	**Pre-test**	30	25.83	4.04	2.65223E-12	59
	Post-test	30	38.36	4.17		

Table 2: Results of paired samples t-test for treatment group

In Table 2, the pre- and post-test results of students within the treatment group are juxtaposed, with analysis conducted utilizing a paired t-test. The resulting significant p-value of 2.65223E-12, well below 0.05, underscores an observed mean difference of 12.53, indicative of notable enhancement in students' academic performance facilitated by computer simulations.

Group	Test	n	mean	SD	t-test	df
Traditional method (control group)	**Pre-test**	30	23.33	5.59	7.21102E-11	59

| Traditional method (control group) | Post-test | 30 | 30.36 | 4.21 | | |

Table 3: Results of paired samples t-test for control group

In Table 3, a comparison between the pre- and post-test scores of students within the control group is presented, with analysis conducted utilizing a paired t-test. The obtained p-value of 7.21102E-11, indicating significance below the 0.05 threshold, suggests a meaningful increase in student achievement, evidenced by a mean difference of 7.03. This implies a positive influence on academic performance resulting from conventional teaching methodologies.

Groups	Test	n	mean	SD	t-test	df
Computer Simulation (treatment group)	Post-test	30	38.36	4.17	6.51437E-10	59
Traditional method (control group)	Post-test	30	30.36	4.21		

Table 4: Results of unpaired samples t-test for both group

Moving to Table 4, a comparison of post-test results between students in the treatment and control groups is provided. An unpaired t-test was utilized for analysis, yielding a significant p-value of 6.51437E-10, indicative of a notable disparity between the post-test achievement scores of the treatment group and those of the control group. Notably, the treatment group, as evidenced by a mean difference of 8.0, exhibited superior performance, suggesting the efficacy of employing computer simulations for instruction within Biology classrooms.

Support for the research questions or hypotheses

H1-Regarding the hypothesis (H1) concerning the absence of a significant difference in achievement among treatment group students between pre-test and post-achievement tests following instruction with computer simulations, the null hypothesis was rejected. Consequently, a substantial disparity in achievement among treatment group students between pre-test and post-achievement tests subsequent to instruction with computer simulations was confirmed.

To investigate further, a paired sample t-test was employed to analyze pre-test and post-achievement test outcomes for treatment group students. Results from this analysis revealed a significant difference in academic performance, indicating enhanced achievement among students who received instruction utilizing computer simulations. Detailed outcomes of the paired sample t-test for treatment group students are outlined in Table 2.

Table 2 illustrates that post-achievement test mean scores for treatment group students utilizing computer simulations were significantly higher than their pre-test results, underscoring the efficacy of computer simulations in bolstering student performance, comprehension, and biological proficiency.

H2- Assessing the discrepancy between pre-test and post-achievement test scores within the control group following instruction with traditional teaching methods, our null hypothesis stipulating no significant difference was dismissed, as evidenced by the paired t-test yielding a p-value below the predetermined significance level of 0.05. Thus, a notable disparity between pre- and post-achievement test scores among control group students emerged subsequent to instruction with traditional teaching methods. This hypothesis was rigorously evaluated via a paired samples t-test, elucidating the distinctiveness in achievement levels within the control group across the two testing instances. Detailed findings of this analysis are delineated in Table 3, underscoring the notable improvement in post-test mean scores relative to their pre-test counterparts. Consequently, it can be inferred that traditional teaching approaches not only facilitated better comprehension but also enhanced overall performance among students.

H3- Exploring the variance in post-achievement test scores between treatment group students, who received instruction via computer simulation, and their counterparts in the control group, instructed using traditional teaching

methods, our null hypothesis positing no significant differences was invalidated, as denoted by the unpaired t-test returning a p-value below the predefined significance threshold of 0.05. Thus, a discernible dissimilarity in post-achievement test scores between the treatment and control groups surfaced, indicating the superior efficacy of computer simulation-based instruction in Biology. Noteworthy mean disparities in post-achievement test scores further corroborated this finding, with treatment group students exhibiting a substantial improvement of 8.0 points more than their counterparts in the control group. These outcomes collectively underscore the enhanced performance and achievement witnessed among students instructed through computer simulation-based methodologies, positioning it as a more effective pedagogical approach for Biology education vis-à-vis traditional teaching methods.

Discussion
The study underscores the positive influence of both computer simulation and traditional teaching methods on Biology students' learning outcomes, encompassing achievement and memory retention. Through rigorous statistical analysis, the efficacy of these instructional approaches on students' post-achievement is substantiated. Notably, both the treatment and control groups exhibited notable improvements in their post-achievement test scores compared to their respective pre-test performances. These findings underscore the efficacy of both computer simulation and traditional teaching methods in enhancing students' comprehension, performance, achievement, and memory retention within the biology classroom.

However, a crucial distinction emerged upon further analysis, indicating a significant disparity in achievement and memory retention between students instructed via computer simulation and those taught through traditional methods. Notably, the cohort exposed to computer simulation demonstrated markedly higher scores in the post-achievement test relative to their counterparts educated through traditional pedagogical approaches. This highlights the superior efficacy of computer simulation in bolstering students' achievement and memory retention in the biology classroom compared to traditional teaching methods.

Comparison with existing literature
The findings of this study align with previous research conducted by Dikinson (n.d.), Chen (2002), and Stafford, Goodeough, and Davies (2010), which corroborate the efficacy of computer simulations in enhancing student learning outcomes. Of particular relevance is Dikinson's investigation into "the effect of computer simulated experiments on high school biology students' problem-solving skills" at Texas State University–San Marcos, which provides valuable insights into the benefits of utilizing computer simulations as a pedagogical tool in the field of biology. Dickinson's study highlights the superiority of computer simulations over traditional teaching methods in improving student learning outcomes.

Similarly, Jimoyiannis and Komis (2001) conducted a study contrasting students instructed in a typical classroom setting with those exposed to a combination of traditional teaching methods and computer simulations. Their research focused on the impact of this intervention on students' comprehension of fundamental kinematics concepts related to motion through Earth's gravitational field. Students who supplemented their conventional instruction with computer simulations exhibited notably higher performance on research tasks, suggesting the potential of computer simulations to enhance understanding of complex concepts such as acceleration and velocity. As such, the researchers advocate for the integration of computer simulations as a supplement or replacement for traditional teaching methods to facilitate deeper comprehension among students.

Implications of the study
The outcomes of this study yield a range of educational insights regarding the integration of computer simulations within secondary biology classrooms. Computer simulations offer dynamic and visually stimulating learning experiences that have the potential to enhance student motivation and engagement. The findings affirm that the incorporation of computer simulations aids in simplifying complex biological concepts. Furthermore, the study underscores that integrating simulations into the curriculum promotes critical thinking and the practical application of learned concepts.
Teachers are encouraged to adapt their pedagogical strategies to accommodate the diverse needs of students and foster an inclusive learning environment. Considering the evolving demands of both the workforce and higher education, educational institutions may find value in integrating these simulations into their curricula.

Limitations of the research

One limitation of this study is its reliance on a small sample size, consisting of only two secondary schools. Expanding the study to include a broader range of secondary schools could provide further insights. Additionally, exploring the impact of computer-based simulations on students' comprehension across various disciplines presents an intriguing avenue for future research.

Conclusion
While both traditional teaching methods and computer simulations offer benefits in biology education, this study suggests that computer simulations demonstrate superiority in facilitating learning outcomes. However, further investigation is warranted to explore the longitudinal effects of utilizing computer simulations in the teaching and learning process.

Recommendations for the future research
Future research endeavors should consider conducting longitudinal studies to assess the sustained impact of computer simulations on student learning. Moreover, employing a combination of quantitative and qualitative research methodologies can offer a comprehensive understanding of the teaching and learning dynamics associated with computer-based simulations.

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LANGUAGE LEARNERS OF THE DIGITAL AGE: "LEARN TURKISH WORDS AND VERBS WITH FLASHCARDS FOR ANDROID"

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ABSTRACT
In the 21st century, the use of digital technologies has become widespread and has become an integral part of life in every field. This has given rise to a new generation, Generation Z, who not only participate in life in the digital age but also grow, develop, and live with the profound effects of these technologies. Their career expectations and learning situations are markedly different from those of previous generations. As Generation Z enters the business world, the notion that decisions will be made by systems and artificial intelligence, thereby potentially reducing the challenges they face, becomes more prominent.

Although there has been no radical change between generations, significant educational advances have occurred. The changing world, economic conditions, and business life have required individuals not to stay in a fixed place in terms of education but to improve themselves and progress cumulatively. The number of individuals who attend university after compulsory education and then obtain master's and doctorate degrees for better job opportunities is increasing as Generation Z comes. The most important reason for this is that business areas prefer individuals who are equipped in every field. The new generation in the digital age is the first to grow up with digital technology.

Today, digital media is an essential tool for language learners of the digital generation. It contains unlimited and very different materials for teaching/learning both language and grammar. A more important feature of digital media is that it attracts students' attention with its applications used in language teaching. This research explains generational theories and language learners of the digital age with the sample application "Learning Turkish Words and Verbs with Flashcards for Android."

Keywords: Digitalization, Generations, Turkish, Language Teaching, Digital Language Teaching Tools.

Introduction

The 21st century is an age surrounded by technology, and we are immersed in technology in every field. We can define groups consisting of individuals who live in the same periods and have common characteristics with different generations. Generation classification in the 21st century is done as Traditionalists, Baby Boomers, Generation X, Y, Millennials, and Generation Z.

People's perceptions, expectations, priorities, perspectives on life, and behaviors change depending on the concept of time. The fact that people born in close periods have similar characteristics and each generation has different characteristics has led researchers to be interested in the concept of generation and the characteristics of generations.

Different definitions between disciplines are observed when the historical development of generation perception is examined. Academic studies on this subject vary according to the literature. The concept of generation that emerges due to inter-individual differences has enabled the emergence of important research areas in disciplines such as historical, sociological, psychology, and management science. Thus, from studies conducted worldwide, generational distinctions have been defined based on country and cultural differences, allowing classifications to be made according to cultural phenomena. The literature shows that these classifications and historical ranges differ according to social events and cultural influences. Generations with different characteristics living together and sharing their cultural riches and collective consciousness have brought about many problems and conflicts, especially communication problems (Joshi et al., 2011).

Although there has been no radical change between generations, significant progress has been made in education. The changing world, economic conditions, and business life have required individuals not to stay in a fixed place in terms of education but to improve themselves and progress cumulatively.

With the rapid development of technology, there have also been significant changes in the field of education. Language teaching, in particular, is being reshaped by the opportunities brought by the digital age. Traditional Turkish language teaching methods are based on printed materials such as textbooks, paper, and pencils. However, with the digital age's interactive media and software tools, students' language learning experiences are greatly enriched. For example, thanks to language learning applications, students can improve their vocabulary, reinforce grammar rules, and practice through interactive games.

In the digital age, interaction outside the classroom is also gaining importance. Virtual classroom environments effectively allow students to improve their language skills. Live lessons with video conferencing tools allow students to interact with each other and their teachers in real-time. Additionally, students are encouraged to improve their writing skills through online discussion forums and blogs.

With the widespread use of the Internet, various digital content and resources for Turkish language teaching have become easily accessible. Students can improve their language skills using online dictionaries, grammar resources, and media content. Additionally, accessing Turkish literature through digital libraries can make language learning more enjoyable.

The digital age allows for the customization of learning experiences. It is possible to offer customized learning programs and materials according to student's interests, language skills, and learning speed. In this way, each student can follow a learning path that suits his or her needs and learn a language more effectively.

Content of the Concept of Generation

The concept of generation is a set of individuals forming age groups of approximately twenty to twenty-five years. The words generation or generation are also used instead of generation. Turkish Language Association Dictionary of Philosophical Terms defines the concept of generation as a group of people who were born in approximately the same years, had the conditions of the same age, therefore experienced similar troubles and destinies, and were obliged to similar duties (https://sozluk.gov.tr/). In other words, generation refers to a structure that is similar in many aspects (years of birth, the society in which one was born and the cultural climate of that society, the economic, political, legal, and social movements and understandings, value judgments, behavior, and attitude patterns prevailing in the relevant year intervals). In this context, each generation has different qualities and criteria for evaluating events and facts, as well as positive and negative sides (Keleş, 2011: 131).

In Turkish culture, the concept of generation is expressed as a group of individuals united in new ways, with a new understanding and a new sense of life, and who were separated by clear lines in the past. These explanations show us that generations are groups of individuals who live in the same periods and have common characteristics. When grouping different generation groups, looking only from an age perspective is not a sufficient phenomenon to explain generation differences and their relationships with other generations. In order to make sense of the perspectives and working styles of different generations and to ensure the construction of a healthy cultural structure, defining the thoughts, feelings, and experiences of the community that makes up the generations should also be used to classify them (Zemke et al., 2013; 4). Working styles shaped by momentous events, social trends, and organizational cultures arise from generational differences. However, each generation develops its unique perspective on right and wrong in that job and creates its rights and wrongs accordingly (ERC Report, 2011). This situation affects the organizational culture and forms the basis of cultural differences and communication problems between generations working together in organizations.

On average, a new generation is born every twenty years and has typical desires, needs, motivations, and actions. The concept of generation and its classification are the subject of different interdisciplinary research today. Additionally, the classification and perception of generations varies from culture to culture. In this research, generation concepts will be explained through the concepts of Traditional, Baby Boom, X, Y, Millennium, and Z Generation. Each generation has its characteristics, values, judgments, attitudes, strengths, and weaknesses. However, it should not be forgotten that there are stereotypical expressions when explaining each generation. Moreover, while defining generations within a group, we cannot state that everyone has every characteristic (Lower, 2008).

Method

To show the function of WEB 2.0 tools in the language teaching process of language learners of the digital age: "In this research, which aims to provide information about Learn Turkish Words and Verbs with Flashcards for Android and to teach language to the digital generation with this application, the document analysis method was used. *Document review* is a technique that includes the analysis of materials containing information about the phenomena targeted to be investigated (Şimşek and Yıldırım, 2016). "Document analysis is a systematic method used to examine and evaluate all documents, including printed and electronic materials. Like other methods used in qualitative research, document analysis requires examining and interpreting data to derive meaning, create an understanding of the subject, and develop empirical knowledge." (Corbin and Strauss, 2008; cited in Kıral, 2020: 173).

Generation Theories

Generation theory and generation reality are pretty old. They have been discussed in different parts of the world and have been the subject of scientific research. Examinations are made on age groups, taking into account social, psychological, economic, and geographical factors, and results are to be obtained with scientific data on these groups' perspectives on life, their reactions, expectations, and perceptions of life.

Each country's generation development is different. Generational characteristics are affected by countries' socio-cultural characteristics and development levels. For this reason, countries should carry out generation studies by considering their social characteristics.

Traditionalists Generation

The traditionalist generation includes individuals born between 1900 and 1945. This generation, consisting of loyal, consistent, and harmonious individuals, was born during World War II. It emerged during World War II and consists of individuals who obey the rules (Kyles, 2005, 54). This generation, also known as the Silent Generation or War Generation, was caused by unemployment worldwide, causing people to save money and live a simple life (Demirkaya, Akdemir, Karaman, and Atan, 2015, 188).

The psychology of parents who lived in this period of high social disintegration and who raised the silent generation was greatly affected. This generation, which experienced the crush of destruction and the happiness of the Republic, gave great responsibility to the generation it raised. The post-1920 generation is called the "Republic Generation" in Turkey.

The common perception of this generation is to preserve what exists to exist. That is why they stuck to the rules. However, they did not favor radical changes in the traditions of the years and sometimes opposed them. The technological device that this generation has is the radio. It is a generation that started to develop in almost every field with the Republic and is proud of it. While the state tries to reach every part of the country, education and awareness also come to the fore in this period. (Yalçın et al., 2013, 140-141).

Traditionalist Generation II. In World War II's destructive atmosphere, he struggled to survive above all else. It is essential to examine other generations after this generation. The "Cold War" period began when the world was divided into Western civilization, the Eastern Bloc, the Islamic world, and the Third World. During this period, pop culture expanded its sphere of influence with the support of the media (Senbir, 2004, 22-23).

Baby Boomers

They are children of the Cold War period born after the war between 1945 and 1965. This generation, also called the Sandwich Generation, is a generation that is prone to spending and having fun, feeling the longing for growth, prosperity, goods, and services. In the communist bloc, anti-Western policies maintained their validity throughout this generation. The baby boom generation is the generation that was born and grew up in the East-West opposition and created the 68 generations (Kupperschmidt, 2000, 69; Senbir, 2004, 23-24).

The most important feature that brings this generation to a different point among all generations is that they are the architects of the legendary 68 generation. The 68 generation is the first generation that grew up with television and realized that television is an effective means of communication. This awareness made it easier for them to move the movement, which started at a local level, to a global dimension through television (Benlisoy, 2008, 31; cited in Altuntuğ, 2012, 205). Baby boomers do not face problems like their parents. They grew up during a period of significant economic growth and prosperity. They attach great importance to youth, health, personal satisfaction, and wealth (Clausing, Kurts, Prendeville, and Walt, 2003, 373).

This generation grew up in a period of continued economic and educational growth and was educated in the traditional system with well-prepared teachers and rigorous academic standards. They graduated in primary school based on their ability to share and work together. At university, they studied humanities. It is a workaholic generation that is willing to work. (Kupperschmidt, 2000, 68-69). One-quarter of this generation with high education levels has undergraduate and graduate degrees (Crumpacker and Crumpacker, 2007, 353).

Generation X

Generation X, born between 1965 and 1977, is also called the Lost Generation. This generation, living with anxiety about the future, is more focused on working, making a career, and making money. For Türkiye, this generation is defined as "Transition Period Children."

This generation was introduced to technology and incorporated it into their lives at a late age. These individuals, raised by the Silent Generation and the Baby Boom Generation, have developed their ability to take

responsibility and work productively individually due to the education they received and the reflections of the conditions experienced by the educators. Raised by generations that grew up with problems, these individuals also have strong problem-solving skills. Their perspective on life is result-oriented rather than process-oriented. (Yalçın et al., 2013, 150).

They are the first generation to have a personal computer and the internet. Members of the generation are resourceful and independent. This independence has been taken to new dimensions with technological progress. Education is necessary for this generation (Clausing et al., 2003, 373; Crumpacker and Crumpacker, 2007, 354; Kupperschmidt, 2000, 69). This generation, which has witnessed essential changes in Turkey and the world, has witnessed the spread of television in Turkey, the transition to color television, and the emergence of the computer (Yalçın et al., 2013, 148-149).

Generation Y
This is the generation born between 1977 and 1994. This generation, also known as the Future Generation, Digital Generation, Copy Boom, Net Generation, and Indigos, is called the "Post-80 Generation" in Turkey. Generation Y children are good with technology, individual, comfortable, and the children of a world that is beginning to globalize. It is also the generation in which the reflections of the contented and idealistic spirits of their older brothers and sisters, the Xs, continue. (Demirkaya et al., 2015, 189; Senbir, 2004, 25).

Individuals of this age do not see computers and other electronic devices as technology because they have been in them and have had them since they were born. Generation Y sees higher education as expensive. Employees of this generation work in workplaces with high-quality education and several educated people, but they need better communication and problem-solving skills (Crumpacker and Crumpacker, 2007, 354).

Generation Y in Turkey has developed in parallel with the world and is accompanied by global developments. In Turkey, as in the rest of the world, members of this generation attach importance to factors such as trying new things, success, and earning money. This versatile generation has quickly come to the fore in family and business life. While this generation obtains information cheaply and effortlessly thanks to technology, it has made the position of educators difficult, and "information has begun to lose its sanctity." The role of educators has turned into a position of guiding, guiding, and leading rather than teaching (Yalçın et al., 2013, 153).

Millennials
These are children born between 1994 and 2003. They are the first interactive generation, which is also called the "Digital Generation" in Turkey. This generation is not only intertwined with technology but also with technological, individualistic, and fastidious global citizens.

Millennial children mainly connect to the internet to download games. They use their own coded language of abbreviations. Millennial children prefer to correspond rather than talk, even if they sit beside each other. Most of these children are sensitive about nature and are reactive to the brands of institutions that harm nature. Millennials, the older brothers and sisters of the Z babies, are the most interactive and international generation to date. (Senbir, 2004, 58-59).

Generation Z
Generation Z, the first cohort of the 21st century, born in 2003 and later, exhibits a unique set of characteristics. Their reliance on the internet is striking, a trait that sets them apart from previous generations. They are avid followers of technological advancements, engaging in uninterrupted communication through various channels such as mobile phones and social networking sites. This generation is not only vocal about their desires but also enjoys continuous and enhanced access to information.

After 2000, technology progressed and reached its peak worldwide. The main feature that distinguishes Generation Z, which emerged in this period, from other generations is that they are very ambitious. Another difference from other generations is that they can receive information very quickly, analyze it, and comment on the subject (Mishra et al., 2012: 97).

Generation Z is at the very center of the internet. This generation uses technology very well and is younger than other generations. In particular, they can perform their daily tasks quickly and easily and perform many tasks simultaneously, which puts them one step ahead of other generations.

Generation Z individuals, who see the time they spend away from the internet and social media as a waste, are speedy in speaking, learning, thinking, growing, and consuming. These individuals have much higher IQ, self-

confidence, and ability to handle multiple tasks simultaneously than previous generations. Therefore, the education methods of previous generations need to be improved for this generation's individuals. When a school-age individual Z does not do his homework, his reason is "I got sick, I couldn't do it." not, "My internet connection was broken, I couldn't do it." this has changed too. The abundance of opportunities offered by technology, lack of concentration and carelessness, and the fact that they do not care about the concept of authority compared to other generations show that different education models should be developed for the individuals of this generation (Oyman, Orkun and Turan, 2013, 80-81; Saniyer, 2015, 33).

In today's world, factors such as technology, evolving social values, changing career perceptions, and shifting education and working conditions necessitate a multidimensional evaluation of generations. The field of education has witnessed a rapid increase in generation studies, particularly in light of the profound influence of technological advancements on the lifestyles of different generations. It is crucial for educators and researchers to understand and adapt to these changes, as they significantly impact education and students.

Language Learners of the Digital Age: "Learn Turkish Words and Verbs with Flashcards for Android"
Changing world conditions and technology making its presence felt in every field, as well as the increase in the level of welfare and lifespan of people, cause generations to stay in business life for a long time and to stay in business life even after retirement. There are members of different generations in institutions, including the silent Generation, baby boom generation, Generation X, and Generation Y, most of whom are retired (Becerikli, 2013: 6). While some of Generation Z are actively involved in business life, some of them are looking for a job.

Members of the traditional Generation represent the oldest group in today's business life. The work values of this Generation in business life are their respect for authority, the importance they attach to honesty, and their ability to postpone satisfaction rather than reach it immediately. The Baby Boom generation, like the employees of the Silent Generation, experienced the poverty periods and hardships of the post-war period. Members of this Generation have turned to jobs where they feel more valuable in their careers. They have excellent knowledge of business life. However, they expect their thoughts and decisions to be approved and appreciated by generations X and Y (Erden Ayhün, 2013: 104).

The life characteristics of Generation According to the Baby Boom generation, are the independent Generation, loves autonomy, is technically skilled, and tries to create a work-life balance in addition to being self-confident (Kerse, 2016: 6). Generation Y has high expectations from life, is seen as the youngest Generation, the one with the best relationship with media and communication, the essential freedom, and the most consumerist Generation compared to other generations (Acılıoğlu, 2015: 40-47). Therefore, they need to be part of a team and work with a team. They are individuals who take care to use existing technology in the best way possible in their work and who can multitask with high adaptability. Since Generation Y wants to continue their development in business life, their motivation can be kept high with various projects, training programs, and personalized career plans. They want to rise to the top in a short time, thinking that they can learn quickly and get used to it quickly. Members of this Generation want to establish their own businesses where they can use their talents, highlight their creativity, and freely evaluate their ideas, instead of the rules set by others.

Generation Z's career expectations are different from those of previous generations. With its entry into business life, the view that systems and artificial intelligence will make decisions effectively, and therefore, members of this Generation will face fewer problems, comes to the fore. The most distinctive feature of this Generation is its ability to adapt quickly to new developments and speed.

The digital Generation has advanced knowledge and skills regarding information technologies compared to previous generations and can use multiple media effectively with all their possibilities (McMahon and Posspisil, 2005, 422). Individuals' ability to do more than one job at the same time has improved. Generation Z students do homework and engage in different activities at the same time. This Generation uses screen-based information technology products in every field, including their daily lives, and they have advanced visual literacy skills compared to previous generations (Prensky, 2001b, 5).

Generation Z individuals generally express themselves through social media and use information technology to obtain information. They manage their own data using web technologies instead of libraries, integrate the information they find from other sources with their own, and share this information with others. Therefore, individuals in the digital age now acquire and share information digitally.

Learners of the digital age are bored with written texts. While we generally prefer multimedia materials such as pictures, sounds, animations, and videos to obtain information, speed, visuality, and entertainment are at the

forefront of accessing information (Günüç, 2011, 5; Karabulut, 2015, 17; Prensky, 2001a, 2; Şahin, 2009). 162; Veen, 2007, 3). This Generation prefers to research and learn through digital resources. They research their homework online through internet resources.

Students of this Generation can access information faster and more, thanks to the opportunities of technology, compared to previous generations. In this age where access to information is more significant than in the past, the reliability of the information source is also an important issue. Students should evaluate every information they obtain from a critical perspective. Students who can criticize also learn to think analytically and blend instead of relying on the first source they access.

Another feature related to the digital age learner is the right to intellectual property (Lozenzo and Dziuban, 2006, 9). Students should be informed about copyright, as they can get all the information they need from the Internet through digital resources. They should be warned to act by scientific research and ethical rules.

Generation Z learners can generally learn on their own in online environments. For this reason, they design personalized learning experiences according to individual needs and preferences. Generation Z students learn through trial and error (Günüç, 2011, 2). In summary, Generation Z students prefer collaborative, active, and personalized learning in line with their individual needs and preferences.

Students prefer to avoid traditional teaching methods; they prefer parallel learning and reading random sections in texts, i.e., they do not like to read in a linear order. Digital natives have different ways of searching, using, and creating information. When learners of the digital age are hungry for information, they use the Internet as their guide instead of asking an expert. Instead of going to libraries, they prefer digital libraries. The perspective of digital-age learners towards libraries, which provide a quiet study environment and information resources, has also changed.

The exemplary behavior of digital-age learners is that they export the knowledge they have acquired and try to increase it by sharing it. Generation Z learners convey many events in their daily lives to the outside world through social media. For this reason, learning has become an activity aimed at exporting.

With the Learn Turkish Words and Verbs with Flashcards application, users can learn how words are used in daily life and listen to how words are pronounced. The application, which includes words of different types, such as nouns, adjectives, and verbs, has different learning levels, and users can choose activities appropriate to their level (Kökçü, 2023).
With the development of technology, language learning has become more accessible and fun. Learning a language, primarily via mobile devices, offers the opportunity to practice anytime, anywhere. Many applications can be used on Android devices for those who want to learn Turkish. Among these, applications that focus on learning words and verbs using flashcards are popular and effective. When the advantages of language teaching with flashcards are examined:
• Repetition and Remembering: Flashcards effectively repeat words and verbs and make them permanent in memory. Constantly repeating words and their meanings helps them become more easily remembered.
• Attractive Visuals: Flashcards are often presented with visual content, so they help learn the meaning of words and verbs more effectively.
• Customizable: Flashcard applications allow users to create their word lists and edit them as they wish. This allows users to learn words that match their personal interests.
• Independence of Time and Place: Thanks to mobile applications, learning Turkish with flashcards is possible anytime and anywhere. This allows users to manage the language learning process flexibly.
Flashcards Apps for Android:
• User-Friendly Interface: Most flashcard applications have an easy and understandable interface. Users can easily find words and verbs and track their studies.
• Lessons and Categories: Applications usually present words by dividing them into categories. For example, essential Turkish words may be divided into categories such as travel and food.
• Progress Tracking: Users can track their learning progress through the application and thus see which areas they need to practice more.
• Voice Pronunciation: Some applications allow users to listen to the correct pronunciation of words. This is useful for improving speaking skills.faydalıdır.
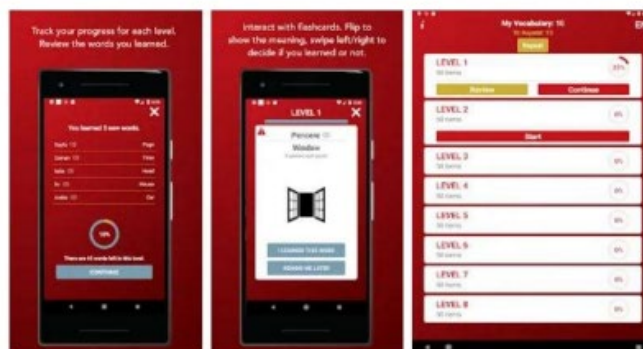
Figure 1: Learn Turkish Words and Verbs with Flashcards for Android. It offers advanced content as well as essential Turkish words and verbs.

- Flashcards supported with visual and audio content are available.
- It allows you to create and edit your word and verb lists.
- It makes the learning process fun with games and quizzes.

Thanks to mobile devices, learning Turkish words and verbs using flashcards has become an easy and effective process. Such applications, which can be used on Android devices, enrich the language learning experience with their customizable features and user-friendly interfaces. Anyone who wants to learn Turkish can benefit from these advantages by trying flashcard applications.

Conclusion, Discussion, and Recommendations

Learners of the digital age differ in many respects compared to previous generations. Since they were born and raised in the age of technology, technology has always been at the forefront of language learning environments. In other words, digital technologies have become indispensable for learners of this age. This generation wants to benefit from digital technologies in almost every aspect. While other generations only benefit from libraries and books as sources of information, Generation Z learners want to use multimedia materials such as sound, animation, visual materials, and videos as information sources, and speed and visuality are at the forefront.

Language learners of the digital age can access information in a shorter time than previous generations. In this context, the information must be reliable. Today's learners need to learn to find information and evaluate it from a critical perspective. Students with such a perspective need to learn and apply the information they have accessed as a result of detailed research, not just benefit from every source they access.

The use of Web 2.0 tools makes language teaching more in teractive, entertaining, and student-focused. With these tools, students can direct their learning processes and improve their language skills more quickly. Using digital materials and applications in teaching Turkish improves students' language learning processes and helps teachers renew their teaching methodologies.olmaktadır.

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NAVIGATING THE ETHICAL LANDSCAPE OF AI- BASED RESOURCES IN EDUCATION: IMPLICATIONS FOR LEARNING, PROPER USAGE, AND COURSE DESIGN ENHANCEMENT

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"Success in creating AI would be the biggest event in human history. Unfortunately, it might also be the last, unless we learn how to avoid the risks."—Stephen Hawking.

ABSTRACT
This article critically examines the ethical dimensions surrounding the integration of Artificial Intelligence (AI) in educational contexts. With a holistic perspective, the paper delves into the far-reaching implications for learning experiences, appropriate usage, and the enhancement of course design. The exploration begins by addressing the imperative of ethical considerations in the utilization of AI-based resources, encompassing concerns such as privacy, fairness, and transparency. The learning implications of AI integration are analyzed, shedding light on how AI influences student engagement, motivation, and cognitive benefits and challenges. The article further underscores the significance of responsible practices in the utilization of AI tools, emphasizing the need for guidelines in citing AI-generated content to ensure academic integrity and ethical standards are maintained. The ethical considerations related to these enhancements are dissected, emphasizing the importance of maintaining transparency and ensuring that the educational content aligns with ethical standards.

Crucially, the paper investigates the role of educators in managing AI tools, establishing ethical parameters, and striking a balance between automation and human intervention. The functions and limitations of AI tools in educational settings are examined, providing insights into the dynamic landscape of AI in education. In essence, this article serves as a comprehensive guide for educators, policymakers, and stakeholders navigating the ethical complexities associated with AI in education. By addressing ethical considerations, learning implications, appropriate usage, and the enhancement of course design, the article aims to contribute to the responsible and effective integration of AI in the ever-evolving educational landscape.

Keywords: Artificial Intelligence, Educational Technology, Learning Implications, course design, academic integrity, cognitive benefits, ethical standards

Introduction
Artificial intelligence (AI) is a ubiquitous phenomenon that we use on a daily basis, even if we may not give it much thought. We use artificial intelligence (AI) and its help on a daily basis, whether it be for driving directions, email reading, booking a doctor's appointment, or finding recommendations for movies and music. The COVID-19 epidemic has highlighted both our reliance on AI systems and our need for assistance. AI systems are becoming more and more prevalent in a variety of industries, including healthcare, education, communications, transportation, and agriculture. Living in today's world would be nearly impossible without coming across AI-powered applications(Bendici & Iman 2018.).

In the dynamic landscape of education, the integration of Artificial Intelligence (AI) has emerged as a transformative force, promising unparalleled opportunities for enhanced learning experiences and innovative instructional design. As educators increasingly harness the power of AI-based resources, a pressing need arises to scrutinize the ethical implications, learning dynamics, and practical considerations associated with their implementation. This article aims to delve into the multifaceted dimensions of employing AI in education, offering insights into the ethical considerations that

educators must navigate, the nuanced implications for student learning, and the appropriate ways of integrating these technologies into course design and preparation.

Definition of Artificial Intelligence
With the development of artificial intelligence, efforts to build intelligent machines that mimic human behavior have intensified. As a result of recent developments in computer science, there are many different definitions and justifications for what constitutes artificial intelligence (AI) systems. For example, "the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings" (Remian,D. 2019).

AI has been defined as "the combination of cognitive automation, machine learning, reasoning, hypothesis generation and analysis, natural language processing, and intentional algorithm mutation producing insights and analytics at or above human capability"(IEEE,2017). This definition incorporates the different sub-fields of AI together and underlines their function while reaching at or above human capability.

The software development company Serokell (2020) defines AI as the development of intelligent programmes and machines capable of creative problem-solving,a capability previously regarded as uniquely human.

With a specific focus on ethical considerations, we explore the privacy concerns, fairness issues, and the imperative of transparency and accountability when incorporating AI tools in educational settings. Delving into the learning implications, our analysis will scrutinize the impact of AI on student engagement, motivation, and the cognitive dimensions of learning. Moreover, we will delve into the responsible usage and citation of AI-generated content, delineating guidelines to maintain academic integrity in this evolving landscape. As we traverse the realms of course design and preparation, the article will shed light on how AI enhances visual impact, aids in story-boarding for video lectures, and contributes to the creation of dynamic and personalized learning environments. Simultaneously, it will tackle the crucial question of control and oversight, exploring the role of educators in managing AI tools and establishing ethical parameters for their utilization.

Finally, the discourse extends to the functions and limitations of AI tools in educational settings, unraveling their potential for personalized learning while critically examining the evolving landscape and potential pitfalls. By dissecting these subtopics, this article endeavors to provide a comprehensive guide for educators and stakeholders navigating the complex terrain of AI in education, fostering responsible, ethical, and effective integration for the benefit of learners in the digital age.

Ethical Considerations in Implementing AI-Based Resources
The integration of AI-based resources in education presents a myriad of ethical considerations that educators and institutions must carefully navigate to ensure responsible and fair implementation. Here, we delve into some key aspects of ethical considerations in implementing AI-based resources:

1. **Addressing Privacy Concerns**
Context: AI tools often require access to diverse sets of data to perform effectively, including personal information, learning behaviors, and potentially sensitive details about individuals.

Ethical Imperative: Educators and institutions must prioritize protecting the privacy of students and stakeholders. This involves establishing clear protocols for data collection, storage, and utilization.

Transparency and Informed Consent: Ethical AI implementation necessitates transparency about the types of data collected, the purposes of data usage, and the protective measures in place. Obtaining informed consent from students or their guardians before deploying AI tools ensures that individuals are aware of how their information will be utilized.

Secure Data Handling: Robust security measures, such as encryption, secure servers, and regular audits, are essential to safeguard collected data. Ensuring that data is only accessible to authorized personnel helps prevent unauthorized breaches.

Data Retention Policies: Institutions should establish clear policies regarding how long data will be retained and under what circumstances it will be disposed of. Regular reviews of privacy policies are essential to align with technological advancements and legal requirements.

2. Ensuring Fairness and Avoiding Bias in AI Tools

Challenge: AI algorithms can inadvertently perpetuate or even exacerbate biases present in training data, leading to unfair outcomes, particularly in areas such as grading, assessment, or recommendation systems.

Ethical Imperative: There is a need for continuous scrutiny to identify and rectify biases in AI algorithms. Ethical implementation involves ensuring fairness, equity, and the absence of discrimination in AI-driven educational processes.

Algorithmic Transparency: Educators should seek transparency in how AI algorithms operate, making efforts to understand the decision-making processes. This transparency facilitates the identification and rectification of biased outcomes.

Diverse and Representative Training Data: To mitigate biases, AI training datasets should be diverse, representative, and thoroughly scrutinized to identify and eliminate potential sources of unfairness.

3. Transparency and Accountability in the Use of AI

Communication: Ethical AI implementation requires clear communication about how AI tools are used in educational settings, including their roles, impact, and limitations.

Accountability Mechanisms: Establishing accountability mechanisms ensures that stakeholders can identify responsible parties in case of issues or concerns related to AI-based resources. This involves defining roles and responsibilities in the deployment and management of AI tools.

Continuous Monitoring and Evaluation: Regular monitoring and evaluation of AI tools' performance are essential for identifying any unintended consequences or ethical challenges. This iterative process allows for ongoing refinement and improvement.

Thus, the ethical considerations in implementing AI-based resources demand a proactive and thoughtful approach, encompassing privacy protection, fairness, transparency, and accountability. By addressing these considerations, educators can foster a learning environment that harnesses the benefits of AI while upholding ethical standards and ensuring the well-being of all stakeholders involved.

Learning Implications of AI Integration in Education

The integration of Artificial Intelligence (AI) in education brings about profound learning implications, impacting various facets of the educational experience. Here, we explore three key aspects:

1. Analyzing the Impact on Student Engagement and Motivation

Positive Impact on Engagement: AI tools can be designed to provide interactive and engaging learning experiences, catering to diverse learning styles. Gamified elements, real-time feedback, and adaptive content can capture students' attention and sustain their interest in the learning process.

Personalization for Motivation: AI's ability to personalize content based on individual student needs and preferences contributes to increased motivation. Tailored learning experiences, adaptive challenges, and instant feedback create a more individualized educational journey, making learning both relevant and enjoyable.

Monitoring and Intervention: AI tools can track students' progress and identify patterns in their engagement. Early detection of disengagement or challenges allows for timely intervention, enabling educators to provide targeted support and maintain a positive learning experience.

2. Identifying Potential Cognitive Benefits and Challenges
Cognitive Benefits

Adaptive Learning Paths: AI can adapt learning paths based on individual progress, ensuring that students advance at their own pace. This personalized approach caters to varying levels of cognitive abilities and promotes deeper understanding.

Data-Driven Insights: AI analytic can provide educators with valuable insights into students' cognitive processes. Understanding how students approach problem-solving or comprehend complex concepts allows for more informed instructional strategies.

Cognitive Challenges
Over reliance on Technology: There's a risk of students becoming overly dependent on AI tools, potentially hindering the development of certain cognitive skills such as critical thinking and problem-solving.

Algorithmic Biases: If not carefully designed, AI algorithms may introduce biases that impact cognitive assessments. Ensuring fairness in algorithmic decision-making is crucial to avoid reinforcing existing educational disparities.

3. Understanding the Role of Personalized Learning through AI
Adaptive Content Delivery: AI enables the customization of learning materials to match each student's proficiency level, learning style, and pace. This adaptability ensures that students receive content that aligns with their individual needs, enhancing comprehension and retention.

Tailored Feedback Mechanisms: Personalized learning through AI involves real-time feedback, addressing misconceptions and reinforcing positive learning behaviors. This instant feedback loop contributes to a more effective learning process.

Enhancing Student Autonomy: AI-supported personalized learning empowers students to take control of their learning journey. By providing resources tailored to their specific requirements, students can develop a sense of autonomy and ownership over their education.

The learning implications of AI integration in education extend beyond conventional instructional methods. AI has the potential to positively influence student engagement, motivation, and cognitive development through personalized and adaptive learning experiences. However, educators and stakeholders must be mindful of the challenges and ethical considerations associated with AI implementation to harness its benefits effectively.

Appropriate Usage and Citing of AI Resources
As educators increasingly incorporate AI resources into academic settings, it becomes paramount to establish ethical guidelines for the proper usage and citation of AI-generated content. Here are key considerations in this regard:

1. Establishing Guidelines for Citing AI-Generated Content
Attribution of AI Contributions: When AI tools contribute significantly to the creation of content, it is essential to provide clear attribution. This involves acknowledging the role of the AI in the generation of the material, similar to how human contributors are recognized.

Transparency in Citations: Citations should transparently convey the AI algorithms or models used in the content creation. This transparency not only recognizes the technology's role but also facilitates reproducibility and further research.

Format and Style Guidelines: Institutions and educators should establish specific formatting and citation styles for AI-generated content. This ensures consistency and clarity in academic writing, allowing both authors and readers to understand the origin of information.

2. Defining Responsible Practices in Utilizing AI Tools
Authorship and Accountability: Clarifying authorship is crucial when AI tools are involved in content creation. Institutions should define whether AI-generated work should be considered co-authored or attributed solely to human contributors. This helps establish accountability for the content.

Ethical Use Guidelines: Establishing ethical guidelines for the use of AI tools ensures that they are employed responsibly. This includes avoiding the use of AI for malicious purposes, maintaining transparency in AI applications, and adhering to ethical standards in research and content creation.

Informed Decision-Making: Educators and researchers should make informed decisions about the use of AI tools, considering the potential biases or limitations associated with specific algorithms. Transparency in disclosing the use of AI ensures that readers can critically evaluate the information presented.

3. Avoiding Plagiarism and Ensuring Academic Integrity

Understanding Plagiarism in AI Context: Educators and students should be educated about the nuances of plagiarism in the context of AI. Copying or using AI-generated content without proper attribution can constitute plagiarism, and it is crucial to differentiate between original human-authored work and AI contributions.

Educational Initiatives: Institutions should implement educational programs to raise awareness about AI's role in content creation and the importance of proper citation. This empowers students and researchers to navigate the ethical dimensions of using AI tools in academic settings.

Integration of AI in Academic Integrity Policies: Academic integrity policies should explicitly address the use of AI tools, emphasizing the importance of giving credit where it is due and adhering to ethical standards. This integration ensures that academic integrity policies are up-to-date with technological advancements.

In essence, appropriate usage and citing of AI resources demand a balance between acknowledging the contributions of AI tools and maintaining academic integrity. Establishing clear guidelines, fostering transparency, and promoting responsible practices contribute to a scholarly environment where AI is integrated ethically and its impact is acknowledged in academic discourse.

Control and Oversight of AI Tools in Education

As Artificial Intelligence (AI) tools become integral to educational settings, ensuring effective control and oversight is essential. Here, we delve into key considerations in managing AI tools in education:

1. Examining the Role of Educators in Managing AI Tools

Training and Professional Development: Educators need training to effectively manage AI tools. Understanding the capabilities and limitations of these tools is crucial for educators to integrate them into teaching strategies. Professional development programs should focus on enhancing educators' technological proficiency.

Curriculum Integration: Educators play a pivotal role in integrating AI concepts into the curriculum. They need to align AI tools with learning objectives, ensuring that technology enhances, rather than detracts from, the educational experience. Actively involving educators in the decision-making process fosters a sense of ownership and responsibility.

2. Establishing Parameters for Ethical Use and Supervision

Ethical Guidelines and Policies: Educational institutions must establish clear ethical guidelines for the use of AI tools. These guidelines should address issues such as data privacy, fairness, transparency, and accountability. Creating and communicating ethical policies ensures responsible AI deployment.

Supervision and Auditing: Regular supervision and auditing of AI tools are essential to identify and rectify any issues promptly. This involves monitoring the performance of AI algorithms, ensuring compliance with ethical standards, and addressing potential biases. Supervision mechanisms also contribute to maintaining the quality of education delivered through AI.

3. Balancing Automation with Human Intervention in Educational Processes

Human-Centric Approach: While AI can automate certain tasks, a human-centric approach remains crucial in education. Educators provide a unique blend of emotional intelligence, adaptability, and nuanced understanding that AI currently lacks. Human intervention ensures a personalized and empathetic learning environment.

Critical Thinking and Creativity: Educators foster critical thinking and creativity, skills that are challenging for AI to replicate. Balancing automation with human intervention involves leveraging AI for repetitive tasks while allowing educators to focus on activities that require complex cognitive abilities, such as facilitating discussions and fostering creativity.

Flexibility in Decision-Making: Decisions related to educational content, assessments, and student support should involve human judgment. AI tools can provide insights, but the final decisions should be made by educators, considering the unique needs and context of their students.

The control and oversight of AI tools in education require a collaborative effort between educators, administrators, and policymakers. Educators play a central role in managing AI tools by staying informed, integrating technology into the curriculum, and ensuring ethical use. Establishing clear guidelines, coupled with effective supervision and a balanced approach to automation, ensures that AI enhances, rather than detracts from, the educational experience.

AI-Enhanced Course Design: Optimizing Education
Adaptive Learning Paths: Adaptive learning paths involve the use of AI algorithms to analyze individual student performance, preferences, and learning styles. The system then tailors the learning experience by adjusting the content, difficulty, and pacing to suit each student's needs. This ensures that students progress through the material at a pace that optimizes their understanding and retention.

Content Customization: AI can analyze data on students' past performance, learning preferences, and feedback to customize course content. This customization may include adjusting the difficulty of assignments, providing additional resources on challenging topics, and delivering content in various formats to accommodate different learning styles.

Gamification and Interactive Elements: AI-powered gamification incorporates game-like elements into the learning experience. This includes features such as quizzes, challenges, and rewards, making the educational journey more engaging. Interactive elements leverage AI to create simulations, virtual labs, or interactive exercises that enhance understanding and application of concepts.

Real-time Feedback Mechanisms:AI tools can provide instant feedback on assessments, pinpointing areas of strength and weakness. This immediate feedback allows students to address misconceptions promptly and fosters a continuous learning process.

Predictive Analytics for Intervention: Predictive analytics in education involves using AI algorithms to analyze student data and predict potential challenges or success. Educators can intervene proactively to provide additional support or resources to students at risk of falling behind, preventing academic struggles.

Collaborative Learning Platforms: AI can facilitate collaborative learning by grouping students with complementary skills or diverse backgrounds for projects. Additionally, AI tools can support online collaboration, discussion forums, and peer reviews, enhancing the overall learning experience.

Learning Resource Recommendations: AI algorithms can analyze a student's performance, preferences, and learning history to recommend additional resources such as articles, videos, or interactive content. This enriches the educational experience by providing supplementary materials tailored to individual needs.

Dynamic Assessment Strategies: Dynamic assessments adapt to students' progress, adjusting the difficulty and content based on their performance. AI-driven dynamic assessments provide a more accurate reflection of a student's understanding, allowing for personalized and targeted feedback.

Training Educators for AI Integration: Educators need training to effectively leverage AI tools in course design. This sub-topic explores professional development programs, workshops, and resources to equip educators with the skills and knowledge necessary for successful AI integration.

Balancing Automation and Human Touch: Achieving a balance between automated processes driven by AI and the human touch in education is crucial. This involves considering when and where human intervention is necessary for effective teaching, mentorship, and support, ensuring that technology complements rather than replaces the human aspect of education.

Functions and Limitations of AI Tools in Educational Settings
The introduction of AI is not without ethical challenges, especially concerning algorithmic biases. Shanklin et al.(2022) emphasize that even when AI algorithms are designed with neutrality in mind,

they can inadvertently produce racially biased results if trained on data reflecting existing biases. Their research in the context of medical appointment scheduling in the United States reveals a concerning trend: algorithms predict that black patients are more likely to miss appointments than non-black patients. This, while technically accurate based on available data, contributes to the perpetuation of racial inequalities and a lack of access to healthcare. Such instances underscore the essential accuracy-fairness trade-offs that policymakers and stakeholders must grapple with, deciding whether to prioritize efficiency or equity in AI applications within these settings.

Now, as Artificial Intelligence (AI) continues to evolve, its integration into educational settings introduces both promising functions and important limitations. Here, we delve into these aspects:

1. Exploring the Capabilities of AI for Personalized Learning
Adaptive Learning Paths: AI can analyze individual student performance and adapt learning paths accordingly. This personalized approach ensures that students receive content tailored to their proficiency levels, learning styles, and pace, optimizing the learning experience.

Customized Content Delivery: AI tools can generate and deliver content that caters to individual needs. This might include adaptive quizzes, interactive simulations, or personalized study materials, enhancing engagement and comprehension.

Real-Time Feedback: AI enables the provision of immediate and tailored feedback to students. This continuous feedback loop supports personalized learning by addressing misconceptions promptly and reinforcing positive learning behaviors.

2. Understanding the Limitations and Potential Pitfalls
Bias in AI Algorithms: AI tools can inadvertently perpetuate biases present in training data. This is a critical limitation, as biased algorithms may result in unfair outcomes, particularly in assessments, grading, or recommendation systems. Vigilance is required to identify and mitigate biases.

Over-reliance on Technology: There is a risk of over dependence on AI tools, potentially hindering the development of essential cognitive skills such as critical thinking and problem-solving. Striking a balance between AI-supported learning and traditional educational methods is crucial to avoid diminishing the role of human educators.

Ethical Concerns: The use of AI in education raises ethical considerations, including issues related to data privacy, informed consent, and the responsible use of technology. Institutions must navigate these ethical challenges to ensure the ethical deployment of AI tools in educational settings.

3. Discussing the Evolving Landscape of AI in Education
Integration of AI in Curriculum: The evolving landscape of AI in education involves the integration of AI concepts into the curriculum. This not only prepares students for a technology-driven future but also fosters a deeper understanding of AI principles and applications.

Professional Development for Educators: As AI becomes more prevalent in education, there is a growing need for professional development programs for educators. Training and support are essential to equip teachers with the skills to effectively integrate AI tools into their teaching methodologies.

Continuous Technological Advancements: The field of AI is dynamic, with continuous technological advancements. Educational institutions need to stay abreast of these developments to leverage the latest tools and techniques for the benefit of students. This requires a commitment to ongoing research, development, and adaptation of educational strategies.

Satterfield and Able(2020) contend that the widespread adoption of AI, evident in applications like predictive software on platforms such as Amazon Prime and autonomous features in automobiles, has far-reaching implications for business, industry, research, and higher education. The influence of AI extends to innovative home technologies like Alexa and Siri, fundamentally altering human interactions with technology and shaping user experiences.

Thus, the functions and limitations of AI tools in educational settings highlight the transformative potential of AI for personalized learning while underscoring the need for careful consideration of

ethical implications and the evolving nature of technology. A balanced approach that harnesses the capabilities of AI while addressing its limitations ensures that education remains a dynamic and adaptive field in the era of technological innovation.

Conclusion

As the integration of Artificial Intelligence (AI) reshapes the educational landscape, our exploration of the ethical dimensions surrounding AI-based resources underscores the imperative for a conscientious and thoughtful approach. In concluding our discussion, several key reflections emerge, emphasizing the overarching principles that should guide educators, policymakers, and stakeholders in this dynamic terrain.

The multifaceted implications for learning in an AI-infused educational environment are undeniable. While AI promises personalized learning experiences, heightened student engagement, and cognitive benefits, the nuanced challenges demand meticulous attention. Educators must remain vigilant against biases in algorithms and foster an environment that balances technological innovation with the preservation of essential human-centric skills.

Proper usage of AI tools demands a commitment to ethical considerations, with privacy concerns at the forefront. Establishing guidelines for citing AI-generated content ensures academic integrity, fostering a culture of transparency and accountability. Responsible practices in utilizing AI tools necessitate ongoing training for educators, empowering them to harness the benefits of AI while navigating potential pitfalls.

Course design enhancement through AI introduces exciting possibilities but demands ethical parameters. The visual impact can be augmented, and video lectures can be optimized with storyboards crafted by AI, yet ethical guidelines must govern these enhancements. Transparency in the use of AI in course design aligns with the broader commitment to fostering an ethical and inclusive educational environment.

Central to the discourse is the pivotal role of educators. As they navigate the complexities of managing AI tools, establishing ethical parameters, and balancing automation with human intervention, they become the linchpin in the ethical integration of AI into education. A collaborative effort, involving educators, administrators, and policymakers, is essential to create a framework that aligns technological advancements with ethical imperatives.

In recognizing the functions and limitations of AI tools in educational settings, we acknowledge the evolving nature of AI in education. The landscape is dynamic, requiring continuous adaptation and scrutiny. As AI becomes deeply woven into the fabric of education, stakeholders must remain vigilant, continually assessing the ethical implications and making informed decisions that prioritize the well-being and equitable access of all learners.Even with all of its difficulties, AI is expected to be able to address some of the issues that open and distance education students face, including difficulty organising their studies, the need for effective interaction, and feeling alone in their studies (Markova et al., 2017). t also has the potential to play a significant role in developing and delivering instructional materials and relevant course content, all the while offering effective student support, interaction opportunities, and appropriate assessment opportunities—all necessary components of a successful distance learning program (Markova et al., 2017). Concerns about AI replacing human instructors exist in addition to the ethical ones raised by the technology's growing use in education (Selwyn, 2019).

It is improbable that AI systems will completely take the job of teachers, even in situations involving distributed and open learning. Rather AI may change their position (Humble & Mozelius, 2019) with 'cobots' (co-working robots) aiding educators with routine tasks and customizing the learning experience depending on the needs of individual students (Goksel & Bozkurt, 2019). Additionally, it might lessen the requirement for teachers to grasp all of the important knowledge and data that pupils need (Roll & Wylie, as stated in Humble & Mozelius, 2019). AI holds great promise for personalized learning, primarily in terms of improving instructional effectiveness.

In essence, our exploration serves as a compass, guiding educational communities through the ethical complexities of AI integration. By embracing the principles of transparency, fairness, and responsible innovation, we can harness the transformative potential of AI-based resources while safeguarding the

ethical foundation upon which education thrives. The journey ahead demands collaboration, adaptability, and an unwavering commitment to an educational ethos that places ethics at its core.

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RELATIONSHIP AMONG PERCEPTIONS, EXPERIENCES, MOTIVATION AND ENGAGEMENT OF STUDENTS INVOLVED IN E LEARNING MODEL- A CORRELATIONAL STUDY

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Background

Technological advancements, in the recent years,   have majorly transformed the teaching learning process (Ni, 2013). The debate over the potential of online learning model to replace the traditional face-to-face education model and the teacher–student relationship still remains unsettled (Schmid et al., 2014).. However, despite preference for in-class teaching, the online teaching still considered as one of the alternative and supplementary model of education, more so especially during life threatening situations such as natural calamities, disasters, cyclones, pandemics etc.. Ever since it had been identified , this COVID19 had been a major impact on people and the economic, social and emotional disturbances caused by this pandemic is dreadful and totally devastating. Education is one such field which has undergone major changes in terms of its teaching and learning process. Most of the schools and colleges had started adopting e- learning model and starting conducting online classes during COVID 19 and still continuing as an adjunct model of learning.

Rationale

Though e-learning is widely proclaimed to be an effective mode of education, certain limitations were observed especially when it comes to rural and economically backward students. The present study was conducted to , understand the student's perceptions towards e learning, its impact on their online learning experience as well as its effect on student motivation and engagements.

Method

A online survey Questionnaire was developed and circulated through whatsapp & email. The respondents were requested to provide information regarding their experiences, perceived benefits of e learning and their impact on their academic performance. The assessment tools used for the study are Modified Student e-learning perception scale, Dr. M.A Khan, (2020) . (Cronbach's Apha 0.957) , Modified Online experiences scale, Pankaj Deshwal (2017) and .Students Engagement, Motivation & beliefs Survey form (SEMS V 2.0) developed by Young Development Executives of King Country(YDEKC). A total of 101 students participated voluntarily and their responses recorded through Google form and the data was analyzed using SPSS

Results

The results indicated marginally low levels of perception towards e learning (51.5%) , and low levels of online learning experiences (64.6%) and student engagement and motivation (56.4%). The results also indicate highly significant ($P<0.05$) correlation among Students Perception towards online learning, their e-learning experiences and their motivation & Engagement. , however the association was found to be weak in nature ($r<0.19$). The study further reports high level of significant relationship ($P<0.05$) between age of the respondents and Students' Motivation and Engagement. The findings also indicate significant difference ($P<0.05$) between genders with reference to online learning experience with females reporting better experiences than males.

Keywords : E-learning Model, New Normal, online learning , perceptions, e-learning experience, motivation , student engagement

BACKGROUND

Technological advancements, in the recent years,   have transformed the teaching learning process in a very big way (Ni, 2013). The debate over the potential of the online model learning to replace the traditional face-to-face education model and the teacher–student relationship still remains unsettled (Schmid et al., 2014). In

principle, the essentiality of classroom activities are way beyond education and knowledge acquisition rather help students to acquire social skills also that have implications on their future personal and professional growth (Goodman et al., 2015). Interaction with teachers and other students is paramount for developing positive self-esteem, self-confidence, and also improving students' ability to work in a team collaboratively and productively with peers (de Souza Fleith, 2000). The main threat concerning to online learning is the absence of face-to-face interaction (Bao, Selhorst, Moore, & Dilworth, 2018). Fraser and Goh (2003) noted that communication behaviour encouraged in a face-to-face classroom are not always supported or available within online teaching. The ability to ask questions, share opinions, or disagree with points is fundamental to learning (Chin & Osborne, 2008). 844 Thomas Walters et al. Research has often compared performance and learning outcomes due to online teaching versus classroom-based teaching (Akkoyunlu & Soylu, 2008; Ni, 2013). A study conducted by Kemp and Grieve (2014) compared undergraduate students' preferences and academic performance during the presentation of class material and written assessments online and within the classroom, reported that students rated face-to-face teaching much higher than online teaching. The feedback collected as part of this study further suggested they felt more engaged during face-to-face teaching since they receive immediate feedback.

However, despite preference for in-class teaching, the online teaching still considered as one of the alternative and supplementary model of education, more so especially during life threatening situations such as natural calamities, disasters, cyclones, pandemics etc.. COVID 19 is one such alarming pandemic situation where the entire world was forced to adopt the online teaching model for teaching leaning process. Ever since it has been identified , this pandemic had been a major impact on people and the economic, social and emotional disturbances caused by this pandemic is dreadful and totally devastating. Infact this pandemic had literally forced a new normal way of living in all walks of life. The educational system across the world is one such field which has been immensely affected and had undergone major changes in terms of its teaching and learning process. Due to the restrictions imposed by this COVID 19 pandemic, education had shifted from the traditional class room teaching to computer based e learning. Most of the educational institutions and students across the world have stated adopting this online platform of learning and continuing to use e-learning as an adjunct model of learning even now.

Rationale For The Study
Though e-learning is proclaimed to be an effective mode of education, on the other hand, as described there are certain limitations such as social isolation, lack of face to face interaction, connectivity issues etc. reported from all over the world. An article on "The Impact of COVID-19 on Education – Recommendations and Opportunities by Robin Donnelly, et al (2021) reported that despite best efforts to sustain supportive remote learning, closures of educational institutions have resulted in actual learning losses & increase in inequality. The article further reported that these outcomes are likely to be even more acute in middle- and lower-income countries where there is much less technological capability and a larger share of families live below the poverty line.A study conducted by George Orlov (May 2021) has reported decline in the student performance in the pandemic semester. Further a study by Eze S.C et al (2020) investigated the use of e-learning facilities by students of Higher education Institutions and revealed the impact of technology-related factors such as ease of use, speed accessibility and service delivery, organization-related factors such as training support and diversity, environment-related factors such as attitudes of the users and impact-related factors such as learning experience, skill development, academic performance, and degree of engagement on the students' adoption of e-learning facilities A study conducted by M.A.Khan et al(December,2020) at NCT, Delhi had reported positive student's perception towards e learning and acceptance of this new learning system thus demonstrating the significance of e learning in this COVID Pandemic.

 Against such back drop and contrasting reports relating to the effectiveness of online learning model, the present study was conducted to , understand the student's perceptions towards e learning, its impact on their online learning experience and its effect on student motivation and engagements in Indian context.

Objectives Of The Study
The primary objective of the study is to measure the levels of perception on e learning , online learning experiences and motivation and engagements of the respondents involved in e learning model during the study period. The second objective is to the study the.significant correlation among perception on e learning , online learning experiences and motivation and engagements levels of the respondents The third objective is to provide suitable evidence based recommendations to varied stake holders of online learning for enhancing of e learning perceptions, online learning experiences and student motivation and engagements. The third objective is to study the relationship and variance among the levels of perception on e learning , online learning experiences and student motivation and engagements with reference to age and gender of the respondents.

Method

The study was conducted on junior and senior college students of both the genders, belonging to varied socio economic regions of the country, who were involved in e-learning. The data collection was carried out using online survey method. The age range of students for the study was restricted to 18-35 years and those students who had pre existing special needs or with any kind of disability were excluded from this current study. A online survey questionnaire was prepared using google form. The form comprised of PART A. Demographic details of the respondents and PART B : 3 specific domains that assess the e-learning perception of students, their online experiences and student's motivation and engagement . The data collection was done by sharing google form through online, social networking, email & whatsapp groups and instant messaging to the prospective samples. The participation of the respondents was voluntary in nature and no special incentive was given to any of the participants. A total of 101 students responded and all were found to be eligible as per the sampling criteria. The Collected data was statistically analyzed and results were tabulated

Assesment Tools Used For The Study

The assessment tools used for the study are Modified Student e-learning perception scale, Dr. M.A Khan, (2020) (Cronbach's Apha 0.957) , Modified Online experiences scale, Pankaj Deshwal (2017) and .Students Engagement, Motivation & beliefs Survey form (SEMS V 2.0) developed by Young Development Executives of King Country(YDEKC).

Results

Socio Demographic Charactreistics Of The Respondents
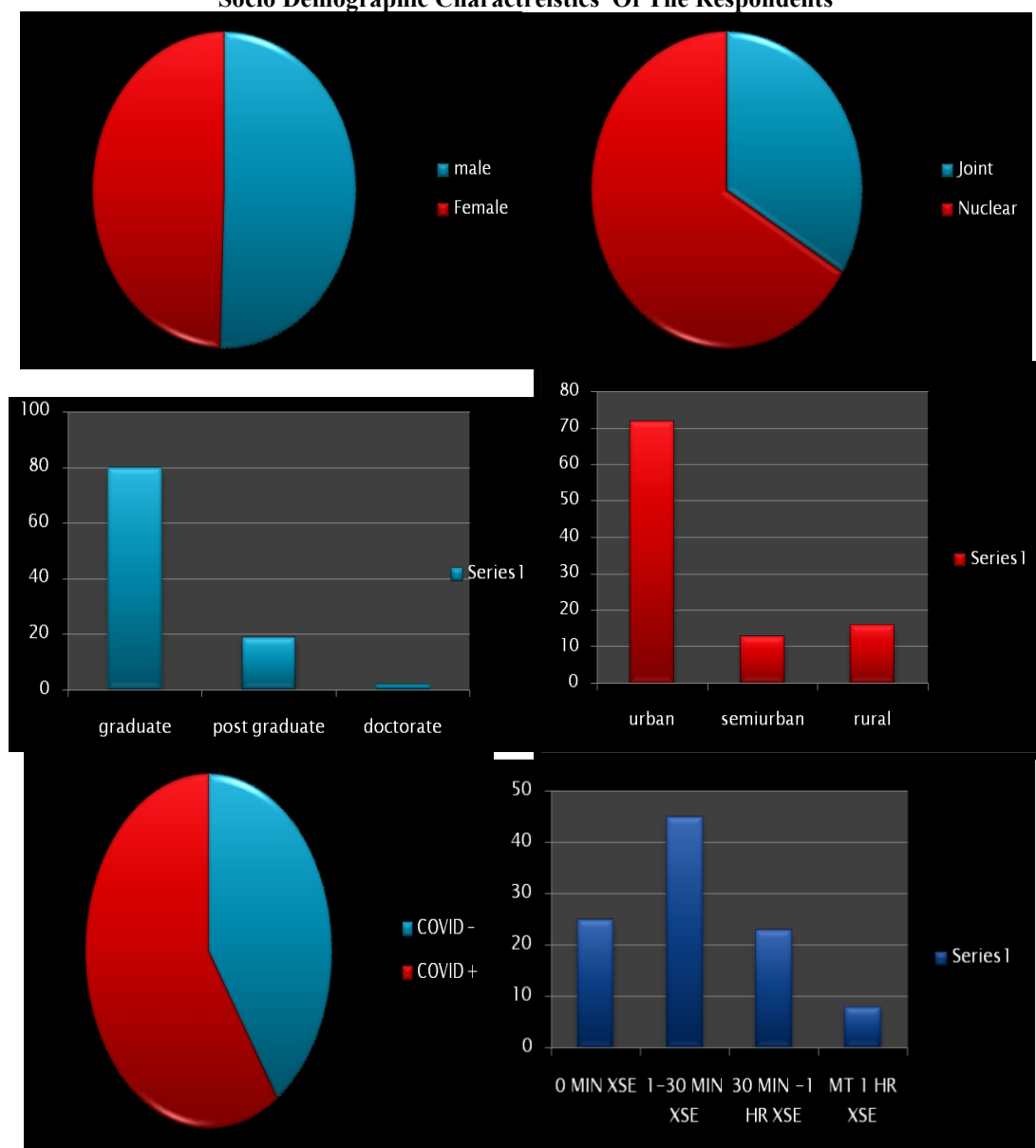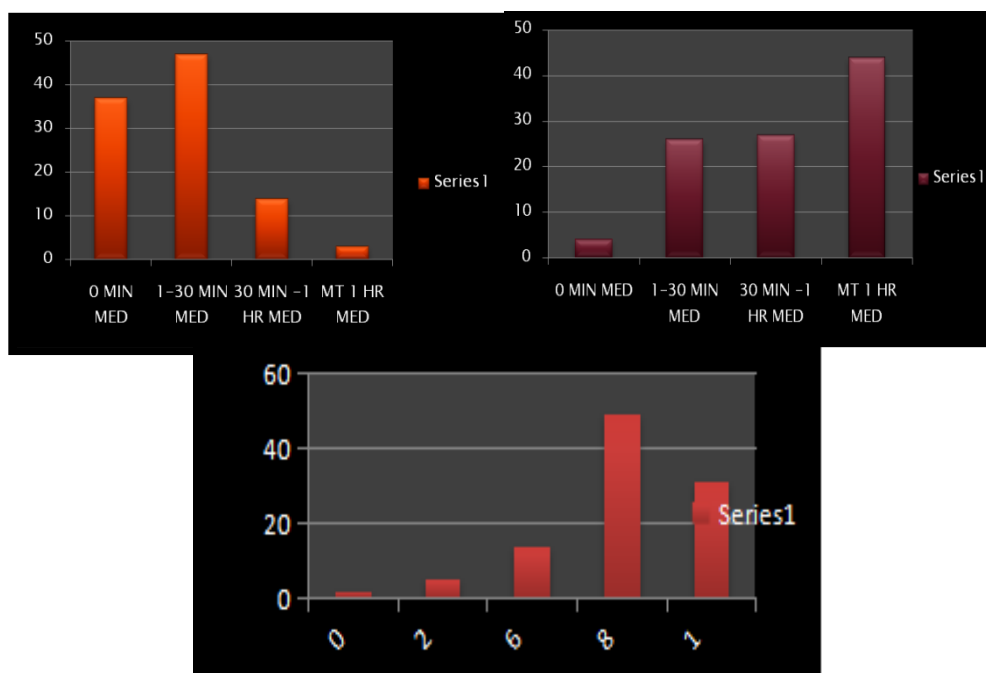
The mean age of the respondents is 23. More than half (50.5%) of the respondents are male.Nearly 3/4th (71.3%) of the respondents belong to urban region. More than 3/4th (79.2%) of the respondents are undergoing graduation studies.Less than 3/4th (66.3%) of the respondents belong to nuclear family. More than half (59.4%) respondents have reported history of COVID in their family and friends.   Nearly half (44.6%) of the respondents are involved in 30 minutes of regular exercise and nearly half (46.5%) of the respondents are practicing 30 minutes of meditation regularly. Nearly half (43.6%) of the respondents are regularly connected with their friends and families through virtual or telecommunication and almost half (48.5%) of the respondents reported to have a sleep of 8-10 hours.

Table 1 : Distribution Of The Respondents Based On The Levels Of E Learning Perception, Online Learning Perception And Students Motivation And Engagement

S.No	Variables	No. of Respondents (n:101)	Percentage
1.	**Students' Perception towards E-learning**		
	Low	52	51.5
	High	49	48.5
2.	**Online Learning Experience**		
	Low	65	64.6
	High	36	35.6
3.	**Students' Motivation and Engagement**		
	Low	57	56.4
	High	44	43.6

Table 1 illustrates that students have marginally low level of perception towards e-learning (51.5%),low levels of online learning experience (64.6%)and student motivation and engagement (56.4%).

Table 2: Correlation Among Students' Perception Towards E-Learning, Their Online Learning Experience And Students' Motivation And Engagement

Variables	Correlation value	Strength of relationship	Statistical inference
Students' perception toward E-learning with Online Learning Experience	r=.277 P=0.05	Week	P<0.01 **Highly Significant**

| Students' perception toward E-learning with Students' Motivation and Engagement | r=.380 P=0.00 | Week | P<0.01 **Highly Significant** |
| Online Learning Experience with Students' Motivation and Engagement | r=.417 P=0.00 | Moderate | P<0.01 **Highly Significant** |

The Karl Pearson Coefficient of correlation statistical test table 2 explains that Students' perception toward E-learning and have a high level of statistically significant linear relationship (p<0.01) with Online Learning Experience as well as Students' Motivation and Engagement   and the direction of relationship is positive.Also the Online Learning Experience and Students' Motivation and Engagement have a high level of statistically significant linear relationship (p<0.01) and the direction of relationship is positive.

Table 3 : Relationship Between Age Of The Respondents With Regard To Perception Towards E-Learning, And Their Online Learning Experience

Variables	Correlation value	Strength of relationship	Statistical inference
Age with Students' perception toward E-learning	r=.044	Very week	P>0.05 **Not Significant**
Age with Online Learning Experience	r=.067	Very week	P>0.05 **Not significant**
Age with Students' Motivation and Engagement	r=.257	Week	P<0.01 **Highly Significant**

The Karl Pearson Coefficient of correlation statistical test table 3 illustrates that the age of the respondents and Students' Motivation and Engagement have a high level of statistically significant linear relationship (p<0.01) and the direction of relationship is positive The table 2 further illustrates that the age of the respondents have no statistically significant linear relationship (p>0.05)with both perception toward E-learning as well as E-learning experiences.

Table 4: Mean Difference Between Gender Of The Respondens With Regard To Students' Perception Towards E-Learning, Online Learning Experience And Students' Motivation And Engagement

Variables	Type of the respondents	N	Mean	Std. Deviation	Statistical inference
Students' perception toward E-learning	Male	51	58.55	7.923	t=.005 df=93.631 P>0.05 **Not significant**
	Female	50	58.54	9.908	
Online Learning Experience	Male	51	82.35	15.956	t=2.009 df=98.967 P<0.05 **Significant**
	Female	50	75.98	15.926	
Students' Motivation and Engagement	Male	51	184.78	27.771	t=1.634 df=93.183 P>0.05 **Not significant**
	Female	50	174.48	35.113	

The independent sample 't' statistical test table-4 demonstrates that male respondents had higher mean(82.35)score in Online Learning Experience when compared to the mean score(75.98) of female respondents who are female and was found to be having a statistically significant difference[$t_{98.967}$=.2.009, p<0.05] between gender of the respondents and Online Learning Experience. Male Respondents had slightly higher mean(58.55)score in Students' Perception Towards E-Learning when compared to the mean score(58.54) of female respondents and was found to be having no statistically significant difference[$t_{98.967}$=.005, p>0.05]. Also male respondents had slightly higher mean(184.78)score in Students' Motivation and Engagement scale when compared to the mean score(174.48) of female respondents and was found to be having no statistically significant difference[$t_{93.183}$=1.634, p>0.05].

Discussion

While analyzing the level of Students' Perception Towards E-Learning, Online Learning Experience and student's motivation and engagement (Table-1) , it was observed that, slightly more than half (51.5 percent) of the respondents are having low level of Students' Perception Towards E-Learning and the remaining (48.5 percent) of the respondents are having high level of Students' Perception Towards E-Learning. .This demonstrates that nearly half of the students did not find online teaching as engaging, enjoyable and productive.These findings are in line with the earlier research which reported that pupils' self-reported concentration, engagement, and ability to learn were significantly lower during online learning (watler et al, 2022).. The results also supplement the existing literature which reports that online education is challenging for learners and can impact their learning process (Friedman, 2020). The results of the present study also complements the finding of research conducted on parental perspectives that reported poor pupils' engagement and self-worth during online learning (Garbe et al., 2020). However there are few researchers who have reported contrasting findings. Zheng et al (2021), in his study had reported that most of the online courses were well accepted by the students, and majority (80 %) of them wanted to continue with online instruction. However these findings could vary among different regions as well as various academic streams. Students pursuing academic streams which require relatively more practical oriented inputs would be benefited from regular class room teachings and demonstrations. Where as students of other streams can benefit from online teaching due to the reduction in travel time and expenditure, ease in accessibility,comfortable home environment, convenience and reduced energy expenditure.

Less than three fourth (64.6 percent)of the respondents have reported low level of Online Learning Experience and slightly more than one third (35.6 percent) of the respondents have reported high level of Online learning Experience. The results supplement the findings of the study by walters T et al (2022) which reported that students learning experiences consisting of concentration, engagement, ability to learn, and self-worth from learning were significantly lower for online learning when compared to the regular classroom learning. However there are few researchers who have reported contrasting findings. Zheng et al (2021), in his study had reported that most of the online courses were well accepted by the students, and majority (80 %) of them wanted to continue with online instruction. However these findings could vary among different regions as well as various academic streams. Students pursuing academic streams which require relatively more practical oriented inputs would be benefited from regular class room teachings and demonstrations. Where as students of other streams can benefit from online teaching due to the reduction in travel time and expenditure, ease in accessibility,comfortable home environment, convenience and reduced energy expenditure.

The study (Table 1) also demonstrates that more than half (56.4 percent) of the respondents have reported low level of students' Motivation and Engagement and more than one third (43.6 percent) of the respondents reported high level of students' Motivation and Engagement. Such low levels of perceptions towards e- learning , online learning experiences and Student's motivation & Engagement levels reported by the students could be attributed to the fact that students who were used to regular class room teaching had been enjoying constant social contact with peer groups and teachers as well as timely and immediate feedback which were relatively less in the online mode of teaching. Further the regular class room has a rigid structure and scheduling with reference to classes and it usually happens in an academic environment where all the essentials are made available and the student is free from other distracting forces. This is in contrast to online model, where the control over varied elements of teaching learning process is relatively plastic in nature. Further in online mode, there are individual variations and large looming uncertainties with reference to the availability of internet connections, adequate bandwidth, power supply, devices such as laptop etc, comfortable searing arrangement, calm and least distractive environment. These could be the reasons for low level of perception, experience, motivation and engagement in online learning reported by students of the current study.A similar national wide cross sectional study on medical students at United kingdom by Dost.s et al (2020).reported that family distractions, Internet connection, timing of tutorials, anxiety and lack of space as barriers to effective online learning. Experiencing a lack of motivation, difficulty concentrating and asking questions and a lack of contact with colleagues are also found to be the additional limitations. These findings highlight the necessity for enhanced focus on addressing such issues so as to improve student's online learning.

The present study (**table 2**) further explains that Students' perception toward E-learning and Online Learning Experience have a high level of statistically significant positive linear relationship (p<0.01) with approximately weak magnitude and strength of relationship (r=277) The table also illustrates that the Students' perception toward E-learning and Students' Motivation and Engagement also have a high level of statistically significant positive linear relationship (p<0.01) and Engagement) with weak magnitude and strength of relationship[r=.380]. . Further the Online Learning Experience and Students' Motivation and Engagement have a high level of statistically significant positive linear relationship (p<0.01) with moderate magnitude and

strength of relationship [r=.417] between Online Learning Experience and Students' Motivation and Engagement.

Similar findings were reported in the regression analyses by Zheng et al (2021) which revealed that students' perceived engagement with faculty and classmates predicted their perceived effectiveness of the online course. This emphasizes the importance of effective planning, structured design and implementation of online classes so as to promote sustaining motivation levels and effective student engagement.

A Recent study (Siah C.R et al (2022) on online learning revealed five important themes that need to be analysed in depth: lack of motivation; limited teamwork; missed learning opportunities; decreased interactions; and differences between online and face-to-face learning.Though recent Literature recommends for Online-tutorials as a feasible pedagogical approach, they also warn that motivation to learn, teamwork and quality of discussion may be compromised due to the lack of socialization and interactions between students and tutors. Literatre (kern et al 2022) also report screen fatigue, physical isolation from peers, and poor internet connection as the Commonly perceived barriers.

The current study further (**table 3**) illustrates that the age of the respondents and Students' Motivation and Engagement have a high level of statistically significant positive linear relationship ($p < 0.01$) and magnitude and strength of relationship is approximately weak [r=-.257]. However the age of the respondents and Students' perception toward E-learning as well as Online Learning Experience have no statistically significant linear relationship ($p > 0.05$).

The study also (table-4) demonstrates that male respondents had higher mean(82.35)score in Online Learning Experience when compared to the mean score(75.98) of female respondents which was found to be statistically significant difference[$t_{98.967}$=.2.009, $p < 0.05$]. It has been inferred that respondents who are male have reported higher Online Learning Experience. The above table also demonstrates that male respondents had slightly higher mean(58.55)score in Students' Perception Towards E-Learning when compared to the mean score(58.54) of female respondents who are female, which was found to be not statistically significant difference[$t_{98.967}$=.005, $p > 0.05$] . It has been inferred that respondents who are male have reported a slightly higher Students' Perception towards E-Learning. Similar findings were reported by SIminds T.A et al (2014) where in a statistically significant relationship between student age and student preference for certain types of online learning activities was found.

Male respondents had slightly higher mean(184.78)score in Students' Motivation and Engagement scale when compared to the mean score(174.48) of female respondents who are female and was found to be having no statistically significant difference[$t_{93.183}$=1.634, $p > 0.05$] between gender of the respondents and Students' Motivation and Engagement. It has been inferred that respondents who are male have reported higher Students' Motivation and Engagement**.**

Numerous Studies in the past have explored the impact of gender (e.g. Boyte-Eckis et al., 2018; Cai et al., 2017) on online learning outcomes and the reports are controversial. Some studies reported that females achieve better learning outcomes than males because they were more persistent and committed than males (Richardson & Woodley, 2003). Females had better self-regulation than males, which also led to their significantly more positive online learning outcomes than males (Alghamdi et al., 2020). However, no significant gender differences were reported in leaning outcomes since males were more stable in attitudes and females performed well in engagement (Nistor, 2013). There were also no significant gender differences in the learning satisfaction levels among the online millennial learners (Harvey et al., 2017).Rationales for inconsistent findings in gender differences may not be limited to the above and there is a need for more in-depth research into this field in future.

To conclude , online learning has both its own merits and demerits. For improving the e-learning model, there is a need to fine tune the existing process of teaching learning,keeping in mind the level, age, stream of education, teaching learning environment and infrastructure. Moving forward, the development of effective online courses and research-based guidelines for e-learning is desirable in order to establish e learning as an adjunct model and to improve the educational landscape as well as to prepare students for competent services in contemporary digital world.

Recommendations For Future Research
The study can be replicated on a larger sample size for better generalization. Future studies can focus on learners across different geographical and socioeconomic regions . Future studies can also attempt to understand the

students based on their stage of learning viz primary,high school ,higher secondary and college levels. Even among college levels, different streams of education can be analyzed as each stream has its own requirements in terms of teaching & learning, practical exposure etc. Further in depth analysis on the impact of various demographic characteristics on the e learning model at Pan India level with larger sample size can help in having better idea of the challenges inherent in the e learning model. This can also help in designing appropriate learning courses in online mode and effective e-teaching learning methods.

Conclusion

This descriptive study reported that students have marginally low levels of perception towards e-learning , online learning experience and student motivation and engagement. The study further reported that statistically significant correlation found among one another namely student's perception towards e learning, online learning experience , student's motivation and engagement. The study also reported significant relationship between age and motivation & engagement levels of students as well as significant difference in online learning experience with reference to gender.

Based on the findings of the study, it is concluded that online learning can be an appropriate model with its own merits and demerits. In order to improve the students perception, experience, motivation and engagement in online, there is a need for fine tuning the existing e learning teaching learning mechanism. More structured teaching design, human resources trained in online mode of teaching, appropriate student orientation, provision of needful technological support to students, upliftment of the organizational technological infrastructure , enhanced reflection & self evaluation mechanisms for all the stake holders, an appropriate and fair monitoring-feedback system are the need of the hour for the betterment of the e-learning model. Notwithstanding, with needful incorporation, e learning can be an adjunct model for the current educational system for creating a more robust and adaptable student's community and also to reach out to more larger learner population .

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A DEEP LEARNING-BASED APPROACH TO DETECTION OF SPINAL DEFORMITIES

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ABSTRACT
As spinal deformities reach advanced levels, they reduce the patient's quality of life and make diagnosis and treatment difficult. Therefore, early diagnosis is very important in order to stop the progression of the deformity and start the treatment process on time. The diagnostic procedure for deformities is based on manual measurements made by specialist doctors on medical images. Manual measurements are error-prone, time-consuming and they rely on subjective opinion. In this study, a deep learning-based automatic diagnosis method is presented to eliminate these disadvantages in the diagnosis of spinal deformities.
In the light of literature research, it has been observed that deep learning-based convolutional neural networks produce high-accuracy results in image processing and segmentation processes. In this study, the X-ray image classification performances of ResNet and GoogleNet architectures, which are convolutional neural network architectures reported to have high accuracy and performance, will be compared in terms of accuracy, sensitivity, precision, F1 score, specificity, training and testing times.
As a result of the experiments conducted within the scope of this study, it was seen that ResNet showed superior performance than GoogleNet in terms of accuracy, precision, F1 score, specificity and sensitivity, and when a comparison was made in terms of training and testing times, it was seen that GoogleNet processed faster than ResNet.
Keywords: Scoliosis, Spondylolisthesis, CNN, GoogleNet, ResNet

1. Introduction

The spine is a multi-jointed bony structure that extends between the head and pelvis, supports the trunk during daily activity and standing, contains the most important component of the central nervous system, and whose primary function is to protect the spinal cord from external factors [1]. The spine also maintains mechanical balance in order to adapt to gravitational stress, has a straight form in the coronal plane and an S-form in the sagittal plane. For the sagittal plane, the normal boundaries of the spine are determined by the lumbar lordosis and thoracic kyphosis angles [2]. Abnormal changes that occur when the spinal alignment goes beyond these defined normal limits are called spinal deformities. While the spine, which should have a straight form in the coronal plan, angles more than 10 degrees to the right, left, or both right and left, is called scoliosis, while in the sagittal plane, the lumbar lordosis and thoracic kyphosis angles are larger than they should be, called hyperkyphosis and hyperlordosis. In addition, spondylolisthesis, another deformity that occurs in the sagittal plane, is defined as the sliding of adjacent vertebrae over each other, creating the appearance of a staircase [3], [4], [5], [6].

Although spinal deformities are generally idiopathic, they can also occur as a result of various traumas or as a result of aging. When deformities reach advanced levels, they reduce the patient's quality of life and make diagnosis and treatment difficult. Therefore, early diagnosis is very important to stop the progression of the deformity and start the treatment process on time [2]. The diagnostic procedure for deformities is based on manual measurements made by specialist doctors on medical images. Manual measurements are error-prone, time-consuming and they rely on subjective opinion. In this study, a deep learning-based automatic diagnosis method is presented to eliminate these disadvantages in diagnosing spinal deformities. The aim of shortening the diagnosis and treatment processes with automatic deformity diagnosis method is to reduce errors, optimize hospital costs and develop an objective diagnostic method.

In studies conducted for the purpose of diagnosis from deep learning-based medical images, convolutional neural networks are used as a popular and reliable method and provide successful performance results. Fraiwan M. and his colleagues compared the classification performances of the convolutional neural network architectures they

used in their deep transfer learning-based studies for the automatic diagnosis of scoliosis and spondylolisthesis. They reported that they achieved the highest accuracy values with the DensNet-201 architecture [7]. In studies on deep learning-based spondylolisthesis diagnosis, Trinh G. M. and his colleagues compared the performance of convolutional neural network architectures LumbarNet and UNet and reported that LumbarNet had higher accuracy [8], while Zhang J. and his colleagues used RCNN and RetinaNet architectures and reported that RCNN had higher performance [9]. In their study on the diagnosis of spondylolisthesis, Varçın F. and his colleagues compared the performances of AlexNet and GoogleNet architectures and reported that GoogleNet had higher classification accuracy [10]. In studies on automatic scoliosis angle measurement, Alharbi R. and his colleagues used ResNet, one of the convolutional neural network architectures, and reported that they achieved high accuracy [11]. Tu Y. and his colleagues used DU-Net deep architecture for automatic Cobb angle measurement and compared the results with the measurements of expert doctors. They reported that the automatic system they designed gave similar results to specialist doctor measurements [12]. In the light of literature research, it has been observed that deep learning-based convolutional neural networks produce high-accuracy results in image processing and segmentation processes. In this study, the X-ray image classification performances of ResNet and GoogleNet architectures, which are convolutional neural network architectures reported to have high accuracy and performance, will be compared.

2. Material and Method

2.1 Deep Learning

Deep learning is a representation-learning technique that has representations at many levels, obtained by combining non-linear and simple layers that transform each representation into a representation at a higher, more abstract level for operations such as classification and feature extraction. Deep learning architectures, which have a structure based on learning many features of the data simultaneously, highlight the important and distinctive parts and suppress the unimportant parts. Inputs from the lower layer determine the features in the upper layer and thus a hierarchical learning representation is formed [13]. In deep learning, which is based on learning from the representation of data, when the image comes to the first layer as input as a series of pixel values, the presence or absence of features in certain positions and directions in the image is represented, while various edges and patterns are detected in the second layer. The patterns detected here are brought together in larger combinations in the third layer, resembling parts of familiar objects, and subsequent layers perceive the object as combinations of these parts. The learning algorithms required for feature extraction are not designed by engineers; deep learning does this by itself learning from data with a general-purpose learning procedure [13]. Deep learning, which is increasingly gaining ground in the medical and health sector, has functions of analyzing medical images, making predictions about the course of diseases in cancer research and playing a guiding role in diagnosis and treatment processes[13].

2.2 Convolutional Neural Network (CNN)

Many deep learning architectures have been developed according to usage areas and requirements, different data properties and different layer types. Convolutional neural networks (CNN), the most commonly used deep learning-based technique in the field of image processing, are inspired by the animal vision system and work on the principle of filtering. CNNs, which have multi-layer feed-forward features, make classification by revealing the defining features of the image with the filters they use [14]. CNNs, which provide successful results in different fields such as audio processing, face recognition, biomedical fields and natural language processing in addition to image processing, include many convolution layers, fully connected layers, activation layers, pooling layers, classification layers and additional layers (Figure 2.1.).
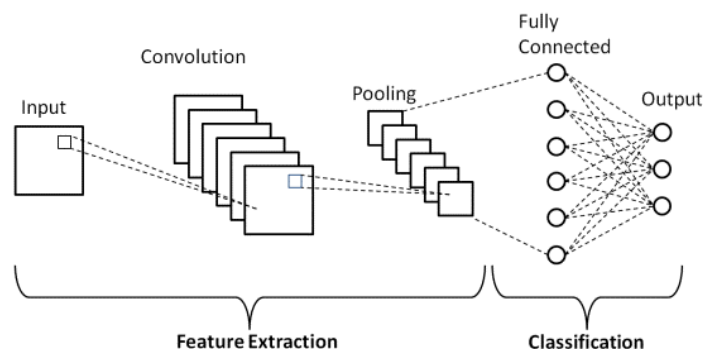
Figure 2.1. CNN architecture [15]

The input layer is the first layer of CNN where data is received in raw form. The size selection of the data received here is very important because the data size affects the memory status, processing and network performance [16].

Convolutional layers are the layers that form the basis of CNNs, where convolution operations are applied to the input images through filters. In the convolution process, a filter is passed over the image step by step, allowing patterns, edges, and features in the image to be detected. After the convolution processes, activation maps are created showing the regions where the features of each filter are discovered [13], [16].

The rectified linear unit layer (ReLU) works as the rectifier unit and is located after the convolution layer. This layer, which accelerates the learning of the network, is also called the activation layer and transforms the network, which entered a linear structure after convolution operations, into a non-linear form again [16].

Pooling layers reduce the size of the input to be sent to the next convolution layer while ensuring that the features learned by the network remain constant even in the face of small changes. Certain filters can be applied to the data at this layer, and the presence of this layer is optional in CNN architectures [16].

Fully connected layers are connected to all areas of the previous layer within the architecture, and the features learned in the convolution layer are integrated by this layer and regression or classification operations are performed [16]. The results produced after the classification process are sent to the output layer and the number of outputs from the output layer depends on the number of objects to be classified.

Transfer learning means that a model previously trained for a different task is later reused for a secondary task. Thanks to transfer learning, instead of training a model from scratch, new models are created with new data sets using the information in the source database [7], [17].

2.3 CNN Architectures Used in the Study

GoogleNet consists of 22 layers and is the 2014 winner of the ImageNet competition. The feature that distinguishes GoogleNet, designed by Szegedy and his friends, from others is the Inception module (Figure 2.2.), which helps keep costs low while increasing the depth and breadth of the network. GoogleNet architecture, parallel config.ures many filters of different sizes and thanks to its parallel modules it optimized the memory cost and prevented the system from memorizing [18].
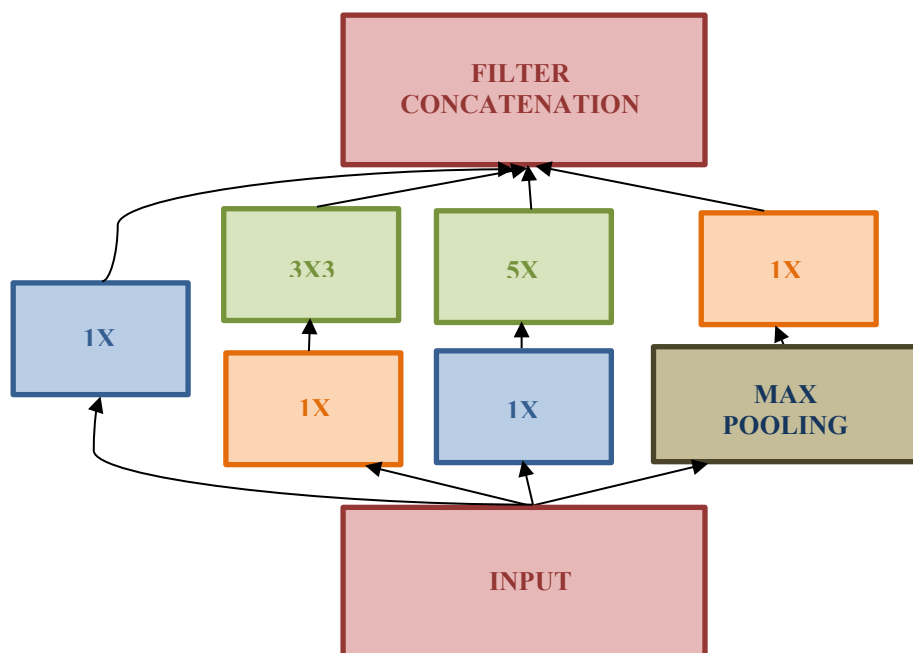

Figure 2.2. Inception module

ResNet consists of 152 layers and is the 2015 winner of the ImageNet competition. The feature that distinguishes ResNet, designed by Zhang and his colleagues, from other architectures is the Residual blocks (Figure 2.3.). Increasing the number of layers in the network causes the efficiency of the network to reach saturation, but then causes a rapid decline. Zhang and his colleagues, who prevented this decrease thanks to the shortcuts they added with the residual block, demonstrated superior performance with an error rate of 3.57% [19].
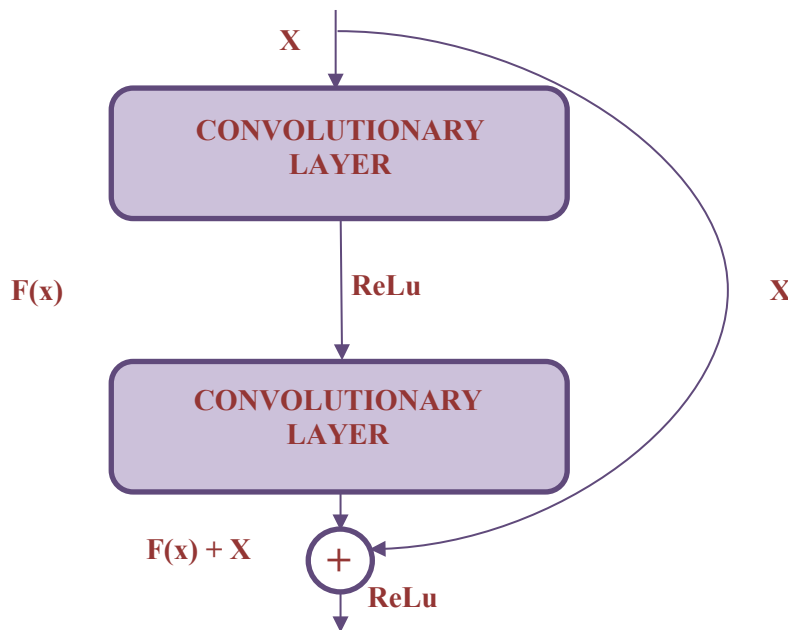
Figure 2.3. Residual block

2.4 Data Set

In this study, a dataset obtained from open sources via Mendeley Data was used, and X-ray images were collected at King Abdullah University Hospital in Jordan [7]. X-ray images of 338 people, 240 women and 98 men, were divided into three groups: 79 with spondylolisthesis, 188 with scoliosis and 71 healthy, and were used in the experimental stages of this study.
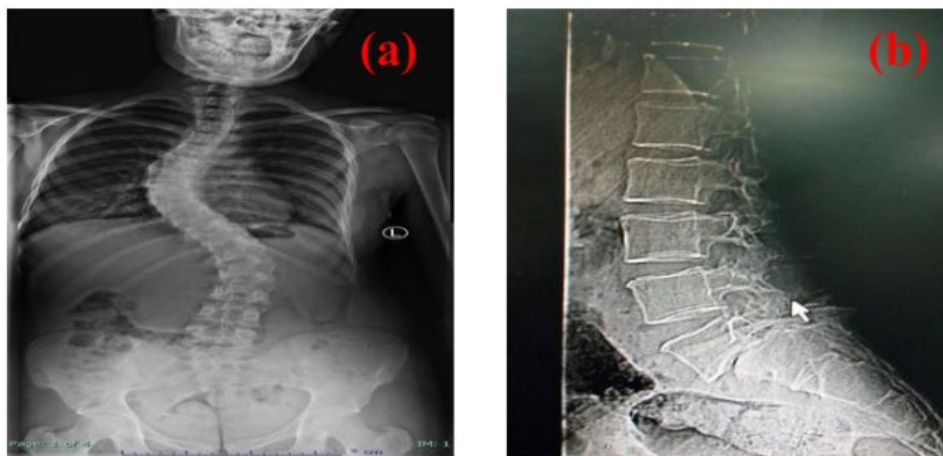
Figure 2.4. X-ray images in dataset **(a)** scoliosis, **(b)** spondylolisthesis

2.5 Experimental Studies

In this study, in which we designed an automatic spinal deformity diagnosis method with deep transfer learning techniques, ResNet and GoogleNet architectures were compared in terms of their performance in classifying X-ray images.

While training and testing the transfer learning-based CNN models, a computer with 8 GB RAM, NVIDIA ® GEFORCE 940MX, Intel ® Core ™ i5-7200U CPU was used and Python programming language was chosen.

At the beginning of the training, the images in the data set were loaded with their own class labels (scol, spond, normal). The data set is divided into 80% training and 20% testing to be used in the training and testing stages. Each architecture was created in its own structural form and initialized to pre-trained intervals in the ImageNet database. After adding the necessary layers for training and validation, the models were trained and performance evaluation metrics were recorded. The training process was graphed and classification reports were created.

3. Results

In this study for the automatic diagnosis of spinal deformities, the classification performances of GoogleNet and ResNet architectures trained with the deep transfer learning approach were compared in terms of accuracy, sensitivity, sensitivity, specificity, F1 score and the result graphs were drawn. When the classification performances of the architectures are compared in terms of accuracy, the ResNet architecture stands out with an accuracy of 0.92 and surpasses GoogleNet in terms of sensitivity with 0.91. According to Figure 3.1, ResNet surpassed GoogleNet in terms of specificity, F1 score and precision values and showed a superior classification performance. Based on these results, it is possible to say that ResNet is superior in terms of classification metrics.
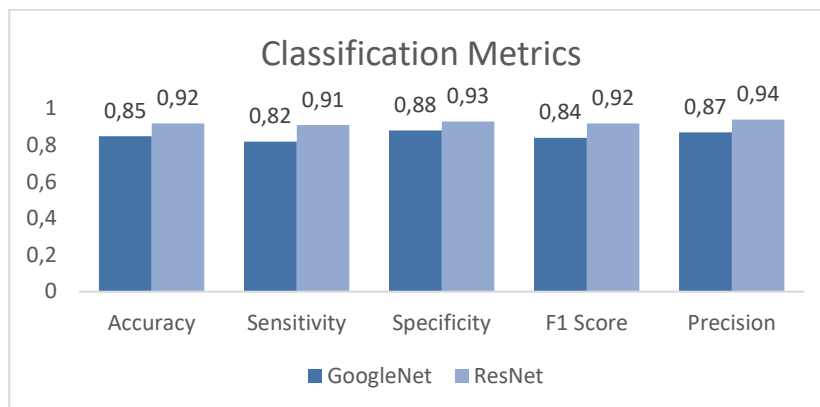
Figure 3.1. Classification Metrics for CNN Architectures

When compared in terms of training and testing times, it was seen that ResNet was behind GoogleNet's 30-second training time with 45 seconds, and GoogleNet gave faster results than ResNet with 0.5 seconds to a 0.6-second test time. According to these results, it is possible to say that GoogleNet is more successful in terms of training and testing times.

4. Conclusion

Artificial intelligence-based techniques are increasing their usage areas day by day and providing successful results. Artificial intelligence, which is expanding its use and application areas in the healthcare sector, has started to take an active role in diagnosis and treatment processes and offers the advantages of optimizing these processes.

In this study, when the classification performances of GoogleNet and ResNet, which are popular convolutional neural networks architectures, were compared in terms of accuracy, sensitivity, precision, F1 score and specificity values, it was concluded that ResNet showed superior performance than GoogleNet. On the other hand, when a comparison was made in terms of training and testing times, it was seen that GoogleNet processed faster. In light of these results, the performance of deep learning-based CNN architectures in classifying X-ray images was found to be successful and it became possible to say that they can be used in automatic diagnosis systems for spinal deformities.

In order for deep learning-based automatic diagnosis systems to operate with higher performance, the scope of this study can be expanded by using larger data sets, images of different diseases and different CNN architectures. Architectures supported by different image types and different parameters can have higher processing capabilities by increasing the number of cycles. In line with the optimized data, higher performance CNN architectures can be designed and higher accuracy automatic diagnosis systems can be developed.

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